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RESEARCH ARTICLE

THE EFFECT OF SELF CARE PROTOCOL FOR PATIENTS WITH URETERIC DOUBLE J STENT ON THEIR HEALTH OUTCOMES

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Abstract

Ureteric double J stent has been common practice in the management of various urological conditions.Ureteral stent placement is associated with some degree of morbidity in the majority of patients that ranges from generalized urinary discomfort to urinary tract infection or obstructionAim of the study: evaluate the effect of self-care protocol for patients with ureteric double J stent on their health outcomes.

Research design:A quasi- experimental study design (study & control) was used to conduct this study. Setting: This study was conducted at Urologysurgery department and Urology Outpatient Clinic affiliated to EL-Fayoum University Hospital.

Subjects: A purposive sample of 80 patients with ureteric double J stent, from both genders. Tools of data collection: I: Structured intervie wing questionnaire; Part 1: Part 1: Socio-demographic data. Part 2: Patients' clinical data. a) Patients' medical history. II: ToolIII: Patients' Level of knowledge Assessment Questionnaire Regarding Ureteric Double J Stent. Tool III: Ureteral Stent Symptom Questionnaire (USSQ). Tool IV: Patients Reported Self-Care Practices Regarding Ureteric Double J Stent. ToolV: Double J stent complications observational checklist.

Results: There was highly statistically significance difference between study and control group in most of total reported self-care practices regarding ureteric double J Stent subscales throughout the study period at (P= < 0.01). As evidence, (72.5%) of the study group of the studied patients have adequate level regarding reported self-care practices regarding ureteric double J Stent after four weeks of intervention compared to (32.5%) for the control group.

Conclusion: a strong and statistically significant positive correlation between patients' knowledge, adherence to self-care protocols, and reductions in discomfort and complications across all phases of the intervention.

Recommendation: the study recommended that, integrate designated self-care protocols into routine nursing care for patients with ureteric stents to reduce complications and improve recovery.

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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 (Ouaddane Alami, et al., 2023). 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 include 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 (Nedjim et al., 2025). 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 (Maxim et al., 2025). Patient education is a cornerstone of effective stent care. Ureteric double J stents are temporary internal devices that require regular monitoring, timely replacement, or removal once no longer needed. Educating patients about the purpose, duration, and potential complications of the stent is essential to prevent adverse outcomes such as encrustation, infection, or migration. When patients are well-informed, they are more likely to adhere to follow-up schedules, recognize warning signs early, and engage in appropriate self-care behaviors, all of which contribute to improved health outcomes (Singh, et al., 2023).Nurses play a pivotal role in implementing self-care protocols by providing structured education, emotional support, and clinical follow-up. Their responsibilities extend beyond initial instruction to include ongoing assessment, symptom monitoring, and reinforcement of safe practices. By guiding patients on how to manage discomfort, maintain hydration, and identify complications, nurses empower them to take an active role in their recovery. This proactive approach not only reduces the risk of complications but also enhances patient satisfaction and autonomy (Audulv et al. (2025).

The effectiveness of self-care protocols depends heavily on the nursing standards of practice, which define the expected level of care and professional competence. These standards serve as a framework for knowledge, decision-making, and clinical judgment, ensuring that nurses deliver safe, evidence-based care. In the context of ureteric stent management, adherence to these standards enables nurses to anticipate problems, intervene early, and tailor education to individual patient needs. This alignment between nursing competence and patient-centered care is critical for optimizing outcomes (Sheta et al. (2023).Implementing a structured self-care protocol for patients with double J ureteric stents has been shown to significantly improve health outcomes, including reduced complication rates, enhanced quality of life, and better adherence to follow-up care. When nurses integrate education with clinical vigilance and emotional support, patients are more likely to manage their stents effectively and avoid preventable issues. Thus, the success of ureteric stent therapy is not only a surgical achievement but also a reflection of nursing excellence and patient empowerment (Mahmoud Mostafa et al. (2022).

Aim of the Study:-

The study aimed to evaluate the effect of self-care protocol for patients with ureteric double J stent on their health outcomes:-

1. Assess patients' level of knowledge regarding ureteric double-J stent.
2. Assess patients' self- care practices regarding ureteric double J stent.
3. Design a self-care protocol for patients with ureteric double J stent based on their assessment needs.
4. Implement the designated self-care protocol for patients with ureteric double J stent on health outcomes.
5. Evaluate the effect of implementing of designated self-care protocol for patients with ureteric double J stent on health outcomes.

Research questions:
The current study answered the following questions:
1. What is the effect of designated self-care protocol on knowledge score for patients with ureteric double J stent?
2. What is the effect of designated self-care protocol on patients' self-care regarding ureteric double J stent?
3. What is the incidence of ureteric double J stent complications?

Research hypothesis:-
At the end of the study:-
H1. Patients with ureteric double J stent who will receive the designated self-care protocol regarding ureteric double J stent will have a high score of knowledge than those patients who don't receive self-care protocol.
H2. Patients with ureteric double J stent who will receive the designated self-care protocol regarding ureteric double J stent will have a high score of self- care practices than those patients who don't receive self-care protocol.
H3. The incidence of complications among patients who will receive the designated self-care protocol regarding ureteric double J stent will have less complications compared with those patients who will not receive self-care protocol.

Operational definition:
Self-care protocol: it is designated self-care protocol regarding ureteric double J stent which include self-care practices regarding (nutrition, physical activities, rest and sleep, personal hygiene, social interaction, work performance, sexual matters, prescribed medication and follow up.
Patient's outcomes: it is desired outcomes for patients with ureteric double J stent regarding knowledge, self-care practices and complications
1-Technical design: The technical design includes research design, setting, subject, tools for data collection

Setting:-
The present study conducted at Urology Outpatient Clinic and Urology Surgery department in Fayoum University Hospital. It receives patients from all areas of Fayoum governorate. The Urology Outpatient Clinic consists of 2 sections; the first sections consist of physician office; the second section is an examination room. The Urology Surgery department consists of 3 sections; the first sections for male and it includes 16 beds, the second section for female and it includes 9 beds, the third section for nurses. The nursing section includes an office, medication section and needed equipment.

Research Design:-
A quasi- experimental study design (study & control) was used to conduct this study.

Subjects:-
A purposive sample of 80 adult patients from both genders with ureteric double J stent. They were recruited from the previously mentioned setting and divided randomly into two equal groups study and control (40 patients for each group).

Study group:-
patients who received the nursing program based on Orem self- care model in addition to routine nursing care. (The self-care protocol with double J ureteric stents (booklet) was introduced to the study group by the researcher)

Control group: patients who received hospital routine nursing care only.

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

Inclusion criteria included the following;
- Patients who agreed to participate in the study.
- Patients who had a ureteric double J stent inserted for the first time.
- Patients aged 18 to 65 years undergoing double J ureteric stent insertion.
- Patients who were able to communicate verbally.

Exclusion Criteria:

- Patients with a previous history of ureteric double J stent insertion.
- Patients diagnosed with chronic conditions such as chronic cystitis, severe renal insufficiency, pulmonary disease, or cardiocerebrovascular disorders.
- Patients with psychiatric disorders.
- Patients with physical disabilities.

Tool of data collection:

Five tools were used in data collections the following: -

Tool I: Structured interviewing questionnaire tool (Appendix I): -

It was developed by researcher and written in Arabic language to accomplish the purpose of the study after reviewing relevant literatures (Ferreira-Valente et al., 2011; Baset et al., 2020 & Ali, et al., 2023) including the following parts. It used to assess patients' demographic and clinical data. It consisted of 2 parts:Part 1: Socio-demographic data: - This tool was used to assess socio-demographic characteristics of patients. It composed of 6 questions; it included age, gender, marital status, level of education, occupation and residence area.Part 2: Patients' clinical data: - This tool was used to assess patients' clinical data. It composed of 5 questions; it included medical diagnosis, patients' present, past and family history.

Tool II:Patients' Level of knowledge Assessment Questionnaire Regarding Ureteric Double J Stent:

It was developed by researcher and written in an Arabic language based on related literatures (Betschart et al., 2017; Hsiao et al., 2019 & Mahmoud Mostafa, et al., 2022) and used to assess patient's knowledge regarding ureteric double J stent. It included the following parts;

Part one was concerned with urinary system anatomy and physiology included urinary system anatomy and function of kidneys. It composed of three multiple choice questions.

Part two was concerned with ureteric double J stent basic knowledge included site of ureteric double J stent insertion and duration of ureteric double J stent removal/replacement. It composed of five multiple choice questions.

Part three was concerned with symptoms related to ureteric double J stent and possible complications. It composed of five questions (two multiple choice and 3 true or false).

Part four was concerned with self-care of ureteric double J stent. It composed of 16 true or false questions about each topic; exercise, nutrition, daily monitoring of intake and output, elimination, personal hygiene, rest and sleep, adherence to the prescribed medication and sexual relations.

Scoring system:

The questionnaire contained 29 questions, 4 subscales, anatomy and physiology including (3 items), ureteric stent basic knowledge include (5 items), complications of ureteric stent include (5 items) and knowledge regarding self-care of ureteric double J stent and home care (16 items); each question evaluated as “the correct answer was scored as one degree and the incorrect answer or don’t know was scored as a zero”. The total scores of the questionnaire were 28 grades. These scores were summed and converted into a percent score.

It was classified into 2 categories:

- **Satisfactory** if score ≥ 75% (22-29 grades).
-**Unsatisfactory** if score from <75% (0-21 grades).

Tool III: Ureteral Stent Symptom Questionnaire (USSQ):-

This tool was adopted from Michel-Ramírez et al. (2020), then modified by the researcher and translated into Arabic, based on related literature, to comprehensively assess stent-related symptoms and their impact on patients’ physical health, urinary function, sexual activity, work performance, and overall quality of life. The questionnaire consists of six sections, each addressing a specific domain through multiple items designed to express the patient's experience with an indwelling ureteral stent. It consisted of 33 statements as the following 6 sections: the following sections;

Section (1) Urinary Symptoms, included 9 statements designed to assess lower urinary tract symptoms, such as increased frequency, urgency, dysuria, hematuria, nocturia, and a sensation of incomplete bladder emptying.

Section (2) Pain: included 8 statements that evaluate the presence, intensity, and location of pain associated with ureteral stent placement. It assesses pain during urination, at rest, and during physical activity, as well as its impact on daily functioning and the need for analgesic medications.

Section (3) General health: included 5 statements regarding patients' perceptions of their overall health status during the period of stent indwelling. It was concerned with Vitality, Psychosocial impact, dependency, social life enjoyment and physical activities.
Section (4) Work performance: It included 6 statements related to the impact of stent-related symptoms on patients' ability to perform occupational tasks. It was concerned with concentration, productivity, and attendance at work. **Section (5) Sexual matters:** included 3 statements related to changes in sexual desire, discomfort during intercourse, emotional distress, and avoidance of sexual activity due to stent-related symptoms.
Section (6) additional problems: included 2 statements related to sleep disturbance and the frequent need for painkillers due to stent-associated symptoms.

Scoring system:-
The scale contained 33 items, covered the following five sections: urinary symptoms (9 questions), pain (8 questions), general health (5 questions), work performance (6 questions), sexual matters (3 questions) and additional problems (2 questions). The scale using a four -point scale, each scale question ranged from (0-4)
grades; (0 = never, 1 = rarely, 2 =sometimes, 3 = more than half the time, 4 = always). The total scores of the scale were 70 grades. These scores were summed and converted into a percent score.

It was classified into 2 categories:
- Mild symptom burden: < 50 %. (0-65 grades).
- Moderate symptom burden: 50-<75%. (66-98 grades).
- Severe symptom burden: ≥ 75%. (99-132 grades).

Tool IV: Patients Reported Self-Care Practices Regarding Ureteric Double J Stent:
It was developed by researcher based on related and literatures (Liu, et al., 2010; Michel-Ramírez, et al., 2020; Mahmoud Mostafa, et al., 2022) to assess patients' self-care regarding ureteric double J stent. It was written in Arabic language after translation and back translation was done by researcher. It included 9 main subscales of activities practiced by the patients. It consisted of 71 statements as the following 9 subscales: the following subscales;
Nutrition was the first subscale and included 11 statements related to number of meals/days, duration between meals, compliance with prescribed therapeutic diet and fluid intake. Physical activitieswere the second subscale and included 12 statements related to ability to perform the activities of daily living, in addition to exercises and leisure time activities.
Rest and sleep were the third subscale and included 4 statements related to rest and sleeping pattern.
Personal hygiene was the fourth subscale and comprised10 statements regarding hand hygiene, oral care, grooming, bathing and showering.
Daily assessment of intake and output was the fifth subscale and included 6 statements including measuring intake and output daily, inspection for urine characteristics.
Adherence to the prescribed medication was the sixth subscale and comprised 7 statements related to compliance with the prescribed medications, and avoiding over the counter medications.
Sexual relation formed the seventh subscale and included 8 statements related to number of times of intimacy, recommendations of resumption of sexual intercourse, problems which associated to double stent during sexual intercourse.
Psychological domain was the eighth subscale and comprised 4 statements including performing relaxation technique, anxiety due to double J stent.
Social interaction and work performance was the ninth subscale and included 9 statements related to time spent with other family members, maintaining role in the family, visits to friends, participation in social occasions and number of hours in work.

Scoring system:
The scale using a 2-point scale that ranges from 1 "done", zero "not done". The total scores of the scale were 70 grades. These scores were summed and converted into a percent score.

It was classified into 2 categories:
- **Adequate** level of self-care practices ≥ 70%. (50-71 grades)
- **Inadequate** level of self-care practices < 70%. (0-49 grades).

ToolV: Double J stent complications observational checklist:-

This tool was developed by the researcher based on relevant and up-to-date national and international literature **(Turo et al., 2018; Michel-Ramírez et al., 2020; Elbatanouny et al., 2020)** to assess the expected complications that may occur among patients with double J stents. It was written in Arabic language after translation and back translation was done by researcher. It consisted of 63 items which inclused the following sections;

Section 1: Urinary Symptoms included 7 statements addressing urinary frequency, urgency, dysuria, hematuria, incomplete bladder emptying, urinary incontinence, and cloudy or foul-smelling urine.

Section 2: Pain comprised 5 statements evaluating the presence and progression of pain in various anatomical locations, including flank or kidney pain on the stent side, bladder pain or spasms, groin or genital pain, pain aggravated by physical activity, and pain triggered by urination.

Section 3: General Well-being and Functional Impact included 5 statements focusing on the patient's overall well-being and the functional consequences of ureteric stent placement. These items covered fatigue or low energy, sleep disturbance, interference with daily activities or work, the need for pain medication, and overall feelings of annoyance or irritation.

Section 4: Clinical Signs and Major Complications comprised 9 domains that addressed the clinical signs and major complications associated with ureteric stent placement. These domains covered infection and sepsis (e.g., fever >38°C, chills, flank pain with fever, cloudy or foul-smelling urine, nausea/vomiting, and generalized fatigue), stent migration or displacement (either upward or downward), encrustation and stone formation, stent fracture or occlusion, ureteral erosion and fistula formation, positive urine culture, stent fragmentation, forgotten or neglected stents, and sexual dysfunction secondary to stenting. Each domain was defined by specific clinical indicators and diagnostic criteria, which included radiographic confirmation (e.g., KUB X-ray) and microbiological findings. These criteria were used to determine the presence and severity of each complication.

Scoring system:-

- The total number of checklist items was (63), each item was scored as either (0) for "not present" or (1) for "present."
- The total score was summed and converted into a percentage.

Based on the percentage score, the symptom burden related to ureteric double J stent was classified into three levels:

- Mild complication: ≥ 85%
- Moderate complication:70% – < 85%
- Severe complication: < 70%

Operational design:

The operational design included preparatory phase, content validity and reliability, pilot study and field work.

The preparatory phase:

It included reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazine, to develop tools for data collection.According to Orem's Self-Care Theory, the researcher initially met patients in the preoperative phase to assess their knowledge and self-care abilities based on identified needs. Following this assessment, patients were selected according to the inclusion and exclusion criteria and subsequently allocated into two groups: the study group and the control group. The study group consisted of patients numbered 1 to 40, while the control group included patients numbered 41 to 80.

Tools validity and reliability:

Testing validity:

It was done for used tools to evaluate each item on the tool as to its degree of representation of the variable to be tested, as well as the tool over all appropriateness for use in examining the variable within the proposed study population. The content validity of the tools was done by a panel of 5 experts in nursing and medicine, including five assistant professors who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance and applicability. Suggestions were given and modifications were done. Tool validity: Content validity as a qualitative form of validity that evaluates whether the expressions contained in the measuring instrument represent the phenomenon intended to be measured.

Testing reliability:-

Reliability of the instrument is defined as "the extent to which the instrument yields consistent, reproducible estimates of what is assumed to be an underlying true score" (Artner, 2021). It refers to the degree to which an instrument measures consistently each time it is applied under the same conditions with the same subjects. In this study, reliability testing was conducted to determine the extent to which the questionnaire items were related to each other. Reliability was assessed using Cronbach's Alpha coefficient, which normally ranges between 0 and 1, with values greater than 0.7 considered acceptable. The analysis revealed excellent reliability for the Patients' Knowledge Assessment Questionnaire ($\alpha = 0.928$), the Reported Self-Care Practices Checklist Regarding Ureteric Stent ($\alpha = 0.937$), and the Ureteral Stent Symptoms Questionnaire (USSQ) ($\alpha = 0.988$). The Ureteral Stent Complications Checklist also demonstrated good reliability with a Cronbach's Alpha of 0.872. All results were statistically significant at $P \leq 0.05$, confirming that the tools used in this study were reliable and suitable for assessing patients' knowledge, self-care practices, stent-related symptoms, and complications.

Pilot study:

A Pilot study was carried out with 10% (8 patients) of the sample under study to test the applicability, clarity and efficiency of the tools, then the tools modified according to the results of the pilot study. Modifications included: rephrasing and rearrangement of some questions. After modification, the final form of the tools wasdeveloped. Patients who shared in pilot study are excluded from the study sample.

Field Work:

Once the necessary approvals allowed to proceed with the proposed study, data collection was started and continued until the assigned number of study sample were completed (from the beginning of December 2024 to the end of September 2025). The study was implemented through the following four phases of the nursing process; according to Orem theory:

- ❖ Assessment phase.
- ❖ Design phase
- ❖ Implementation phase
- ❖ Evaluation phase

Assessment phase:

- The assessment phase represented the initial step of the program, during which baseline data were collected from patients and their medical records to evaluate their existing knowledge and self-care needs. This phase was conducted prior to initiating the intervention and included both the study and control groups.
- Furthermore, the assessment process was extended to the first week post-discharge, during which the researcher reassessed patients to complete the assessment of self-care practices and actual performance. This sequential assessment allowed for a comprehensive understanding of patients' knowledge before surgery and their ability to apply self-care strategies during the early recovery period
- An exploratory visit was done to urology units and urological outpatients' clinic at both setting of the study in order to estimate the rate of admission and suitable time for collecting data, and application of the nursing program besides, the researcher contacts with nurses and physician and clarify the aim of the study to obtain their best possible cooperation. The patient who met study criteria was included in the study after explaining the nature and purpose of the study and obtaining their consent.
- Data collection was conducted through personal interviews after the researcher introduced herself and explained the purpose and nature of the study. To avoid data contamination, the control group was assessed first, followed by the study group. All patients were interviewed individually, and the tools were administered according to a structured timeline to ensure consistency and reliability.
- **For the control group,** patients received only the routine hospital care provided by the responsible nurse and were not exposed to the self-care program. The researcher's role with this group was limited to assessment and monitoring of their natural progress under routine care. Baseline data were collected preoperatively using the Sociodemographic and Health Relevant Data Sheet (Tool I) and the Patients' Knowledge Questionnaire (Tool II). Follow-up assessments were conducted at one week, two weeks, and one-month post-discharge using the Self-Care Reported Practice Checklist (Tool IV) and the Complications Observational Checklist (Tool V). In addition, the Ureteral Stent Symptom Questionnaire (USSQ – Tool III) was administered at two weeks post-discharge to evaluate stent-related symptoms, including urinary complaints, pain, general health, work performance, and sexual matters.

- **For the study group,** patients underwent the same baseline preoperative assessment using Tool I and Tool II. However, unlike the control group, they received the structured self-care educational program immediately after the preoperative assessment. This program included clear instructions, demonstrations, and re-demonstrations covering all aspects of ureteric Double J stent care. Following discharge, patients were assessed at one week using Tool IV and Tool V to evaluate adherence to self-care practices and detect early complications. At two weeks, Tool IV and Tool V were repeated, and Tool III (USSQ) was administered to measure stent-related symptoms. Knowledge was reassessed at two weeks using Tool II to evaluate improvement. At one-month post-discharge, Tool IV and Tool V were applied again for final evaluation of practices and complications, while Tool II was reassessed to measure sustained knowledge improvement.
- Together, these tools provided both subjective and objective data, ensuring a comprehensive assessment of patients' knowledge, self-care practices, symptom burden, and clinical outcomes. This structured approach allowed for a clear comparison between patients who received only routine hospital care (control group) and those who benefited from the educational intervention (study group).
- For illiterate patients, the researcher read each item aloud and recorded responses; educated patients completed the tools independently. Each form was reviewed to ensure completeness and accuracy.

Planning and design phase:
This phase was based on the analysis of the pre-test findings, through which patients' needs, deficiencies, and requirements were identified. According to these findings, the researcher formulated the goals and expected outcomes that directly impact patient care. The intervention was then planned, and the educational content was designed to address the specific needs detected during the baseline assessment.The identified needs were translated into the aims and objectives of the educational program, which were structured into sections presented in the form of a guideline's booklet. This instructional booklet was developed exclusively for patients in the study group during the implementation phase. It was prepared in simple, easily understandable Arabic language, supplemented with colored photos and illustrations, to ensure clarity and accessibility for all patients regardless of their educational level.The booklet was designed to enhance patients' knowledge, self-care practices, and awareness of possible complications related to the ureteric Double J stent. By providing clear instructions and practical demonstrations, the educational material aimed to empower patients to manage their condition effectively and minimize stent-related problems

Implementation phase:
Based on the analysis of pre-test findings and literature review, the researcher developed a structured self-care nursing program. Patients in the control group received only routine hospital care, while patients in the study group received the full educational program preoperatively, in addition to routine care.
The program was implemented through five structured sessions (two theoretical and three practical), all delivered before surgery to ensure that patients were adequately prepared for self-care once discharged.

Theoretical Sessions:
First session: The researcher introduced herself, explained the aim and nature of the study, and obtained patient consent. The session covered knowledge about the anatomy and physiology of the urinary system, definition and purpose of the ureteric Double J stent, and common symptoms associated with stent insertion. It took about 30:45 minute, using video, poster and booklet.
Second session: Conducted before surgery as well, this session provided detailed knowledge about stent-related symptoms, possible complications, and strategies to overcome them, in addition to self-care practices to be followed while the stent is in place. Both theoretical sessions were delivered in simplified language appropriate to patients' educational levels, supported by visual aids and interactive discussion to enhance engagement and knowledge retention. It took about 30:45 minute, using video, poster and booklet.

Practical Sessions:-
Session 1: Focused on essential self-care practices after stent insertion, including nutrition, safe physical activity, adequate rest, personal hygiene, and monitoring fluid balance. Demonstrations were supported by videos, posters, and booklets. Duration: approximately 30–45 minutes.
Session 2: Addressed psychosocial and behavioral aspects of living with a ureteric Double J stent, including medication adherence, sexual health concerns, psychological coping strategies, and guidance on resuming daily and occupational activities. Duration: approximately 30–45 minutes.

Session3: Focused on recognition and management of potential complications associated with the stent. Preventive and management strategies were demonstrated using videos, posters, and booklets to ensure understanding, retention, and active participation. Duration: approximately 1 hour.

- By delivering the entire program before surgery, patients in the study group were equipped with comprehensive knowledge and practical skills in advance, enabling them to apply self-care practices effectively during the postoperative period and reducing the likelihood of complications compared to the control group.
- The researcher started teaching lectures from 9 am to 1 pm 3 days/ week
- At the beginning of each session, discussions about the previously explained topics to patients were done by the researcher to determine their knowledge level as well as misremembered and vague points. Then, a summary of the last session was given to help the patients to restore their memories.
- During each session, the researcher applied the teaching strategies for patients using simple, brief, and comprehensible words. At the end of each session, every patient received a short summary of important points. Furthermore, an instructional booklet and video was provided to patients in the study group to attract their attention, motivate them, guide teaching, and self-care at home.
- The researcher used different teaching methods as lectures followed by discussion, demonstration, and re-demonstration, also the researcher used different media for teaching included power point presentation, pictures, videos, and handouts.
- Each patient received frequent telephone calls (two calls a week) post-nursing program finish that extended for 3 months to assure patients adherence to the treatment plan. Moreover, regular meeting at outpatient clinic was held to discuss patients' difficulties and fears that developed at home. Also, the researcher used WhatsApp application to facilitate communication with patients and to send videos about the practical part to help patient return to it when needed.
- The researcher and patients exchanged their phone numbers to ensure contact and meeting them during follow-up visits in outpatient clinics to finish data collection during the follow-up period.

Evaluation phase:

The evaluation phase was conducted to reassess patients after the implementation of the nursing program and to determine progress by comparing their responses with baseline measures. This phase ensured alignment with the assessment, planning, and implementation stages, providing a comprehensive view of the program's effectiveness. Both the study group and the control group were evaluated at three distinct time points using the same structured tools, which allowed for consistency and comparability of outcomes.For the study group, the first evaluationwas conducted preoperatively using Tool I (Sociodemographic and Health Relevant Data Sheet) and Tool II (Patients' Knowledge Questionnaire) to establish baseline knowledge. Following the delivery of the educational program,patients were reassessed during the first outpatient clinic visit (one week post-discharge) using Tool II, Tool IV (Self-Care Reported Practice Checklist), and Tool V (Complications Observational Checklist). The second evaluation was performed two weeks after the intervention, using Tool II, Tool III (USSQ), Tool IV, and Tool V to measure improvements in knowledge, self-care practices, and symptom burden. A follow-up evaluation was conducted onemonth post-intervention using Tool II, Tool IV, and Tool V to assess sustained knowledge retention, adherence to self-care practices, and long-term complication outcomes.

For the control group, the first evaluation (baseline) was conducted preoperatively using Tool I and Tool II. During the first outpatient clinic visit (oneweek post-discharge), patients were assessed using Tool II, Tool IV, and Tool V. The second evaluation was carried out two weeks later using Tool III, Tool IV, and Tool V, without exposure to the nursing intervention. A follow-up evaluation was conducted one month later using Tool II, Tool IV, and Tool V to monitor the natural progression of patients under routine hospital care.This structured evaluation framework ensured that the outcomes of the nursing program could be accurately measured against baseline data, thereby validating the planning and implementation phases. It also allowed for a clear comparison between patients who received only routine hospital care (control group) and those who benefited from the structured educational intervention (study group).

Administrative design:

An official permission was obtained from the director of Fayoum University Hospital, in which the study was conducted. A letter was issued to them from the faculty of Nursing, Helwan University explains the aim of the study for obtaining the permission for data collection.

Ethical considerations:

The ethical research considerations include the following:

- An ethical approval to conduct the proposed study was obtained from the Scientific Research, Ethical Committee of the faculty of Nursing, Helwan University.
- The study facilitation letter to conduct the study was received from the postgraduate studies department of the faculty of Nursing at Helwan University and sent to the director of Fayoum University Hospital
- An official permission was obtained from the administrative authority of the selected setting for the current study.
- The researcher obtained an oral and written consent from the studied patients.
- Participation in the study was voluntary, studied patients were given complete full information about the study and their role before signing the informed consent.
- The ethical considerations include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of data assured by the researcher by using codes to identify participants instead of names or any other personal identifiers.

Statistical Design:-

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). The Shapiro-Wilk test was used to verify the normality of distribution. Test of significance, qualitative variables were compared using Chi square test. Mann-Whitney Test was used to compare between two independent groupand Kruskal-Wallis Test was used for comparing more than two groups. Spearman correlation test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$. No statistical significance difference was considered when $p \geq 0.05$.

Results:-

Table (1):43.36 ± 7.50 years was the mean age of the study group compared to 42.09 ± 7.97 years in the control group. Regarding gender, 70.0% of the study group and 75.0% of the control group were males. Concerning marital status, 65.0% of the study group and 55.0% of the control group were married. In terms of education, 55.0% of the study group and 50.0% of the control group had secondary education. Regarding occupation, 40.0% of the study group and 42.5% of the control group were employees. Moreover, 55.0% of the study group and 47.5% of the control group resided in urban areas. Furthermore, there were no statistically significant differences between the two groups regarding socio-demographic characteristics ($p > 0.05$).

Table (2): illustrates that, 57.5% of the study group and 42.5% of the control group were diagnosed with lithotripsy/extraction of stones. Regarding chronic disease, 45.0% of the study group and 50.0% of the control group reported no chronic illness. Moreover, 95.0% of the study group and 90.0% of the control group had the stent inserted on one side. In addition, 72.5% of the study group and 62.5% of the control group had no surgical history. Furthermore, 95.0% of the study group and 90.0% of the control group reported a family history of ureteral obstruction.

Figure(1):illustrates that,there was a highly statistically significant difference between the study and control groups regarding total knowledge about ureteric double J stent throughout the study period of implementing the self-care protocol ($p < 0.01$). As evidence, 20.0% of the study group had a satisfactory level of knowledge at the pre-implementation phase, which increased to 80.0% after two weeks and 75.0% after four weeks. In contrast, 17.5% of the control group had a satisfactory level of knowledge at the pre-implementation phase of routine care, which slightly increased to 30.0% after two weeks and 25.0% after four weeks.

Table (3):illustrates that,there was a highly statistically significant difference between the study and control groups regarding all ureteral stent symptom subscales two weeks post implementation of the self-care protocol ($p < 0.01$). As evidence, 62.5% of the study group reported a mild level of symptoms two weeks post intervention compared to only 27.5% in the control group.

Figure (2): illustrates that,77.5% of the study group reported an adequate level of self-care practices regarding ureteric double J stent one week post implementation of the self-care protocol. This slightly decreased to 75.0% after

two weeks and 72.5% after four weeks. In contrast, 40.0% of the control group reported an adequate level of self-care practices one week post implementation of routine care, which declined to 35.0% after two weeks and 32.5% after four weeks.

Table (4): illustrates that, there was highly statistically significance between study and control group in all complication's subscales throughout study period at (P= > 0.05). As evidence, the Mean ± SD of total complications score among the study group was (1.32±1.59) after four weeks of intervention compared to (5.07±2.82) for the control group.

Table (5): illustrates that, there was a highly statistically significant positive correlation between patients' total knowledge and their reported self-care practices within the study group during the implementation of the self-care protocol ($p < 0.001$). In addition, a highly statistically significant positive correlation was observed between total ureteral stent symptoms and stent complications among the study group ($p < 0.001$). Conversely, there was a highly statistically significant negative correlation between patients' total knowledge and reported self-care practices with ureteral stent symptoms and complications throughout the study period ($p < 0.001$).

Table (1): Comparison between the study and control groups according to their socio demographic data.

Socio demographic characteristics	Study group (n=40)		Control group (n=40)		X^2	P-Value
	No.	%	No.	%		
Age (years)					0.583	0.900
20 -< 35	3	7.5	4	10.0		
35 -< 45	6	15.0	8	20.0		
45 -< 60	**19**	**47.5**	**17**	**42.5**		
≥ 60	12	30.0	11	27.5		
Mean ± S.D	**43.36±7.50**		**42.09±7.97**		**Z= 2.110**	**0.417**
Gender					0.251	0.617
Male	**28**	**70.0**	**30**	**75.0**		
Female	12	30.0	10	40.0		
Marital status					0.867	0.833
Married	**26**	**65.0**	**22**	**55.0**		
Single	2	5.0	3	7.5		
Divorced	8	20.0	10	25.0		
Widowed	4	10.0	5	12.5		
Education level					2.004	0.735
Can't read and write	3	7.5	5	12.5		
Read and write	4	10.0	7	17.5		
Basic school	6	15.0	5	12.5		
Secondary education	**22**	**55.0**	**20**	**50.0**		
University education	5	12.5	3	7.5		
Level of occupation					0.070	0.965
Employee	**16**	**40.0**	**17**	**42.5**		
Manual work	13	32.5	12	30.0		
Don't work	11	27.5	11	27.5		
Place of residence					0.450	0.502
Rural area	18	45.0	21	52.5		
Urban area	**22**	**55.0**	**19**	**47.5**		

Table (2): Comparison between the study and control groups according to their clinical data.

Medical Data	Study group (n=40)		Control group (n=40)		X^2	P-Value
	No.	%	No.	%		
Medical diagnosis					1.817	0.403
Cystitis/kidney obstruction	7	17.5	9	22.5		
Lithotripsy/extraction of stones	**23**	**57.5**	**17**	**42.5**		
External ureteral obstruction	10	25.0	14	35.0		
History from chronic disease					0.994	0.608
No chronic disease	**18**	**45.0**	**20**	**50.0**		
Diabetes mellitus	14	35.0	10	25.0		
Hypertension	8	20.0	10	25.0		
Side of double ureteral stent placed on					0.721	0.396
On one side	**38**	**95.0**	**36**	**90.0**		
On both sides	2	5.0	4	10.0		
Previous surgery					0.912	0.340
Yes	11	27.5	15	37.5		
No	29	72.5	25	62.5		
If yes, specify	**(n=12)**		**(n=15)**			
Previoussurgery	**8**	**72.7**	**11**	**73.3**		
Urologicalsurgery	3	27.3	4	26.7		
Family history of ureteral obstruction					0.721	0.396
Yes	**38**	**95.0**	**36**	**90.0**		
No	2	5.0	4	10.0		
If yes, what was the relationship?	**(n=38)**		**(n=36)**			
1st degree	4	10.5	4	11.1		
2nd degree	**24**	**63.2**	**20**	**55.6**		
3rd degree	10	26.3	12	33.3		

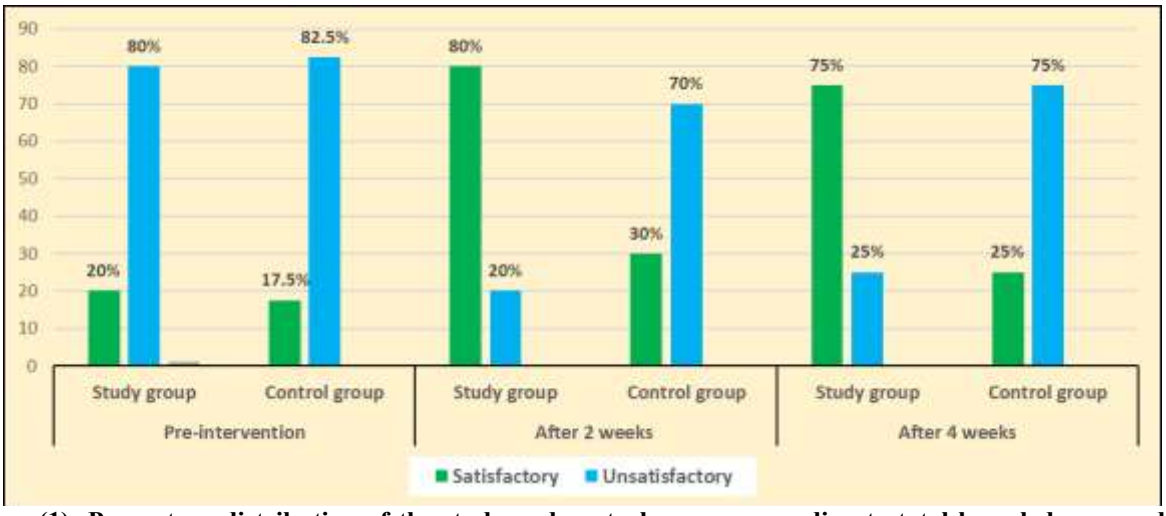

Figure (1): Percentage distribution of the study and control groups according to total knowledge regarding ureteric double J stent at study period of implementation of self-care protocol

Table (3): Comparison between the study and control groups regarding total ureteral stent symptoms two weeks post implementation of self-care protocol.

Subscales	Study group (n=40)						Controlgroup (n=40)						X^2	P-value
	Mild		Moderate		Severe		Mild		Moderate		Severe			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Urinary symptoms	25	62.5	12	30.0	3	7.5	12	30.0	19	47.5	9	22.5	**148**	**010****
Pain	27	67.5	11	27.5	2	5.0	10	25.0	22	55.0	8	20.0	**.07**	**000****
General health	28	70.0	9	22.5	3	7.5	11	27.5	21	52.5	8	20.0	**.48**	**000****
Work performance	28	70.0	10	25.0	2	5.0	11	27.5	20	50.0	9	22.5	**.19**	**004****
Sexual matters	24	60.0	12	30.0	4	10.0	9	22.5	21	52.5	10	25.0	**.84**	**003****
Additional problems	30	75.0	8	20.0	2	5.0	6	15.0	26	65.0	8	20.0	**.12**	**000****
Total ureteral stent symptoms score	**25**	**62.5**	**12**	**30.0**	**3**	**7.5**	**11**	**27.5**	**21**	**52.5**	**8**	**20.0**	**.17**	**006****
Mean SD	**48.77±23.24**						**81.77±23.87**						**Z=5.357**	**000****

$X^{2:}$ Chi Square Test. Z: Mann-Whitney test. (**) highly Statistically significant at p <0.01.

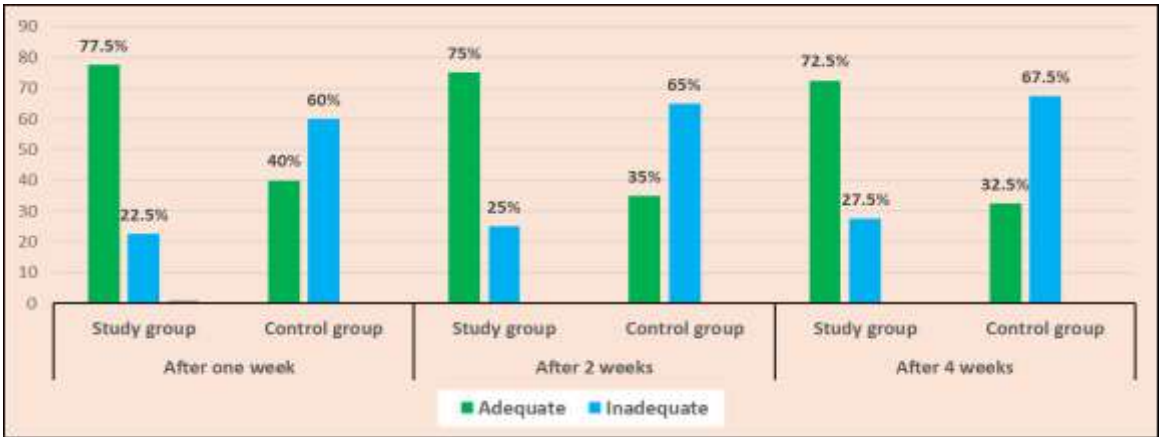

Figure (2): Percentage distribution of the study and control groups according to total reported self-care practices regarding ureteric double J Stent among study and control groups at study period of implementation of self-care protocol.

Table (4): Comparison between the study and control groups regarding total Double J stent complications throughout study period of implementation of self-care protocol.

Double tent omplication	Study group (n=40)			Control group (n=40)			(p_1)	(p_2)	(p_3)
	One week	Two weeks	Four weeks	One week	Two weeks	Four weeks			
	edian (IQR) Mean ± SD	edian (IQR) Mean ± SD	edian (IQR) Mean ± SD	edian (IQR) Mean ± SD	edian (IQR) Mean ± SD	edian (IQR) Mean ± SD			
Urinary symptoms	.0 (2.0-4.0) 2.90±1.80	0 (1.25-2.7) 2.00±0.71	.50 (0.0-1.0) 0.55±0.63	.0 (4.0-6.0) 5.17±1.12	.0 (3.0-4.0) 3.82±0.98	(1.0-3.0) 2.05±1.43	**Z=5.324 p=0.000****	**Z=7.033 p=0.000***	**Z=5.316 p=0.000****
Pain	.0 (1.2-3.0) 2.20±0.91	0 (1.25-1.7) 1.35±1.12	.0 (0.0=1.0) 0.37±0.58	.0 (3.0-5.0) 4.05±0.95	(2.0-4.0) 2.90±1.27	(1.0-2.0) 1.25±0.66	**Z=6.396 p=0.000****	**Z=4.872 p=0.000***	**Z=5.189 p=0.000****
General Well-being & Function	.0 (1.2-3.0) 2.07±0.79	0 (0.25-1.7) 1.22±1.14	0 (0.0-0.75) 0.32±0.61	.0 (3.0-5.0) 4.07±0.99	0 (2.0-4.0) 2.90±1.33	(1.0-2.0) 1.35±0.86	**Z=6.843 p=0.000****	**Z=5.228 p=0.000***	**Z=5.231 p=0.000****

al Impact									
linical signs & majo omplication	.0 (0.0-1.0) 0.95±0.81	.0 (0.0-1.) 0.40±0.67	.0 (0.0-0.0) 0.07±0.26	.0 (1.0-2.75) .45±1.25	(0.25-1.7) 1.15±1.00	0 (0.0-0.7) 0.42±0.84	**Z=6.843 p=0.000****	**Z=3.865 p=0.000* ***	**Z=2.212 p=0.000****
otal omplication core	.5 (6.0-9.0) 8.12±3.09	.0 (3.0-6.7) 4.97±2.75	.0 (0.0-2.0) **1.32±1.59**	(11.0-18.0) 4.75±3.86	0.5 (7.25-5.0) 10.77±3.77	.0 (3.0-6.0) **5.07±2.82**	**Z=6.534 p=0.000****	**Z=6.065 p=0.000* ***	**Z=6.518 p=0.000****

Z^{1}: Mann-Whitney test. IQR: Interquartile Range. SD: Standard deviation. P: p-value.
****Highly significant at p ‹ 0.01.**

P_1: p value for significance between the (Study and Control group) in hospitalization.
P_2: p value for significance between the (Study and Control group) 2wks post intervention.
P_3: p value for significance between the (Study and Control group) 4wks post intervention

Table (5): Correlation between total patients' knowledge, reported self-care practices, ureteral stent symptoms and ureteral stent complications among the study group at study period of implementation of self-care protocol (n=40).

ariables	Totalself-care practices						Total ureteral stent symptoms		Total ureteral stent complications					
	One week		2 weeks post		4 weeks post		2 weeks post		One week		2 weeks post		4 weeks post	
	r	P-value	r	P-value	r	P-value	r	P-value	r	P-value	r	P-value	r	P- value
Total self-care practices							-0776.	0.000**						
Total knowledge			0.716	0.000**	0.639	0.000**	-0.776	0.000**			-0.759	0.000**	-0.751	0.000**
Total ureteral stent complications			-0.678	0.000**	-0.770	0.000**	0.784	0.000**						

Notes: r= Correlation coefficients test. **Highly significantCorrelation at p ‹ 0.001.

Discussion:-

Ureteric double J stents are commonly used in urological practice to relieve obstruction, facilitate urine drainage, and support healing following surgical or endoscopic procedures. Despite their clinical benefits, these stents are frequently associated with a range of distressing symptoms, including urinary urgency, pain, hematuria, and limitations in daily activities and sexual function. These symptoms can significantly affect patients' physical comfort, psychological well-being, sexual function, work performance and overall quality of life, making symptom management a critical component of post-stent care (Mahmoud Mostafa, et al., 2022). Patients with DJS may develop many complications including major complications as; displacement, encrustation, forgotten stent, stent fracture, urinary tract infection and minor complications as pain, hematuria, dysuria, frequency, urgency, incontinence. Recent clinical evidences have suggested patient/ care giver engagement in performing self-care practices and identify early danger symptoms to reduce the risk of double J stent associated complications and improve their quality of life (Jindal et al. 2025). Regarding demographic characteristics of the patients under the study, considering age, the current study result indicated that, nearly half of the patients in both groups were aged between 45 and 60 years, with a mean age of 43.36 ± 7.5 in the study group and 42.09 ± 7.97 in the control group. The reason for this may be related to the fact that the prevalence of urinary stone formation increased with aging. This result is consistent with Metwally et al., (2021), who revealed that the majority of patients undergoing ureteral stent insertion were aged between 50-60 years, in a study entitled "Effect of self-care practice health educational program for patients on urinary tract infection recurrence", which conducted in tanta. Concerning gender, the current study result indicated that three quarters of the patients in both groups with ureteric double J stent were males which

was interpreted as the possibility of benign prostatic hypertrophy, carcinoma, and the higher incidence of urinary out flow obstruction and urinary stones especially in men older than 50 years. This finding goes in the same line with Abdelmowla et al. (2022), who reported that male patients were more prevalent in their study" Double J ureteric stent: Effect of developing and implementing nursing educational program on patients' outcomes " conducted in Assiut, attributing the finding to the higher incidence of urinary stones among men. Regarding marital status, the current study revealed that about two-thirds of the patients in the study group and more than half of those in the control group were married. This may be related to the age distribution of the sample, as the majority of patients were aged between 50 and 60 years, a stage of life typically associated with stable marital status. A similar finding was reported by Friedersdorff et al. (2020), who found that most patients undergoing ureteric procedures were married, in their study entitled "The ureter in the kidney transplant setting: Ureteroneocystostomy surgical options, double-J stent considerations and management of related complications." However, this result is contradicted by Raja et al. (2020), who revealed that the majority of patients were single or divorced in their qualitative study "The impact of urinary stone disease and their treatment on patients' quality of life."

Considering educational level, the current study showed that more than half of the patients had secondary education. This finding is supported by Khalil et al. (2023) in their study "Role of health literacy in managing ureteral stent-related symptoms" conducted in Cairo, where higher education was associated with better symptom control and fewer complications. However, this result is contradicted with Patil et al. (2020), who reported that the majority of their sample were illiterate in their study "Forgotten ureteral double-J stents and related complications: A real-world experience" in India, highlighting the risks of poor education on stent management. In relation to occupational status, the current study revealed that two-fifths of both groups were employees. This finding is consistent with Harper et al. (2022), who reported that nearly half of the studied patients were engaged in work in their study Impact of occupational status on stent-related quality of life in urological patients conducted in Washington. Conversely, this result contradicts Bargues-Balanzá et al. (2022), who emphasized in their study Ureteral stents: Impact on patient's quality of life that the majority of patients experienced significant impairment in daily activities and professional life, with many unable to maintain employment during the stent period. As for residence, the current study revealed that, more than half of the studied patients was resided in urban areas. this finding is in accordance with the finding of the study done by Abdelmowla et al., (2017), who reported that, more than half of the studied patients lived in urban areas in their study entitled "Impact of nursing interventions and patients' education on quality of life regarding renal stones treated by percutaneous nephrolithotomy" in Assiut.

However, this result is contradicted with Mahmoud et al., (2019) in their study entitled "Effectiveness of self-care intervention for patients with urolithiasis on their practices regarding nutrition" in Banha. Finding of this study clarified that, around two thirds of patients were lived in rural areas. Regarding initial diagnosis of the studied patients, the current study revealed that lithotripsy or stone extraction was the most frequent medical indication for DJ stent insertion, accounting for more than half of the study group and approximately two-thirds of the control group. This predominance may be attributed to the high prevalence of urolithiasis among middle-aged adults, which is often linked to poor dietary habits, low fluid intake, and sedentary lifestyle. In the same context, Corrales et al. (2025) reported in theirstudy entitled "Patterns and outcomes of ureteric stent use in patients with obstructive uropathy" that the majority of DJ stents were placed following surgical intervention for renal or ureteric stones, confirming that stone-related obstruction remains the most frequent indication for stenting. Similarly, Lin et al. (2019) found that nearly two thirds of patients with urolithiasis were the primary reason for DJ stent insertion, in their study "The risk factors and complications of forgotten double-J stents: A single-center experience" in Columbia. These findings are supported by Narayan., (2025), who conducted a prospective study titled "Study of Indications and Early Complications of Ureteric Double-J Stent".

Their results revealed that the majority of stent placements were due to urinary calculi, with renal and ureteric stones accounting for over 80% of cases. Regarding the side of DJ stent placement, the present findings revealed that the majority of patients in both groups had stents inserted on one side only. This suggests that unilateral stenting is often sufficient to relieve obstruction, especially when the contralateral kidney is functioning adequately. This finding goes in the same line with the study which conducted by Wang et al. (2022), entitled "Comparison of patient outcomes after unilateral versus bilateral ureteral stent placement", The results of that study clarified that most patients underwent double-J ureteral stent placement, with the majority receiving unilateral stents. Unilateral DJ stenting was clinically effective in most cases, resulting in fewer complications and shorter hospital stays. The authors emphasized that bilateral stenting should be reserved for patients with bilateral obstruction or impaired renal function, as it may increase discomfort and the risk of infection. Conversely, Arslan et al. (2024), in their study

entitled “Comparison of percutaneous antegrade double-J ureteral stent placement: first-hand vs. nephrostomy route approaches”, noted that bilateral stenting was more frequently used in cases of urinary malignancy or complex obstruction, especially when performed via nephrostomy. They noted a higher rate of discomfort and infection in bilaterally stented patients. Regarding chronic diseases, the current study revealed that nearly one-third of patients in both the study and control groups had chronic conditions, predominantly diabetes mellitus and hypertension. These diseases are known to trigger oxidative stress, vascular dysfunction, and chronic inflammation, which collectively contribute to renal impairment and increase the risk of obstructive uropathy often necessitating ureteral stent placement. Recent evidence reinforces this association. Aljaghoub et al. (2024), reported acute kidney injury following DJ stent insertion in a diabetic patient with multiple comorbidities, highlighting the increased susceptibility to post-procedural complications.

Amado et al. (2023) emphasized the role of diabetes in accelerating biofilm formation and encrustation on stents, which may compromise their function and elevate infection risk. In addition, Vallée et al., (2021) in “Epidemiology and risk factors for ureteral stent-associated urinary tract infections in non-transplanted renal patients” confirmed that patients with diabetes mellitus and hypertension are more likely to require stenting due to their predisposition to nephropathy and recurrent urinary tract infections Regarding family history, this result showed that, the majority of the studied patients in both the study and control groups had a family history of ureteral obstruction secondary to renal stones. According to view of the researcher, this pattern may be explained by the multifactorial nature of ureteral obstruction, where shared environmental exposures and lifestyle factors within families, in addition to possible genetic predisposition, contribute to the occurrence of the condition. This result is consistent with Howles and Thakker (2020), who demonstrated in their study “Genetics of Kidney Stone Disease” that both genetic and environmental factors play a crucial role in stone formation, with heritability estimates exceeding 45% for nephrolithiasis. Similarly, this result is congruent with Chen et al. (2019), in their study “Prevalence of Kidney Stones in the USA: The National Health and Nutrition Examination Survey”, which reported that a family history of kidney stones is significantly associated with an increased risk of stone formation, highlighting the importance of genetic predisposition in urolithiasis.

Pertaining to patients’ knowledge regarding ureteric double J stent care, possible complications, and daily self-care practices, the findings of the present study illustrated that there was no statistically significant difference between the study and control groups in terms of knowledge scores before the implementation of the designated self-care protocol. This result is expected, as both groups were randomly selected from the same population and shared similar baseline characteristics and educational backgrounds. This finding is in line with Hu et al. (2024), who conducted a study entitled "Recent Development and Future Application of Biodegradable Ureteral Stents". Their results demonstrated that both study groups had comparable levels of education and baseline knowledge regarding ureteric double J stents and daily self-care practices across the main domains assessed ($p > 0.05$). The result of the present study demonstrated that, there is an improvement in patients' knowledge in the study group after the implementation of nursing program and follow up, from the researcher point of view, this result may be due to training program affect patients’ knowledge positively that appeared in the highest scores in the post intervention phase. The studied patients were prone to the nursing program covered all the knowledge, and skills needed by the patient based on the assessment done during the pilot study and included all items related to the knowledge about ureteric double J stent care; which support research hypothesis (HI). This outcome is supported by Sheta et al. (2023), who conducted a study entitled "Effect of Developing and Implementing Nursing Care Standards on Patients' Outcomes Regarding Ureteral Stent", published in the Egyptian Journal of Nursing & Health Sciences.

Their findings revealed a statistically significant improvement in patients’ knowledge and self-care practices following the application of structured nursing care standards, particularly in relation to stent management, complication prevention, and home care routines. Similarly, Hamed & Gaballah (2024), published in Evidence-Based Nursing Research Journal a study titled "Effect of Designed Ureteral Stent Instructions on Patient Recovery", which demonstrated that patients who received tailored stent care instructions experienced better recovery outcomes and reduced symptom burden compared to those who did not receive structured guidance. In the same line with Gamal et al., (2023). Who conducted a study about "Effect of Designed Nursing Protocol on Self-Reported Outcomes among Patients with Bladder Cancer Undergoing Radical Cystectomy" and found that there was a significant difference between pre nursing protocol with immediate post and post three months periods. The current study’s findings regarding the mean total ureteral stent symptoms score demonstrated a significant reduction in patients’ reported symptoms; including urinary complaints, pain, general health, work performance, and sexual matters, two weeks after the implementation of the self-care protocol. This improvement highlights the pivotal role

of structured patient education, which remains a cornerstone in the effective management of ureteral stents. By enhancing patients' knowledge and self-care practices, education minimizes stent-related adverse effects and contributes to greater comfort and overall satisfaction. This outcome is consistent with research conducted by Bosio et al., (2021), about "Pigtail suture stents significantly reduce stent-related symptoms compared to conventional double J stents" stated that stented patients have functional impairment in many aspects of everyday life, including general health, pain, urinary tract symptoms, and hematuria are frequent and sexual function. Also, the USSQ is the most recommended instrument to objectify a patient's subjective experience due to its composition of five domains.

From the researcher's point of view, the noticeable reduction in ureteral stent-related symptoms among patients in the study group two weeks after applying the self-care protocol reflects the positive effect of structured nursing education. This improvement shows that when patients receive clear instructions and practical demonstrations, they become more capable of managing their symptoms and reducing discomfort. Moreover, the use of demonstration and re-demonstration techniques enhanced patients' understanding and confidence in performing self-care practices effectively. In comparison, the control group showed minimal change, which further confirms that education is a key factor in improving patient outcomes and supporting recovery. Regarding patients' practices in caring for ureteric double J stents, the findings of the present study revealed a highly statistically significant difference between the study and control groups in total reported self-care practices regarding ureteric double J Stent subscales throughout the study period at ($P= < 0.01$). Moreover, a significant improvement was observed in the study group following the implementation of self-care protocol and throughout the follow-up period, compared to the control group. From the researcher's perspective, these results highlight the critical role of demonstration and re-demonstration techniques in effectively enhancing patients' self-care abilities related to ureteric double J stent management.

These findings provide strong support for the research hypothesis (H2), affirming that designated self-care protocol can lead to measurable improvements in patient outcomes. This finding agrees with Abdelsamie et al., (2025). who stated in a study about " Effect of a Nursing Rehabilitation Program Knowledge and Self-care Practice of Patients Undergoing Urinary Diversion ", that the findings showed that there were inadequate self-care practices about stoma care for both study and control group pre implementation of program, while improved among study groups post and 3 months after implementation. The current study demonstrated a highly statistically significant reduction in ureteral stent-related complications among patients in the study group following the implementation of a designated self-care protocol. This improvement was consistently observed across all measured domains, including urinary symptoms, pain, general well-being, and functional impact at both two- and four-weeks post-discharge. In contrast, the control group exhibited no meaningful change over time, indicating that routine care alone may be insufficient to alleviate stent-related discomfort. From the researcher's perspective, these results highlight the critical role of nursing-led education and guided self-care practices in improving both behavioral and clinical outcomes. The use of verbal instructions, practical demonstrations, and re-demonstration techniques proved effective in enhancing patients' understanding, confidence, and adherence to self-care routines.

These findings provide strong support for the second and third research hypotheses, affirming that structured self-care protocols and educational interventions can lead to measurable improvements in patient practices and quality of life. These findings agree with OuYang et al. (2025) emphasized that nurse-led discharge planning based on the Health Action Process Approach (HAPA) significantly improves post-operative outcomes in patients with double-J stents. Similarly, Mahmoud Mostafa et al. (2022), who conducted a study entitled "Assessment of Self-Care among Patients with Ureteric Double-J Stent". Their findings showed that patients who received a simplified educational booklet and nurse-led guidance reported significantly lower complication scores and higher satisfaction levels compared to those receiving standard care. The study also recommended that self-care protocols be integrated into discharge planning to improve long-term outcomes. Regarding to the current study correlations, the current study revealed strong and statistically significant positive correlations between patients' knowledge, self-care practices, and reductions in ureteral stent symptoms and complications across all phases of the intervention. These findings confirm that informed and actively engaged patients tend to experience fewer stent-related issues and achieve better overall health outcomes. This finding is harmonious with the study conducted by Mahmoud Mostafa et al. (2022), entitled "Assessment of Self-Care among Patients with Ureteric Double-J Stent: Suggested Guideline", conducted at Ain Shams University.

The authors concluded that there was a positive correlation between knowledge and self-care practices among patients with ureteric double-J stents, emphasizing that structured education enhances symptom control and patient confidence. From the researcher's point of view, these results affirm that knowledge and self-care are not merely

supportive elements but are essential predictors of clinical success in ureteral stent management. The researcher believes that empowering patients through targeted education should be a standard component of nursing practice, especially in procedures involving long-term devices like ureteral stents. Without such education, even the most advanced medical interventions may fall short in achieving optimal outcomes. Therefore, integrating structured self-care programs into routine urological care is not only beneficial, it is necessary for enhancing patient safety, satisfaction, and long-term well-being. This finding is consistent with Mohammed (2023), in their study "Knowledge and Self-care Practices among Patients Undergoing Percutaneous Nephrostomy Tube", which reported a strong statistically significant positive correlation between patients' knowledge and their self-care practices, confirming that enhanced knowledge directly contributes to better self-care outcomes.

In addition, Mohamed Morsy Mansour et al. (2020), in their study "Effect of Educational Intervention for Nurses about Pre and Post-Operative Care on Clinical Outcomes of Patients Undergoing Ureteral Stent Surgery", confirmed that educational interventions directed at nurses significantly improved their knowledge and practices regarding perioperative care, which in turn led to better clinical outcomes for patients undergoing ureteral stent surgery. Recent evidence by Hu et al. (2024), in their publication "Recent Development and Future Application of Biodegradable Ureteral Stents", further supports these findings. The authors noted that even with technological advancements such as biodegradable ureteral stents, patient education remains essential to minimizing complications and optimizing quality of life. Their study concluded that without proper guidance, innovations in stent design may not achieve their intended clinical benefits.

Conclusion:-

Based on the findings of the current study, it can be concluded that: Based on the findings of the current study, the implementation of a designated self-care protocol was shown to be highly effective in improving patients' knowledge and self-care practices. This improvement led to better clinical outcomes for individuals with ureteric double J stents. The intervention helped patients gain a clearer understanding of their condition and contributed to a noticeable decrease in stent-related symptoms and complications, as reflected in higher knowledge scores and improved self-care performance. In addition, the study revealed a strong and statistically significant positive correlation between patients' knowledge, adherence to self-care protocols, and reductions in discomfort and complications across all phases of the intervention. These results confirm that patient empowerment through education and active participation in care plays a vital role in achieving better health outcomes. Patients who are well-informed and able to apply self-care independently are more successful in managing their condition, preventing complications, and improving their overall recovery

Recommendations:-

Based on the findings of the present study, the following are recommended: For Nursing Practice: -

- Integrate structured self-care protocols into routine nursing care for patients with ureteric stents to reduce complications and improve recovery.
- Develop and distribute a simplified, illustrated educational booklet covering stent purpose, care instructions, warning signs, and follow-up schedules.
- Conduct standardized patient education sessions led by trained nurses, focusing on hydration, hygiene, symptom recognition, and adherence to appointments.
- Implement nurse training programs to enhance knowledge, communication skills, and consistency in delivering self-care education.

For Patients –

- Utilize digital health tools (e.g., mobile apps, SMS reminders) to reinforce self-care instructions and improve adherence to follow-up.
- Encourage patient feedback on educational materials and care experience to refine future protocol.

For Research:-

- Conduct future studies with larger, more diverse samples and longer follow-up periods to assess long-term outcomes of self-care protocols.
- Advocate for the inclusion of self-care protocols in national urological nursing guidelines to standardize care across institutions.

- Establish a national registry or tracking system for ureteric stents to prevent forgotten stents and reduce associated complications.

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