

Double J Ureteric Stent: Effect of Developing and Implementing Nursing Educational Program on Patients Outcomes

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Abstract

Background: Double J ureteric stent commonly inserted for stone management. However, stent-related side effects still a major issue. **Aim:** The study aimed to evaluate the effect of developing and implementing nursing educational program on outcomes of patients with double J ureteric stent. **Patients and methods:** Research design: Quasi experimental research design. **Sample and setting:** A sample of "60" adult patients undergoing double J ureteric stent insertion, their ages from "18 - 65" years. Patients assigned into 2 groups, each group "30" patients. Odd number = control group while even number = study group. Nursing educational program (brochure) introduced to patients of study group by researchers while patients of control group was received routine hospital instructions. **Tools:** Assessment sheet and King's health questionnaire. **Results:** Urinary tract infection demonstrated statistically significant difference between the two groups. It occurred in 93.3% of control group patients versus 46.7% of study group ($p < 0.001$). Patients' responses to King's health questionnaire conveyed significant difference in quality of life between the two groups ($p < 0.001$). **Conclusion:** Patients education reduce double J ureteric stent related-symptoms and significantly reduce complications and improve quality of life. **Recommendation:** Nursing educational program (brochure) should utilized in urology hospitals as teaching guide for patients with double J ureteric stent.

Keywords: Double J ureteric stent, Nursing educational program & Patients outcomes

Introduction

Double J ureteric stent is a tube placed in lumen of ureter; antegrade or retrograde. It is useful to maintain patency of the hole or maintain anastomose graft. It becomes one of the most valuable and basic tools in urological practices. It provides direct drainage of upper urinary tract to bladder without need for external diversion. Also, it used to promote healing of ureteral lesions by preventing urinary extravasation. The indications for insertion of double J ureteric stent into urinary tract has expanded significantly during the last few decade (Taily & Denstedt, 2016).

Double J ureteric stent is inserted routinely to relieve or prevent ureter obstruction in patients with ureteral obstruction due to obstructing ureteral stone, ureter stricture, ureteral fistula, ureteral reconstruction, congenital anomalies as obstruction of uretero-pelvic junction, retroperitoneal fibrosis or tumor, or that developing following endoscopic or open ureter surgery (Sigdel et al., 2021).

Placement of double J ureteric stent is not free of side effects and complications. Common side effects includes lower abdominal pain, urinary tract

infection, dysuria, fever, flank pain, haematuria, bacteriuria, pyelonephritis, urinary frequency and urgency. Furthermore, more serious complications can occur as stent migration, fragmentation, encrustation, occlusion and stone formation (Ray et al., 2015)

The removal of double J ureteric stent is one of the simplest endourologic maneuver. It can tend to develop stone particularly in renal pelvis and bladder. So, it needs to be changed or removed regularly when no longer needed. The surgeon should keep track of the double J ureteric stent and make sure about the appropriate time of changed or removed. Most standard double J ureteric stent may remain for 3 - 6 months, but the time will vary according to patients' stone producing propensity and urinary chemistry (Taguchi et al., 2018).

Nurses should instruct patients with double J ureteric stent that the stent is a temporary device need to change or remove when no needed to avoid complications. Patients should also instruct about double J ureteric stent potential side effects and complications and how to reduce and manage it. The

urology nurses need to assist and support patient to cope with double J ureteric stent in the best way and how to detect and manage its effects. (Freifeld et al., 2017).

Nurses caring for such group of patients require to be qualified with specific knowledge to minimize problems by anticipation or prevention and early intervention to enhance outcome. Nurses can enhance patients' experiences of living with double J ureteric stent by educating patients regarding double J ureteric stent symptoms, complications and management, giving psychological support to them and advocating for patients with adverse stent-related symptoms (Freifeld et al., 2017).

Significance of the study

Based on various studies, placement of double J ureteric stent is associated with morbidity in the majority of patients ranging from generalized urinary discomfort to urinary tract infection/obstruction. It also adversely affects patients' quality of life (Pietropaolo et al., 2022; Camtosun & Bicer, 2020; Lim et al., 2020). So, this study conducted in an attempt to provide patients with necessary instructions required to minimize the effects of double J ureteric stent.

Aims

General objective

The study aimed to evaluate the effect of developing and implementing nursing educational program on outcomes of patients with double J ureteric stent.

Specific objectives

1. Reduce double J ureteric stent-related symptoms.
2. Reduce double J ureteric stent-related complications.
3. Improve quality of life for patients with double J ureteric stent.

Research Hypotheses

1. Implementing nursing educational program will reduce double J ureteric stent-related symptoms.
2. Implementing nursing educational program will reduce double J ureteric stent-related complications.
3. Implementing nursing educational program will improve quality of life for patients with double J ureteric stent.

Operational definition

Patients outcomes: double J ureteric stent-related symptoms, double J ureteric stent-related complications and quality of life.

Patients and Methods

Research design

Quasi experimental research design was utilized to conduct the present study.

Setting

The study was conducted in urology department and urology outpatients clinic at Assiut Urology and Nephrology University Hospital.

Sample size

It calculated by (G power software) as "60" patients (30 for each group). The sample calculated size for testing differences between 2 independent means 2 tailed. Power (95 %), effect size (0.8), and error (0.05).

Patients

A purposive sample of "60" adult, conscious and cooperative patients (male and female), their ages ranged from "18 - 65" years and undergoing double J ureteric stent insertion. Patients were assigned into 2 groups (study and control). Odd number = control group while even number = study group. Each group composed of "30" patients. Nursing educational program for patients with double J ureteric stent (brochure) was introduced to patients of the study group by researchers while patients of control group was received routine hospital nursing instructions. Patients with previous history of double J ureteric stent insertion, chronic cystitis, severe renal insufficiency, severe liver, lung, cardio-cerebrovascular and other chronic diseases were excluded from the present study.

Tools for data collection

Tool I: Assessment sheet for patient undergoing double J ureteric stent insertion:

It developed by researchers after reviewing several and different literature in order to assess demographic and medical data for patients undergoing double J ureteric stent insertion.

Part 1: Demographic data which included: age, sex, marital status and occupation.

Part 2: Medical data included medical diagnosis, duration of double J ureteric stent insertion and indication.

Part 3: Lower urinary tract symptoms (LUTS).

Part 4: Complications of double J ureteric stent.

Tool II: King's health questionnaire (KHQ):

It developed by (Liu et al., 2010) to assess health-related quality of life related to specific condition; bladder problems. 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, urge,

nocturnal enuresis, infections, intercourse incontinence, pain and difficulty in voiding. The responses have "4" point rating system. The 9-subcales (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. Decrease in domain scores of the KHQ indicate improvement in quality of life.

Tools validity

The present study content was reviewed and approved by "5" experts (2 medical-surgical nursing staff and 3 urologists) to ensure validity. Minor modifications for study content were done to ensure suitability and visibility of sentences and study content.

Tool reliability

The KHQ (tool II) is a reliable tool; internal consistency was acceptable by Cronbach's alpha ranging from "0.721 - 0.915".

Procedure

The present study proceeded through the following phases:

Preparatory phase

An official permission/approval to conduct the present study was obtained from the head of urology department and outpatients clinics at Assiut Urology and Nephrology University Hospital.

Ethical considerations

All ethical principles of research according to World Medical Association Declaration of Helsinki were fulfilled (Kong et al., 1997). Official approval from faculty of nursing ethical committee was obtained. Also, permission and consent gained from the director of urology department and outpatients clinic following detailed explanation to the nature and purpose of present study. All patients were informed about their right to refuse participation or to withdraw from the present study at any time without any explanation/reason. Patients' privacy were maintained. Confidentiality and anonymity were also assured through coding of data.

The aim of the present study explained to all the studied patients before beginning data collection. They also informed about what would be done. Oral consent taken from all the studied patients who agreeing to participate following reassurance about confidentiality and information would be used for purposeful research study.

Pilot study

It done on "10%" [6 patients] of the study sample in order to test feasibility and clarity of the present study tools and estimate the required time to fill out the present study tools. No needs for modifications, so patients included in pilot study sample added to the whole present study sample.

Fieldwork description

Data collection for the present study included all eligible patients who agreed to participate in the study through a period of one year. The researchers attended the urology department and urology outpatients clinic at Assiut Urology and Nephrology University Hospital for data collection and follow up.

Nrsing educational program for patients with double J ureteric stent (brochure):

The researchers developed nursing educational program (brochure) in Arabic following review of many related literature and patients assessed needs. This educational program was helped patients with double J ureteric stent to minimize its symptoms/side-effects and complications and improved their quality of life. The researchers educated patients about definition and importance of double J ureteric stent, the necessary instructions which reduce double J ureteric stent effects and how to deal with it if occur to prevent further complications and improve quality of life. It included instructions concerning double J ureteric stent related symptoms and its management, instructions to prevent further complications: diet, activity, rest, and work. Also, warning manifestations that seek medical advice were also included.

Implementation phase

Each patient of the present study interviewed individually by researchers. The average time required for filling the present study tools around "30 - 35" minutes relying on patients' responses.

Patients of the study group were provided with detailed explanation about the nursing educational program through "1" session lasting from 1 – 1.30 hour included explanation and answering patients' questions.

The researchers instructed patients of the study group about:

- Definition and importance of double J ureteric stent.
- Double J ureteric stent-related symptoms and how to reduce and manage it.
- Double J ureteric stent-related complications and how to reduce and manage it.
- Instructions to avoid further manifestations/complications concerning diet, activity, rest, work.
- Warning manifestations that seek medical advice.

Patients of the study group were given a copy of educational illustrated program in the form of brochure in Arabic language with clear, simple instructions.

Evaluation phase

In this phase, patients of both groups were evaluated using (tool I part 3, 4 and tool II) to evaluate the effect of the indwelling double J ureteric stent, in addition evaluate the effect of implementing nursing educational program for patients of the study

group. Patients were followed up by phone and at urology outpatients clinic at Assiut Urology and Nephrology University Hospital. Every patient was followed up according to his/her condition; until removal of the double J ureteric stent (the duration of double J ureteric stent range from 3- 12 weeks).

Statistical analysis

It was done using IBM SPSS (version 21). Quantitative variables presented as median (range) and analyzed by Mann-Whitney U test, while categorical variables presented as frequency (%) and

analyzed by Pearson Chi square test. Comparison between the two groups regarding symptoms and complications of double J ureteric stent obtained by Fisher's exact test. Comparison between the two groups regarding results of various domains included in King's health questionnaire obtained by Mann-Whitney U test. Statistical significance considered when "p. value less than 0.05".

Results

Table (1): Comparison between the two groups regarding sex, age, indication of double J ureteric stent and its duration

Variables *	All patients N = 60	Control group N = 30	Study group N = 30	P value
Age in years	48.5 (18-64)	47 (24-64)	50 (18-64)	0.976
Sex				0.317
• Male	49 (81.7%)	23 (76.7%)	26 (86.7%)	
• Female	11 (18.3%)	7 (23.3%)	4 (13.3%)	
Indication of double J ureteric stent				0.518
• Post-ureteroscopy	26 (43.3%)	12 (40%)	14 (46.7%)	
• Obstructive pyelonephritis	11 (18.3%)	8 (26.7%)	3 (10%)	
• Persistent renal colic	11 (18.3%)	4 (13.3%)	7 (23.3)	
• Pre- shockwave lithotripsy	10 (16.7%)	5 (16.7%)	5 (16.7%)	
• Extrinsic obstruction	2 (3.4%)	1 (3.3%)	1 (3.3%)	
Duration of double J ureteric stent in weeks	6 (3-12)	5 (3-12)	6.5 (3-11)	0.579

* Quantitative variables presented as median (range) and analyzed by Mann-Whitney U test, while categorical variables presented as frequency (%) and analyzed by Pearson Chi square test.

Table (2): Comparison between the two groups regarding symptoms of double J ureteric stent

	All patients N = 60	Control group N = 30	Study group N = 30	p value*
Pain during micturition	47 (78.3%)	25 (83.3%)	22 (73.3%)	0.532
Frequency	36 (60%)	14 (46.7%)	22 (73.3%)	0.064
Bladder pain	43 (71.7)	21 (70%)	22 (73.3%)	1
Straining during micturition	3 (5%)	1 (3.3%)	2 (6.7%)	1
Weak stream	7 (11.7%)	3 (10%)	4 (13.3%)	1
Intermittency	3 (5%)	0	3 (10%)	0.237
Sensation of incomplete emptying	14 (23.3%)	5 (16.7%)	9 (30%)	0.36
Urgency	16 (26.7%)	5 (16.7%)	11 (36.7%)	0.143
Urge incontinence	3 (5%)	0	3 (10%)	0.237
Stress incontinence	8 (13.3%)	5 (16.7%)	3 (10%)	0.706
Nocturia	35 (58.3%)	18 (60%)	17 (56.7%)	1
Nocturnal enuresis	10 (16.7%)	4 (13.3%)	6 (20%)	0.731
Post-micturition dripping	2 (3.3%)	1 (3.3%)	1 (3.3%)	1
Hesitancy	29 (48.3%)	16	13	0.606

* Obtained by Fisher's exact test.

Table (3): Comparison between the two groups regarding complications of double J ureteric stent

	All patients	Control group	Study group	p value*
Renal pain	55 (91.7%)	26 (86.7%)	29 (96.7%)	0.353
Voiding LUTS	43 (71.7%)	19 (63.3%)	24 (80%)	0.252
Storage LUTS	23 (38.3%)	12 (40%)	11 (36.7%)	1
Urinary tract infection	42 (70%)	28 (93.3%)	14 (46.7%)	< 0.001**
Hematuria	22 (36.7%)	11 (36.7%)	11 (36.7%)	1
Stone formation	7 (11.7%)	6 (20%)	1 (3.3%)	0.103
Stent fragmentation	2 (3.3%)	2 (6.7%)	0	0.492
Stent migration	3 (5%)	3 (10%)	0	0.237
Foreign body phobia	2 (3.3%)	2 (6.7%)	0	0.492

* Obtained by Fisher's exact test.

** Statistically significant

LUTS = lower urinary tract symptoms

Table (4): Comparison between the two groups regarding results of various domains included in King's health questionnaire (quality of life)

Domain*	Control group	Study group	p value**
The first part			
General health perception	4 (2-4)	2 (2-4)	< 0.001***
Incontinence impact	3 (2-3)	2 (2-3)	< 0.001***
The second part			
Role limitations	6 (4-8)	4 (4-6)	< 0.001***
Physical limitations	5 (2-6)	4 (2-6)	0.014***
Social limitations	5 (2-6)	4 (2-7)	0.005***
Personal relationships	9 (5-9)	5 (1-9)	< 0.001***
Emotions	9 (3-9)	6 (3-9)	0.014***
Sleep/energy	6 (4-6)	4 (2-6)	0.003***
Severity measures	5 (4-11)	4.5 (4-11)	0.002***
The third part			
Symptom severity scale	6.5 (4-13)	5.5 (3-12)	< 0.001***

* Data presented as median (range) of the scores.

** Obtained by Mann-Whitney U test.

*** Statistically significant

Table (1): Clarifies that this study included 49 (81.7%) male and 11 (18.3%) female with median (range) age 48.5 (18-64) years. The most common indication for double J ureteric stent insertion was post-ureteroscopy which was the indication in 26 (43.3%) patients. The median (range) duration of double J ureteric stent was 6 (3-12) weeks. There was no statistically significant difference between the two groups regarding sex, age, indication of double J ureteric stent and its duration.

Table (2): Shows that all patients experienced various LUTS related to indwelling double J ureteric stent. The most prevalent symptom was pain during micturition which was encountered in 47 (78.3%) patients. There was no statistically significant difference between the two groups regarding any of these symptoms.

Table (3): Clarifies that the patients had one or more complications of double J ureteric stent. Renal pain was the most common complication occurring in 55 (91.7%) patients. Urinary tract infection was the only complication that demonstrated statistically significant difference between the two groups. It occurred in 93.3% of the control group patients versus 46.7% of the study group patients ($p < 0.001$).

Table (4): Shows that the patients' responses to King's health questionnaire conveyed significant difference in quality of life between the two groups ($p < 0.001$). All quality of life domains of the questionnaire showed statistically significant difference in favor of the study group patients. Study group patients reported lower impact of double J ureteric stent on their lives than control group patients [general health perception ($p < 0.001$), incontinence impact ($p < 0.001$), role limitations ($p < 0.001$),

physical limitations ($p < 0.014$), social limitations ($p < 0.005$), personal relationships ($p < 0.001$), emotions ($p < 0.014$), sleep/energy ($p < 0.003$), severity measures ($p < 0.002$)]. Regarding symptom severity scale, study group patients reported moderate to little impact of symptoms on their lives than control group patients ($p < 0.001$).

Discussion

Urology nurses can improve the self-care level of patients with indwelling double J ureteric stent. Enable education play significant role in nursing especially in implementation of nursing education, improvement of self-care level for patients, at the same time enhance communication between patients and nurses and improve quality of life of patients with double J ureteric stent (Li et al., 2021).

In the present study, the most common indication for double J ureteric stent insertion was post-ureteroscopy. The majority of patients were males with age ranged from eighteen to sixty-four years old. The duration of double J ureteric stent was three to twelve weeks. The two groups were matched regarding baseline data with no statistically significant difference between them.

In this regard, a study of Patil et al., (2020) included thirty patients underwent double J ureteric stent. The mean age of patients fifty-six years, age ranged from twenty-three to sixty-six years. More than half of patients were males. The mean duration of the indwelling double J ureteric stent was thirteen months. Most common indications for indwelling double J ureteric stent were ureteroscopy and percutaneous nephrolithotomy.

All patients in the present study experienced various LUTS related to indwelling double J ureteric stent. The most prevalent symptom was pain during micturition. There was no statistically significant difference between the two groups regarding any of these symptoms, however, the study group patients experienced fewer urinary tract symptoms related to indwelling double J ureteric stent than the control group patients.

A study finding of Bosio et al., (2019) is within the same line with finding of the present study as they conducted study on two-hundred and thirty-two patients with indwelling double J ureteric stent. They reported that double J ureteric stent had deep impact on urinary symptoms (frequency, nocturnal micturition, urgency, burning) that represented a problem for the majority of patients. Also, the majority of patients experienced pain in bladder area, particularly during physical activity and micturition. Lower urinary tract symptoms following double J ureteric stent placement still common and include frequency, urgency and incomplete emptying in more

than half of patients, dysuria and urge incontinence in less than half of patients. Also, it include pain of voiding, nocturia, sexual dysfunction and hematuria. Urologists and urology nurses need to know how to prevent/reduce and manage symptoms and educate patients (Lee et al., 2019).

From the researchers point of view, LUTS associated with double J ureteric stent might be caused by mechanical stimulus from bladder coil, which may increase detrusor overactivity. Nocturia is less frequent and might be caused by mechanical stimulation due to physical activities. Urgency, urge incontinence might be caused by irritating by bladder coil. Painful voiding might be the result of trigonal irritation by bladder coil. This opinion is also supported by the opinion of Lee et al., (2019).

From the researchers point of view, LUTS-related double J ureteric stent is fewer in patients of study group than those of control group might be due to the effect of the nursing educational program which developed by the researchers concerning patients education about symptoms-related double J ureteric stent and how to prevent/reduce and manage it.

All patients of the present study had one or more complications of double J ureteric stent. Renal pain was the most common complication. Urinary tract infection was the only complication that demonstrated statistically significant difference between the two groups. It occurred in the majority of control group patients versus less than half of study group patients.

A study finding of Bansal et al., (2020) is within the same line with finding of the present study as they conducted study on hundred patients with indwelling double J ureteric stent. They reported that majority of patients had minor complications related to double-J ureteric stent as flank or suprapubic pain and hematuria. Major complication as double J ureteric stent migration was occurred only in one patient.

Also, study finding of Patil et al., (2020) who included thirty patients underwent double J ureteric stent supported the present the study finding which reported that complications of double J ureteric stent included LUTIS, flank pain, stent fragmentation, stent migration, voiding LUTS and storage LUTS. They stated that patients and relatives counseling before and after placement of double J ureteric stent may play significant role in reducing double J ureteric stent-related complications.

From the researchers point of view, complications-related double J ureteric stent is fewer in patients of study group than those of control group with statistically significant difference between the two groups concerning urinary tract infection might be due to the effect of the nursing educational program which developed by the researchers concerning patients education about complications-related double

J ureteric stent and how to prevent/reduce and manage it. Proper education of patients and their relatives before and after placement of double J ureteric stent and maintaining double J ureteric stent register may help in minimizing incidence of complications-related double J ureteric stent. Also, instructions concerning how to prevent urinary tract infection included in the nursing educational program showed significant reduction in urinary tract infection for the study group patients.

In the present study, patients of study group showed significant improvement in quality of life than those of control group in all quality of life domains. Study group patients reported lower impact of double J ureteric stent on their lives than control group patients. Regarding symptom severity scale, study group patients reported moderate to little impact of symptoms on their lives than control group patients.

A study of **Bosio et al., (2019)** supported the present study results as they reported that proper instructions on the possibility of LUTS as frequency, urgency, or incontinence should be conveyed to patients. Most importantly, patients with double J ureteric stent need to know how to avoid exacerbating symptoms of double J ureteric stent, as may lead to poor quality of life/work performance. Pain-related to indwelling double J ureteric stent interfered with everyday life in the majority of patients. Also, general health and working were affected.

Recently randomized clinical trial implies that LUTS as urgency and pain of voiding related to double J ureteric stent placement are more common but negatively impact on patients quality of life. All LUTS are associated double J ureteric stent morbidities. It may be as a result of consequence of urinary tract infection and encrustation (**Lee et al., 2019**).

From the researchers point of view, the significant improvement in quality of life which reported by patients of study group could be due to the effect of the nursing educational program which developed by the researchers concerning patients education about various aspects of care, instructions and how to manage and perform every day activities with double J ureteric stent. This program showed significant effects in minimizing double J ureteric stent-related symptoms/ complications and thus led to greater improvement in quality of life for patients of the study group. Also, continuous follow up through attending patients to outpatient clinic and by phone aid in detecting and managing various effects of double J ureteric stent early and thus preventing many further double J ureteric stent symptoms/complications.

Standard practice for patients with double J ureteric stent should include patients education, double J

ureteric stent monitoring and removal at appropriate time. It is important that patients with double J ureteric stent be monitored via mobile-based app reminder systems, emails. Moreover, further and scientific efforts are required to develop double J ureteric stent that improve quality of life of patients and minimize financial burden for healthcare providers arising from double J ureteric stent-related complications (**Ramachandra et al., 2020**).

Study limitations

1. The present study covered short observation period.
2. Commitment of patients to the nursing instructions (nursing educational program) reported to the researchers by patients.

Conclusions

Nursing educational program for patients with double J ureteric stent showed obvious reduction in double J ureteric stent-related symptoms and significant decrease in double J ureteric stent-related complications. It also improved quality of life for patients of the study group. Urology nurses play significant and important role in patients education for minimizing the effects of double J ureteric stent. Educating patients about LUTS and complications related to double J ureteric stent, how to reduce and manage it, preventing further symptoms/complications and thus improving quality of life. Also, continuous follow up for patients is necessary and aid in managing various problems of double J ureteric stent and thus led to prevention of many further double J ureteric stent symptoms/complications.

Recommendations

The present study recommends that:

1. Nursing educational program (brochure) should be disseminating to all patients with double J ureteric stent to reduce double J ureteric stent-related symptoms/complications and improve quality of life.
2. Support from urology nurses is essential and vital to assist patients with double J ureteric stent-related symptoms.
3. Patients with double J ureteric stent should be monitored and followed up carefully till the appropriate time of removal.
4. Patients should be reassured that double J ureteric stent-related symptoms are transient and resolve once the double J ureteric stent is removed.

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