

## Does Negligence of Ureteral Double J Stent Affect Patients' Quality of Life? (Comparative Study)

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### Abstract:

**Background:** Ureteral double J stents are commonly used tools in urology for the management of various urological conditions. However, it is not devoid of morbidity. **Aim:** To assess the effect of neglected ureteral double J stent on the patients' quality of life and conducting a comparative study. **Research design:** Comparative research design was utilized to conduct this study. **Setting:** Urology operation at Assiut University Urology and Nephrology Hospital. **Sample:** A convenience sample of "70" patients were undergoing ureteral double J stent removal, their ages from "18 - 65" years. Patient divided into 2 group: non-neglected group (less than 120 days) included 40 patients and neglected group (more than 120 days) included 30 patients. **Tools:** Tool (I) Patient assessment sheet, Tool (II) Ureteral stent related symptoms and Tool (III) King's health questionnaire. **Results:** Median age of patients was (39.50) years. Hematuria, urinary tract infection, and stone formation were encountered in 56.7%, 50%, and 63.3% of neglected patients, versus 27.5%, 20%, and 2.5% of non-neglected patients, respectively. Neglected patients have a lower overall quality of life than non-neglected patients. **Conclusion:** Negligence of ureteral double J stent, accompanied by acute side effects, affected and reduced the patient's quality of life. **Recommendations:** Educational booklet should be available to all patients with ureteral double J stent.

**Keywords:** Negligence, patients' quality of life & ureteral double J stent.

### Introduction

Ureteral stents are a very powerful device in everyday practice for urologists worldwide. (Herout et al., 2024). The DJ stent is a self-retaining ureteral catheter inserted either retrograde or antegrade to preserve ureteral patency. The device employs a double-coil configuration at its proximal and distal ends, which anchor it securely within the renal pelvis or upper calyx and the urinary bladder (Reddy et al., 2023).

It preserve the ureter patent, ensure the elimination of any edema, and allow for healing of minor injury. Hence, it is viewed as an effective way of postoperative management in patients with ureteric stones, ureteric stricture, retroperitoneal tumors, ureteropelvic junction blockage, or any iatrogenic ureteric injury (Hatroom & Break, 2022).

A stent is usually said to be neglected if the indwelling period is more than 3–6 months, which was not planned by the treating doctor. A neglected DJ stent can lead to a cascade of complications, ranging from hematuria and stent-related issues like occlusion, fragmentation, and migration to more severe conditions such as stone formation, recurrent urinary tract infections, urinary tract obstruction, and

ultimately, kidney failure and mortality (Ram et al., 2023).

Nursing care for patients with ureteral stents necessitates a nurse with evaluative skills to assist the patient to understand the various issues that may arise. Nursing knowledge is integrated before and during ureteral stent placement to optimize short- and long-term outcomes, ensure a safe and successful surgery, and reduce complications (Sheta et al., 2023).

### Significance of the Study:

From the researcher's experience during 2 years training period at Assiut University Urology and Nephrology Hospital, it had been observed that there was an increase in the number of patients with neglected ureteral double J stents accompanied by complications. Because there were a limited number of studies on this topic, it was necessary to extend the scope of the literature search. Total patients admitted to the hospital in 2022 for DJS removal were 180 (Assiut University Urology and Nephrology Hospital record, 2022). So, this study was conducted in an attempt to assess and compare quality of life among patients with ureteral double J stents, either neglected or non-neglected.

**Aim of study:**

To assess the effect of neglected ureteral double J stent on the patients' quality of life and conducting a comparative study.

**Research question:**

Is there a difference in quality of life among patients with neglected ureteral double J stent and patients with non-neglected ureteral double J stent?

**Patients and Methods:****Research design:**

Comparative design was utilized in this study.

**Setting:**

This study was conducted in urology operation at Assiut University Urology and Nephrology Hospital.

**Sample:**

A convenience sample of "70" patients were undergoing ureteral double J stent removal from both genders with age grouped ranged from 18-65 years in the period of six months from October 2023 to March 2024 at Assiut University Urology and Nephrology Hospital.

**Exclusion criteria:**

Urological patients with c-flex, percuflex or silicone ureteral double J stent.

**Study tools:**

The following tools were utilized to conduct this study:

**Tool (I): Patient assessment sheet:**

This tool was developed by the researcher based on the literature review (Abdelmowla et al., 2022) to assess patient's condition. It consisted of three parts:

**Part (1): Demographic data sheet:** such as (age, gender, education, marital status, residence and occupation)

**Part (2): Medical data:** (method of DJS insertion, stones present before DJ insertion, stone burden (mm), indications of DJ insertion in details, duration of ureteral double J stent in days, ureteral double J stent placement and causes of negligence)

**Part (3): Complications of ureteral double J stent** (complications before double J stent removal, operation and operation time in minutes)

**Tool (II): Ureteral stent related symptoms:**

Derived from Ureteral Stent Symptom Questionnaire (USSQ) used to assess ureteral stent symptom. Developed by (Joshi et al., 2003) Include (weak stream, intermittent, incomplete empty, straining to start, frequency, urgency, nocturia, dysuria, hematuria, flank pain, bladder pain, lumber pain)

**Tool (III): King's health questionnaire (KHQ):** It developed by Hebbbar et al., (2015) to assess health related quality of life. It has "3" parts consisting of "21" items, subdivided into 9 domains in addition to symptom severity scale. The first part composed of general health perception domain and incontinence

impact domain, each domain composed of "1" item. The second part composed of the following domains: role physical "2" items, social limitations "2" items, personal relationships "3" items, emotions "3" items, sleep/energy "2" items and severity measures "4" items. The third part (the symptom severity scale) is single item and composed of "10" responses in relation to nocturia, urgency, frequency, stress incontinence, urge incontinence, nocturnal enuresis, infections, intercourse incontinence, pain and postvoid dribble. The responses have "4" point rating system. The 9 subscales (domains) scored from "0" = best to "100" = worst. The responses of symptom severity scale have "3" point rating system. It scored from "0" = best to "30" = worst. Decreases in domain scores of the KHQ indicate improvement in quality of life.

**Procedure:** This study was carried out in two phases:

**Preparatory phase:****Tools development:**

Data collection tools were developed through a comprehensive review of current and past local and international literature, including books, articles, periodicals, and references.

**Content validity and reliability:**

**Patient assessment (Tool I):** Was evaluated and approved by "5" experts from Assiut University (3 medical-surgical nursing staff and 2 urologists) to confirm its validity. Minor alterations were made to the study's content to ensure its applicability and clarity.

**Ureteral stent related symptoms (Tool II):** Was found to have good convergent validity and reliability. Cronbach Alpha was 0.94 suggesting excellent internal consistency (Joshi et al., 2003)

**The KHQ (Tool III):** The King's Health Questionnaire (KHQ) demonstrated strong face validity, with most respondents reporting it to be comprehensive and a suitable measure. The questionnaire's internal consistency, as measured by Cronbach's alpha, was found to be excellent at 0.93 (Kieres et al., 2021)

**Pilot study:**

A pilot study involving 10% of the study subjects (n = 7) was conducted to assess the applicability and clarity of the research tools. Following data analysis, no modifications were made, and the pilot group was subsequently integrated into the main study subjects.

**Ethical considerations:**

Ethical approval for this study was obtained from the Faculty of Nursing Ethics Committee on August 20, 2023 (approval number 1120240659). Formal permission to collect data was granted by the manager of Assiut University Urology and Nephrology Hospital. Following a detailed explanation of the study's objectives, oral informed consent was

obtained from participating patients or their legal guardians. The study adhered to rigorous ethical standards in clinical research, ensuring participant safety, confidentiality, and anonymity. Participants were informed of their right to withdraw from the study at any time without providing a reason.

**Development of the interview questionnaire for patients:**

The questionnaire was developed in English to collect data on demographics, medical data, complications, ureteral stent-related symptoms, and quality of life.

**Implementation phase:**

- Upon receiving the necessary ethical approval, the researcher proceeded with data collection.
- Data were collected over two periods with each patient who undergoes ureteral stent removal in urology operation from Sunday to Thursday every week, at any time from eight o'clock in the morning until two in the afternoon. The first period included a session with the patient in the morning before the operation. The second period included attending the operation with the patient to collect data regarding complications.
- During the session, the researcher introduced herself, explained the purpose of the study, and obtained the patient's verbal consent to participate in the study on a voluntary basis.
- Each participant in the study (70 patients) was questioned individually to get data that was established using an interview questionnaire, and

the researcher obtained the data. The session lasted about 30 to 40 minutes.

- The data collection phase spanned from October 2023 to March 2024, encompassing a total of six months.

**Statistical analysis:**

After obtaining patients 'data using the study tools, the included patients were divided into two groups: the non-neglected group (less than 120 days) included 40 patients, and the neglected group (more than 120 days) included 30 patients. The two groups compared in relation to demographic, medical data, complications, stent related symptoms and quality of life. The data were analyzed using IBM SPSS Statistics version 26. Quantitative variables were presented as median (range) and analyzed by the Mann-Whitney U test, while categorical variables were presented as frequency (%) and analyzed by the Fisher's exact test. Comparisons between groups regarding symptoms, complications of ureteral DJ stent, and King's Health Questionnaire domains were conducted using Fisher's exact test and the Mann-Whitney U test, respectively. The correlation between total King's Health Questionnaire scores and duration of ureteral DJ stent was assessed using Spearman's correlation coefficient. Statistical significance was set at  $p < 0.05$ .

**Results:**

**Table (1): Comparison between the two groups regarding demographic data (n=70)**

Variables	All patients N = 70	Non-Neglected patients N = 40	Neglected patients N =30	P value
<b>Age in years</b>	39.50 (18-65)	44.50 (18-65)	37 (20-60)	.019*
<b>Gender</b>				.469
-Male	37 (52.9 %)	23 (57.5 %)	14 (46.7 %)	
-Female	33 (47.1 %)	17 (42.5 %)	16 (53.3 %)	
<b>Education</b>				.808
-Educated	30 (42.9 %)	18 (45.0 %)	12 (40.0 %)	
-Uneducated	40 (57.1 %)	22 (55.0 %)	18 (60.0 %)	
<b>Marital status</b>				.661
-Single	9 (12.9 %)	4 (10.0 %)	5 (16.7 %)	
-Married	55 (78.6 %)	32 (80.0 %)	23 (76.7 %)	
-Divorced	2 (2.9 %)	2 (5.0 %)	0	
-Widow /widower	4 (5.7 %)	2 (5.0 %)	2 (6.7 %)	
<b>Residence</b>				1
-Urban	31 (44.3 %)	18 (45.0 %)	13 (43.3 %)	
-Rural	39 (55.7 %)	22 (55.0 %)	17 (56.7 %)	
<b>Occupation</b>				.578
-Employed	17 (24.3 %)	11 (27.5 %)	6 (20.0 %)	
-Unemployed	53 (75.7 %)	29 (72.5 %)	24 (80.0 %)	

Quantitative variables presented as median (range) and analyzed by Mann-Whitney U test, while categorical variables presented as frequency (percentage) and analyzed by Fisher's Exact Test.

\*Significant level at P value < 0.05

**Table (2): Comparison between the two groups regarding medical data (n=70)**

Medical data	All Patients N = 70	Non-Neglected patients N = 40	Neglected patients N =30	P value
<b>Method of double J stent insertion</b>				
-Endoscopic surgeries	63 (90 %)	35 (87.5%)	28 (39.3%)	.690
-Open surgeries	7 (10 %)	5 (12.5 %)	2 (6.7 %)	
<b>Stones present before DJS insertion</b>				
-Renal stones	6 (8.6%)	1 (2.5 %)	5 (16.7 %)	.077
-Ureteral stones	11 (15.7 %)	4 (10 %)	7 (23.3 %)	.186
<b>Stone burden (mm)</b>	10 (3-27.2)	8,200 (5.3-16.1)	11,100 (3-27.2)	1
<b>Duration of ureteral double J stent in days</b>	90 (30-425)	60 (30-105)	180 (130-425)	< 0.001*
<b>Ureteral double J stent placement</b>				
-Right	27 (38.6 %)	13 (32.5 %)	14 (46.7 %)	.357
-Left	38 (54.3 %)	23 (57.5 %)	15 (50 %)	
-Bilateral	5 (7.1 %)	4 (10 %)	1 (3.3 %)	

Quantitative variables presented as median (range) and analyzed by Mann-Whitney U test, while categorical variables presented as frequency (percentage) and analyzed by Fisher's Exact Test.

\* Highly significant at P value < 0.001

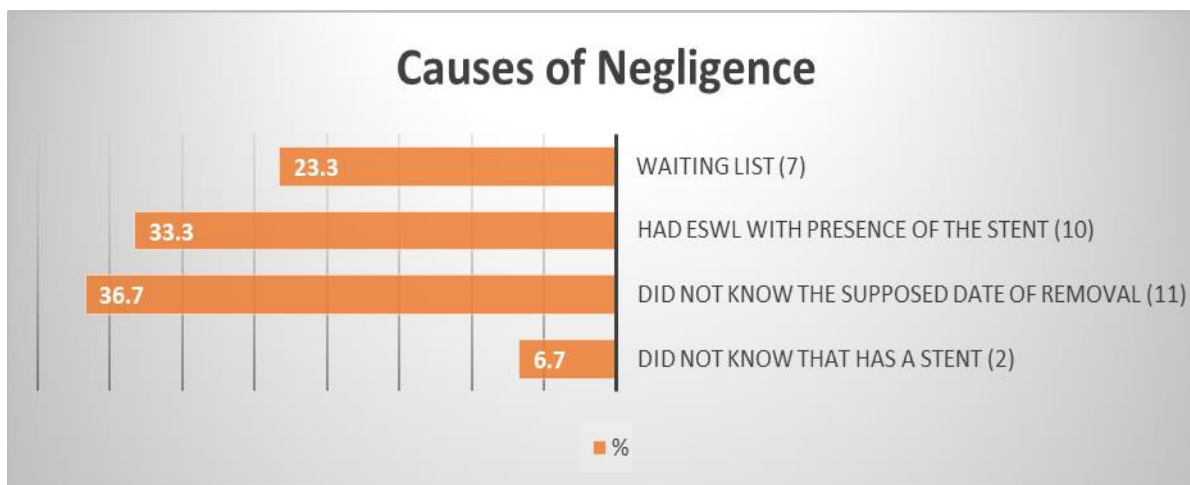
**Table (3): Distribution of patients regarding indications of DJ insertion in details (n=70)**

Indications	All Patients N = 70	Non-Neglected patients N = 40	Neglected patients N =30
<b>1-Obstructive anuria</b>	4 (5.7 %)	0	4 (13.3 %)
<b>2-Upper urinary tract reconstructive surgeries</b>			
Post-Pyeloplasty	3 (4.3 %)	2 (5 %)	1 (3.3 %)
ureteric reimplantation	1 (1.4 %)	0	1 (3.3 %)
<b>3-Endoscopic management of upper urinary tract stones</b>			
-Post-ureteroscopy	25 (35.7 %)	21 (52.5 %)	4 (13.3 %)
-Post-PCNL	23 (32.9 %)	13 (32.5 %)	10 (33.3 %)
-Pre- shockwave lithotripsy	10 (14.3 %)	0	10 (33.3 %)
-Open-Nephrolithotomy	3 (4.3 %)	3 (7.5 %)	0
-Post-RIRS	1 (1.4 %)	1 (2.5 %)	0

Data presented as frequency (percentage)

PCNL Percutaneous Nephrolithotomy

RIRS Retrograde Intrarenal Surgery



**Figure (1): Percentage distribution of the neglected patients according to causes of negligence.**

**Table (4): Comparison between the two groups regarding complications of ureteral double J stent and operation details of ureteral double J stent removal (n=70)**

Complications	All patients N = 70	Non-Neglected Patients N = 40	Neglected patients N =30	P value
<b>Before double J stent removal</b>				
-Urinary tract infection	23 (32.9 %)	8 (20 %)	15 (50 %)	.011*
-Stone formation	20 (28.6 %)	1 (2.5 %)	19 (63.3 %)	< 0.001**
-Stent fragmentation	1 (1.4 %)	0	1 (3.3 %)	.429
-Stent migration	1 (1.4 %)	0	1 (3.3 %)	.429
<b>Operation</b>				
-JJ removal only	52 (74.3 %)	34 (85.0 %)	18 (60 %)	.014*
-JJ removal + URS	14 (20%)	6 (15.0 %)	8 (26.7 %)	
-JJ removal + PNL	4 (5.7 %)	0	4 (13.3 %)	
<b>Operation time in minutes</b>	10 (3-120)	10 (3-120)	11 (4-120)	.231

Quantitative variables presented as median (range) and analyzed by Mann-Whitney U test, while categorical variables presented as frequency (percentage) and analyzed by Fisher's Exact Test.

\*Significant level at P value < 0.05

\*\* Highly significant at P value < 0.001

**Table (5): Comparison between the two groups regarding Ureteral stent related symptoms (n=70)**

Symptoms	All patients N = 70	Non-Neglected patients N = 40	Neglected patients N =30	P value
Weak stream	2 (2.9 %)	1 (2.5 %)	1 (3.3 %)	1
Intermittent	6 (8.6 %)	3 (7.5 %)	3 (10.0 %)	1
Incomplete empty	11 (15.7 %)	5 (12.5 %)	6 (20.0 %)	.511
Straining to start	21 (30.0 %)	10 (25.0 %)	11 (36.7 %)	.307
Frequency	64 (91.4 %)	35 (87.5 %)	29 (96.7 %)	.228
Urgency	56 (80.0 %)	30 (75.0 %)	26 (86.7 %)	.336
Nocturia	62 (88.6 %)	35 (87.5 %)	27 (90.0 %)	1
Dysuria	67 (95.7 %)	38 (95.0 %)	29 (96.7 %)	1
Hematuria	28 (40.0 %)	11 (27.5 %)	17 (56.7 %)	.026*
flank pain	60 (85.7 %)	33 (82.5 %)	27 (90.0 %)	.498
bladder pain	44 (62.9 %)	23 (57.5 %)	21 (70.0 %)	.326
lumber pain	28 (40.0 %)	15 (37.5 %)	13 (43.3 %)	.632

Data presented as frequency (percentage) and analyzed by Fisher's Exact Test

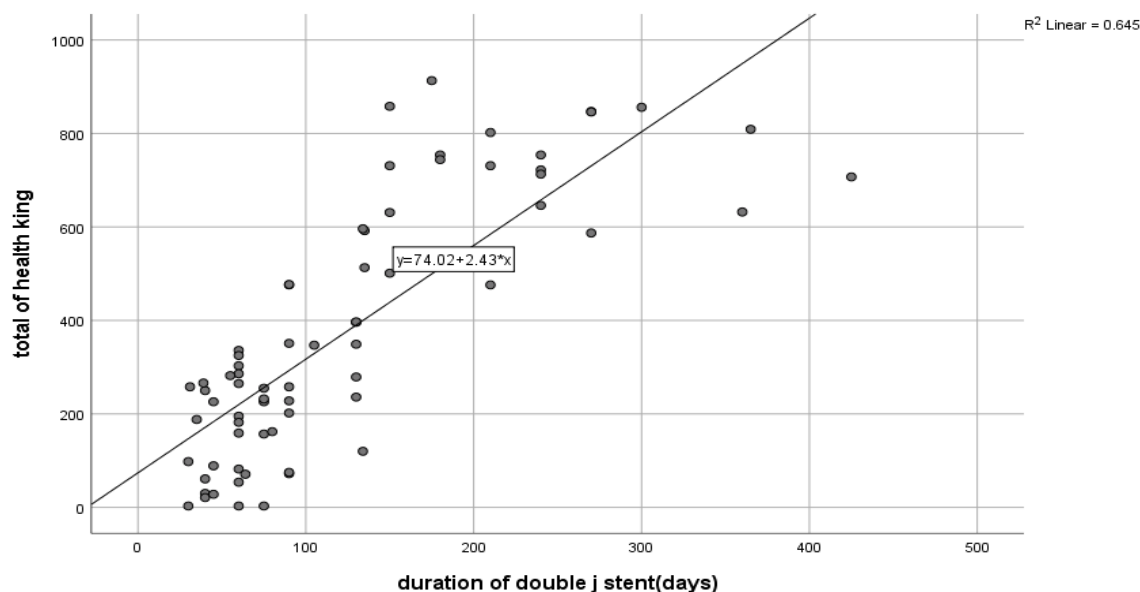
\*Significant level at P value < 0.05

**Table (6): Comparison between the two groups regarding the results of various domains included in King's health questionnaire (quality of life)**

Domain	All Patients N = 70	Non-Neglected patients N = 40	Neglected patients N =30	P value
<b>The first part</b>				
-General health perception	50 (0-100)	25 (0-75)	75(25-100)	< 0.001*
-Incontinence impact	33.30 (0-100)	33.30 (0-67)	83.30 (0-100)	< 0.001*
<b>The second part</b>				
-Role limitations	33.30 (0-100)	33.30 (0-67)	100 (33-100)	< 0.001*
-Physical limitations	33.30 (0-100)	33.30 (0-67)	100 (33-100)	< 0.001*
-Social limitations	27.75 (0-100)	11.10 (0-56)	66.70 (0-100)	< 0.001*
-Personal relationships	0 (0-100)	0 (0-33)	66.70 (0-100)	< 0.001*
-Emotions	22.20 (0-100)	11.10 (0-56)	66.70 (0-100)	< 0.001*
-Sleep/energy	33.30 (0-100)	33.30 (0-67)	100 (0-100)	< 0.001*
-Severity measures	16.70 (0-100)	12.50 (0-33)	33.30 (0-100)	< 0.001*
<b>The third part</b>				
-Symptom severity scale	8 (2-24)	4.50 (2-13)	16 (4-24)	< 0.001*

Data presented as median (range) of the scores and analyzed by Mann-Whitney U test.

\*Highly significant at P value < 0.001



$r = .803^{**}$  (P value < 0.001)

\* Analyzed by Spearman's Correlation

**Figure (2): Correlation between the total quality of life domains (KHQ) and duration of ureteral double J stent in days (n=70).**

**Table (1):** Illustrates that the median (range) age of patients is 39.50 (18–65) years. More than half of the patients are males (52.9%), uneducated (57.1%), and live in rural areas (55.7%). More than three-quarters of patients are married (78.6%) and unemployed (75.7%). Age is the only demographic variable to show a statistically significant difference between the two groups.

**Table (2):** Illustrates that the most common method for DJS insertion is endoscopic surgeries, which are carried out in the majority (87.5%) of non-neglected patients. Ureteral stones are most common in the urinary tract system before DJ insertion and are present in more than one-fifth (23.3%) of neglected patients. The median (range) stone burden is 10 (3–27.2) mm. More than half (57.5%) of non-neglected patients have a ureteral DJ stent in the left ureter, and the median (range) duration of the ureteral DJ stent is 90 (30–425) days. There is a highly statistically significant difference between the two groups regarding the duration of the ureteral DJ stent.

**Table (3):** Illustrates that the most frequent indications for ureteral DJ stent insertion are post-ureteroscopy and post-PCNL, which are indicated in more than half (52.5%) and less than one-third (32.5%) of non-neglected patients, respectively, while pre-shockwave lithotripsy is indicated in one-third (33.3%) of neglected patients, so all patients that have ureteral double J stents for obstructive anuria or pre-shockwave lithotripsy are in the neglected group.

**Figure (1):** Illustrates that the most common causes of ureteral double J stent negligence are that the patients do not know the supposed date of removal and have ESWL with presence of the stent, which is the cause in more than one third (36.7) and in one third (33.3) patients, respectively.

**Table (4):** Illustrates that the most common complications before DJ stent removal are urinary tract infection and stone formation, which are encountered in half (50%) and less than two thirds (63.3%) of neglected patients, respectively. also illustrates that the most common operation is JJ removal only, which is carried out in the majority (85.0%) of non-neglected patients, while more than one quarter (26.7%) of neglected patients require JJ removal and URS. As for JJ removal and PNL carried out in all neglected patients (13.3% less than one fifth). The median (range) operation time of the ureteral DJ stent removal is 10 (3–120) minutes. So a statistically significant difference is observed between the two groups regarding urinary tract infection, stone formation, and operation ( $p < 0.05$ ).

**Table (5):** Illustrates that all patients reported a variety of LUTs associated with ureteral DJ stents, with dysuria being the most prevalent symptom, experienced by a vast majority (95.7%) of patients. Hematuria is the only symptom that demonstrate a statistically significant difference between the two groups ( $p < 0.05$ ). It occurred in more than half (56.7%) of the neglected group patients versus more than one quarter (27.5%) of the non-neglected group.

**Table (6):** Illustrates that the patients' responses to King's health questionnaire display a highly statistically significant difference in quality of life between the two groups ( $p < 0.001$ ), indicating that neglected patients have a lower overall quality of life than non-neglected patients.

**Figure (2):** Illustrates that there is positive significant correlation between the total (KHQ) and duration of ureteral double J stent in days ( $r = 0.803$ ,  $P$  value  $< 0.001$ ).

### Discussion:

The use of double J stents has expanded in urological procedures with the passage of time. It helps in urinary elimination and ureter healing, and prevention of constriction of the ureter during the healing process. Although it has a lot of benefits, it causes severe symptoms and complications, especially with prolonged indwelling, causing burden for patients and also extra burden on limited healthcare resources and affecting quality of life (Rahman et al., 2023).

Regarding demographic data, the current study demonstrated that the age of studied patients ranged from eighteen to sixty-five years old. More than half of the patients were males, uneducated, and lived in rural areas. More than three-quarters of patients were married and unemployed.

These findings, accepted with the study of Mostafa et al. (2022), consisted of seventy patients who underwent DJ ureteric stents. The age of the patients ranged from eighteen to more than sixty years old. Nearly three-quarters of the patients were males, half were illiterate, and less than three-quarters lived in rural areas. The most were married, and more than two-fifths were unemployed.

From the researcher's perspective, this result might be attributable to greater male exposure to factors predisposing to stone formation. Sexual hormones, including androgens, have been implicated in the pathogenesis of renal calculi and may contribute to the observed gender disparity in stone formation rates. This matched with Hanan et al. (2022), who mentioned that males are more likely than females to suffer from renal stone disease because of the androgen hormones that predominate in men. It increases the formation of kidney crystals and oxalate excretion, while estrogen in females reduces the excretion of oxalate in the urine.

Age was the only demographic variable to show a statistically significant difference between the two groups. This matched with Connelly et al. (2022), who found that there was a significant difference between the average ages of those patients with a retained stent. From the researcher's perspective, this difference can be attributed to the family's interest in continuous follow-up for elderly members.

The present study illustrated that the most common method for DJS insertion was endoscopic surgeries, which were carried out in the majority of patients; non-neglected patients were the majority, versus more than one-third of neglected patients. This result was supported by results from a study of Ergün et al. (2022), who reported that double j stents were inserted by using the most prevalent endoscopic method, such as the ureterorenoscope and the cystoscope.

Regarding stones present before DJ insertion, the current study showed ureteral stones were most common in the urinary tract system before DJ insertion, which were present in more than one-fifth of neglected patients versus less than one-fifth of non-neglected patients. The stone's median burden was 10 mm.

This finding was supported by the results of a study done by Polat et al. (2024), who declared that ureteral stones were most common in more than half of patients before double-j stent insertion, so it was indicated to insert. This was also consistent with the results of the study done by Sheta et al. (2023), who clarified that more than two-thirds had ureteral stones and more than one-quarter had stones sized 10 mm. Also with Bosio et al. (2024), who mentioned that the median stone size was 9 mm.

Regarding the duration of ureteral DJS indwelling, the findings of the current study showed that duration ranged from thirty days to four hundred and twenty-five days. This finding was supported by the results of a study done by Mostafa et al. (2022), who mentioned that duration of DJ placement ranged from week to more than six months.

The results of the present study showed that the indwelling duration of the non-neglected group ranged from thirty days to one hundred and five days. This result was matched with a study by Abdelmowla et al. (2022), who mentioned that the duration of DJ placement ranged from three to twelve weeks. The indwelling duration of the neglected group ranged from four to fourteen months. Also this finding was matched with a study by Ram et al. (2023), who mentioned that indwelling time ranged from five to ten months.

Concerning ureteral double J stent placement, the results of the present study revealed that more than half of non-neglected patients versus half of neglected patients had a ureteral DJ stent in the left ureter. This finding was compatible with a study by Reddy et al. (2023) in which a study was conducted on forty-five patients with double-J ureteral stents and found that twenty-five had stents on the left side, sixteen had stents on the right side, and four had bilateral stents.

Regarding indications of DJ stent insertion, the current study demonstrated that the most frequent

indications for ureteral DJ stent insertion post-ureteroscopy and post-PCNL, which were indicated in more than half and less than one-third of non-neglected patients, respectively, while pre-shockwave lithotripsy was indicated in one-third of neglected patients, so all patients that had ureteral double J stents for obstructive anuria or pre-shockwave lithotripsy were in the neglected group.

This result was compatible with the study of **Ali et al. (2023)**, who found that the DJ stents were implanted after URS, before SWL and after PCNL. Stenting previous extracorporeal shockwave was the most common reason among patients with ignored DJS. Also, this result was supported by results from a study by **Wang et al. (2024)**, who identified the most prevalent reason for stent insertion as an additional treatment to urolithiasis by endourological procedures. From the researcher's perspective, the reason was that the patients who undergo SWL may need multiple sessions. The period between successive SWL sessions should be at least three weeks. As for obstructive anuria patients, they did not realize that inserting a stent was an emergency treatment and not a treatment for the main cause of their condition, so patients neglected it.

Concerning the causes of negligence, the present study clarified that more than one-third of the neglected patients did not know the supposed date of removal and one-third had SWL with presence of the stent. From the researcher's perspective, this result might be due to low education status, a lack of adequate counseling for the patient or patient's attendant, and a lack of sufficient SWL lithotripsy machines, which leads to a long waiting period between sessions.

This result was compatible with the study of **Manharlal et al. (2023)**, which included thirty patients with prolonged stents who mentioned for forgotten patients that low education status and low socioeconomic background might be one of the patient-related factors. Another factor that could be responsible for forgotten DJ stents was a lack of adequate counseling for the patient or patient's attendant and poor patient compliance.

In addition, this result was supported from the results of a study done by **El-Kholy et al. (2019)**, who demonstrated that more than one-third of the neglected patients had stenting before SWL, which was the most common reason of neglected stents because of a lack of SWL lithotripter machines in government hospitals or increase the cost of private surgery. This resulted in an increase in patient numbers in government hospitals, increasing the duration of SWL sessions, and raising the cost of stent removal. Other factors include patients misunderstanding or disregarding instructions,

forgetting to arrive at the scheduled time, misplacing the discharge card, or failing to follow instructions that are not included on it.

Regarding complications, the current study demonstrated that the most common complications before double J stent removal were UTI and stone formation, with a statistically significant difference between the two groups. UTI occurred in half of neglected patients versus one fifth of non-neglected patients, and stone formation occurred in less than two-thirds of neglected patients versus a minority of non-neglected patients, without intraoperative complications for all studied patients. This result matched with the finding of the study done by **Ali et al. (2023)**, who clarified that more than half of studied patients had recurrent UTI and two fifths had stone formation.

From the researcher's perspective, the reason for UTI and stone formation was that the presence of a stent could irritate the lining of the urinary tract, trigger inflammation, and make it more susceptible to bacterial colonization. This colonization caused the formation of mineral deposits that could evolve into stones.

This matched with **Manharlal et al. (2023)**, who clarified that bacterial biofilms adhering to the surface of indwelling DJ stents are the predominant causative factor in stent-related urinary tract infections, and stone formation is the product of the crystallization of organic compounds in the urine produced by the bacterial biofilm. The urease formed by the adhered bacteria in biofilm hydrolyzes the urea and generates ammonia. This increases the urinary pH and promotes the buildup of magnesium and calcium on the stent.

Regarding operations, the study revealed that the most common operation was JJ removal only, which was carried out in the majority of non-neglected patients, while more than one quarter of neglected patients require JJ removal and URS. As for JJ removal and PNL carried out in all neglected patients (less than one fifth), So a statistically significant difference was observed between the two groups. The median (range) operation time of the ureteral DJ stent removal was 10 (3–120) minutes. From the researcher's perspective, this result was due to neglected DJ stents that caused stone formation, which need simultaneous management with DJ removal.

This result was supported by results from a study done by **Wang et al. (2024)**, who mentioned the most common device utilized was a cystoscope. In more complex cases, retrograde ureteroscopy and antegrade stent removal were frequently used. Also with **Lim et al. (2024)**, who mentioned the mean procedure time for cases underwent DJS removal was fifteen minutes.



Regarding ureteral stent-related symptoms, the current study showed that all patients reported a variety of LUTs associated with ureteral DJ stents, with dysuria being the most prevalent symptom, experienced by a vast majority of patients. Hematuria was the only symptom that demonstrated a statistically significant difference between the two groups. It occurred in more than half of the neglected patients versus more than one-quarter of the non-neglected patients.

This result was compatible with the findings of the study done by **Bellos et al. (2024)**, who indicated that the most prevalent symptoms associated with ureteral stents include hematuria, fever, pain, and LUTS. Also, it was compatible with the results of the study done by **Azari et al. (2023)**; a study was conducted on seventy patients with double-J ureteral stents who reported the most common presenting complaints included dysuria and frequency.

From the researcher's perspective, this hematuria might be due to the high percentage of UTI that caused irritation and erosion of the urinary tract tissue of the neglected patient. This viewpoint was affirmed by the opinions of **Horváth et al. (2023)**, who mentioned that the most prevalent reason for postglomerular gross hematuria is UTI.

Regarding quality of life, the current study demonstrated a statistically significant difference between the two groups. Neglected patients had a lower overall quality of life than non-neglected patients. This result was compatible with the findings of the study done by **Abdelmowla et al. (2022)**, it was shown that the patients' responses to (KHQ) displayed that there was significant variation in quality of life between the study and control groups. A nursing educational program that was carried out for patients with DJ stents showed a reduction DJ stent-related symptoms and complications. It also enhanced the quality of life for patients who took part in this program.

Also, the present study showed that there was a significant positive correlation between the total (KHQ) score and the duration of the ureteral DJ stent indwelling in days, meaning that the longer the period of stay of the stent, the higher the score of the KHQ. An increase in domain scores of the KHQ indicates worse quality of life. Therefore, the longer the stent indwelling, the lower the patient's quality of life.

This result was supported by the results of the study done by **Camtosun & Bicer (2020)**, who found significant variations in quality of life among patients with stents and after removal and indicated that irritative DJ stent-related symptoms negatively impact all parts of people's lives. Also was supported by study done by **Polat et al. (2024)**, who demonstrated that DJS causes a financial and social

burden on patients due to decreased job performance and lost workdays. As a result, minimizing the period of the DJ stent's presence and giving treatments that reduce the patient's discomfort will improve their professional lives.

From the researcher's perspective, this result was due to that neglected patients suffered from severe urinary symptoms that prevented them from practicing activities of daily living, this resulted in a lower quality of life. This opinion was supported by the opinion of **Mares et al. (2023)**, who mentioned that the LUTS had a negative effect on the quality of life.

#### **Limitations:**

Not randomized due to the nature of classifying the patients into study groups. This can lead to unmatched groups as demonstrated by the difference in age between the two groups.

#### **Conclusion**

In light of the results obtained in this study, it was concluded that patients with neglected stents suffered from severe symptoms and complications such as hematuria, urinary tract infection, and stone formation. Negligence of ureteral Double J stent affected and reduced the patient's quality of life. The most common cause of neglected stents was that patients did not know the supposed date of removal, which can be prevented by patient education and follow-up.

#### **Recommendations**

In light of the results obtained in this study, the following recommendations are proposed:

- Urologist and Nurses should provide adequate pre-discharge instructions for the patient and his family.
- Educational booklet should be available to all patients with ureteral double J stent.
- Creation of a phone line for patient monitoring and follow-up.

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