Impact of Postoperative Nursing Care Guidelines on Mothers' Knowledge, Reported Practice and Recovery of their Children with Hypospadias.

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Abstract

Background and aim: Hypospadias is among the most common congenital anomalies of the male genitalia. While surgical technique is pivotal, recovery is strongly shaped by postoperative nursing guideline protocols. **Aimed of The study:** to evaluate the impact of postoperative nursing care guidelines on mothers' knowledge, reported practice and recovery of their children with hypospadias**. Research design**: non-equivalent quasi-experimental control group design was utilized. **Setting**: The study was conducted in surgical out-patient clinic and in patient surgical pediatric unit at Suez Canal University Hospitals.**Sample**: A purposive sample of 60 mothers of children with hypospadias was allocated into two groups. Data were collected through: socio-demographic data sheet. Mothers' knowledge and practice questionnaire, postoperative recovery evaluation sheet**. Results:** Following the implementation of the nursing care guidelines, 90% of mothers in the study group achieved satisfactory knowledge and practices, compared to none in the control group. A strong positive correlation was found between knowledge and practices (r = .820, p < .001). Postoperative complications occurred in only 3.3% of the study group with 100% surgical success, versus 53.3% complications and 67.6% surgical success in the control group. **Conclusion:** Postoperative nursing care guidelines markedly improved mothers' knowledge and reported practices, leading to fewer complications and higher surgical success rates in children with hypospadias. **Recommendation**: Integration of postoperative nursing care guidelines into routine practice is recommended for mothers of children undergoing hypospadias repair, ensuring standardized, evidence-based education crucial for child health.

Keywords: Nursing Guidelines, Mothers' Knowledge, Practice, Recovery, Children, Hypospadias**.**

Introduction:

Hypospadias has become more common in recent years. Despite being the most prevalent penile congenital deformity, it is the second most common congenital condition in boys, after cryptorchidism. According to reports, the prevalence of hypospadias in the United States is one in every 250 males (0.4%), however in Denmark, it is estimated to be between 0.5% and 0.8%. Less than 0.1 percent, or 11.3 out of 10,000 infants, was the global prevalence, according to a South American study. (Donaire & Mendez, 2023)

The location of the urethral meatus on the ventral surface of the penis is known as hypospadias. This can occur anywhere from the glans corona to the perineum and is caused by the urethral folds of the urethral spongiosum not fully fusing during intrauterine development. Apart from changes in the location of the urethral opening, hypospadias can also manifest as unilateral or bilateral cryptorchidism, and abnormalities in the form of the glans, penile skin, and urethral

opening (Roychoudhury, 2019 & Hassouna et al., 2020).

With a frequency of 1 in 300 men (0.3%), hypospadias is one of the most common congenital abnormalities. In first-degree relatives, such as a brother, father, or son, the recurrence rate is roughly 13 times higher (Hockenberry & Wilson, 2018 & Yang et al., 2019). According to Dolk (2023), hypospadias affects between one in 200 to one in 300 male babies born. Globally, the prevalence of this congenital defect varies; for instance, it is 19.9 per 10,000 in Europe, 34.2 per 10,000 in North America, and 5.9 per 10,000 in Africa. According to Vander et al. (2018), the majority of hypospadias cases have an unclear etiology that likely combines monogenic and multifactorial forms, involving both environmental and genetic variables.

All forms of hypospadias can only be treated by surgical surgery. The optimal time for surgical correction is (6-12) months of age, before the child develops body image. Enhancing the child's ability to void in a straight stream while standing, improving the genitalia's physical appearance for psychological reasons, and maintaining an asexually adequate organ are the main goals of surgical correction (Vander et al., 2018 and Hockenberry & Wilson, 2018). Since pediatric day surgery has grown in popularity in recent years, the procedure is officially approved as a one-day procedure. Improvements in minimally invasive surgical methods, the creation of novel general anesthetic medications, and the increased use of regional anesthesia have all contributed to the rise in the number of pediatric procedures that qualify for day surgery (Mohamed and Mahmoud, 2021).

A pediatric nurse has very important pre and postoperative role for child with hypospadias. The goals of nursing management are to assist in collaborative identification of the defect, promote parental understanding, prevent potential complications and promote a normal voiding pattern (Grove & Gray, 2018 and Wong, 2019). It has been confirmed that nursing intervention can reduce postoperative complications for children undergoing surgery (Schor & Bergman, 2021). Postoperative nursing intervention measures, according to Graif et al. (2021), could reduce the risk of surgery and the incidence of other non-infectious complications. This is because nursing can be gradually strengthened through the establishment of a support system and environment, health education, complication prevention, and rehabilitation nursing.

The Institute of Pediatric Urology (2 019),Ball, Binder and Crown(2019) and Mohamed(2019) state that postoperative n ursing care guidelines are a set of nursing care recommendations that are intended to be used for children in order to facilitate r ecovery and minimize complications. The se recommendations include general care (postoperative position, nutrition, hygiene, activities, fever, cough, respiration, straini ng, infection control, and followup care) a nd specific care (dressing and stent), as we ll as medications (antibiotics, pain manage ment).

The nurse should instruct the parents about postoperative nursing care guidelines including prevent infections, cleansing the operative site of stool and urine, pain control, observation of the wound for complications and activity restriction are discussed, the child should avoid vigorous sports activities and use of toys that are straddled for 2 weeks postoperatively (Hockenberry & Wilson, 2018). Mohamed (2019) showed that involving parents, particularly mothers, in the provision of high-quality care for the

healing of hypospadias is crucial. It has been demonstrated that when parents are involved in the child's care, the child heals more quickly. Mothers require information regarding the actual procedure, potential side effects, and the immediate and long-term surgical results within specific units.

Significance of the study:

Through clinical observation, the researchers noticed that at Suez Canal University Hospitals, children with hypospadias who underwent surgical repair had many complications related to the lack of awareness and inadequate care given by the mothers of these children. The children are diagnosed and surgery date is defined, parents are requested to provide lab work for the children then they appear in operation day for the surgery.

Soon after recovery hours the children are discharged with medication and dressing brief instructions and left alone to home situation with no knowledge about postoperative care nursing guidelines. This results in high ratio of postoperative complications and need for surgery redo. These complications are preventable if mothers were provided with knowledge about postoperative nursing care guidelines. The current study is to provide nurses as well as mothers with these guidelines that will improve patient recovery.

In Egypt, there are a few studies conducted in the field of postoperative nursing care guidelines for children with urogenital surgical disorders in particular those children with hypospadias (Abd El-Salam, Mohamed, Abolwafa, & Mohamed; 2022). Hopefully, results of the present study will close this gap of knowledge in the body of pediatric nursing knowledge as well as be a corner stone in the establishment of development and implementation of nursing guidelines in the postoperative care of children with hypospadias.

Therefore, the aim of the current study was to evaluate the impact of postoperative nursing care guidelines on mothers' knowledge, reported practice and recovery of their children with hypospadias.

Operational definitions:

1- Postoperative Nursing Care guidelines: A group of postoperative nursing care actions that is prepared by the researchers after extensive review of related nursing researches that proven to have positive impact on hypospadias patient postoperative recovery. The guidelines will be prepared in simple Arabic language illustrated booklet that is suitable to mothers.

2- Post-operative recovery: For the purpose of the current study this term is representative to absence of postoperative complication (namely wound infection and accidental early removal of stent) that result in failure of surgical procedure.

The research hypotheses:

H1. Mothers of children with hypospadias who received postoperative nursing care guidelines had a higher level of knowledge and practices than mothers who didn't receive the guidelines.

H2. Children with hypospadias whose mothers received postoperative nursing care guidelines exhibited better postoperative recovery compared to those whose mothers did not receive the guidelines.

Methodology:

Research design:

This study utilized the nonequivalent control group design which is a type of a quasi-experimental design. This design used when random assignment is not possible. In this design, the researcher compares outcomes between a study (intervention) group and a control (comparison) group that are pre-existing and not randomly assigned (Sedgwick, 2021).

Setting:

The study conducted in two different settings:

Surgical Out-patient clinic at Suez Canal University Hospitals.

In Patient Surgical Pediatric unit at Suez Canal University Hospitals.

Sample

A purposive sample of 60 mothers and their 60 children was included in the study sample. Half of the study sample (30) assigned to the control group and the other half (30) assigned to the study group.

Inclusion criteria:

- **For the mother**:
  - Can read and write
- **For the child:**
  - Admitted for hypospadias correction for the first time.

Exclusion criteria:

- **For the mother:**
  - Attended similar programs on hypospadias postoperative care.
  - Mothers who have sensory impairment.
- **For the child"**
  - Chronic disease, disability or other congenital anomalies

The sample size was calculated based on type 1 error ($\alpha = 0.05$) and power of test (95% or 0.95). Type 1 error ($\alpha = 0.05$) means the researchers accepted a 5% risk of concluding that there is an effect when there is none (i.e., a false positive). It's a common threshold in research. Power of test (95% or 0.95) indicates the study is designed to have a 95% probability of correctly detecting a true effect **if it exists** (i.e., to avoid a Type 2 error or false negative) (International Fund for Agricultural Development, 2021).

Data collection tools:

1) Structured interview questionnaire (17 items) was developed by the researchers and is divided into three main parts: Part (I): Mother personal data (6 questions) as age, gender, educational level, work etc. Part (II): Child personal data (2 questions) as age and rank. Part (III): Past and present medical history of the child (9 questions) as causes and frequency of hospital admission, medications of the child and type of feeding.
2) Mothers' Knowledge and Reported Practice structured questionnaire was developed by the researchers after extensive reviewing of the related literature. The questionnaire consisted of (16) sections with (63) questions and divided into two part:

   Part 1: (7) sections to measure mothers' knowledge about post-operative care of children with hypospadias, these sections are: general knowledge about hypospadias (8) Q, nutrition (3) Q, hydration (4) Q, activities (3) Q, hernia care, infection prevention (3) Q, signs of complication (2) Q.

   Part 2: (9) sections to measure mothers' reported practice about post-operative care of children with hypospadias these sections are: care of vomiting management

(4) Q, Care of fever (8) Q, breathing and cough care (4) Q, pain management (4) Q, medication administration (1) Q, Q, surgical dressing (4) Q, stent care (4) Q, hygiene (5) Q, urination care (4) and follow up (2) Q.

3) Hypospadias Postoperative Recovery Sheet: this tool was developed by the researchers after extensive literature review to assess the recovery of the child in the first follow up visit one week after operation. The tool consisted of (5) items (vital signs, child's weight, outcome of surgical procedure, presence of complications and if there is complication the type of it).

Scoring system of tool (2):

Every correct response will be scored (1) and the incorrect will be scored (zero). Scores will be summed-up and will be converted into percent scores. Knowledge and reported practice will be considered satisfactory if the percent score is 60% or more and unsatisfactory if less than 60%.

Intervention program:

The intervention program to be used will be prepared based on assessment of the mothers' need for knowledge and skills to provide post-operative care for their children. The program will be provided in sessions as well as the mothers will receive a booklet. The booklet will be prepared by the researchers after extensive literature review. The Booklet will be in simple Arabic language to be suitable for mothers' level and illustrated to help them to understand its content (introduction, definition of hypospadias, causes, and surgery, post-operative sleeping position, nutrition, hydration, vomiting, activities, fever, respiration and cough, pain, medications, bearing down, surgical dressing, stent, hygiene, urination, infection control, dangerous signs, follow up and conclusion).

Tools validity and reliability:

Validity of the study tools was assessed by jury group consisted of three experts in nursing from faculties of nursing. Jury group members judge tools for comprehensiveness, accuracy and clarity in language. Based on their recommendations, correction, addition and / or omission of some items was done. Reliability was tested for its internal consistency using Cronbach's Alpha. (0.83) for mothers' knowledge and reported practice structured questionnaire sheet and for hypospadias postoperative recovery sheet (0. 81).

A pilot study:

A pilot study was conducted on 10 % (6 mothers) of mothers and their children to assess the feasibility and effectiveness of implementing postoperative nursing care guidelines for mothers of children undergoing hypospadias surgery. The study aimed to evaluate the initial impact of these guidelines on mothers' knowledge, reported practices, and their children's recovery outcomes. A small sample of mothers was selected to receive structured educational sessions and written guidelines. Preliminary findings suggested that mothers who received the guidelines demonstrated improved understanding and adherence to postoperative care practices, which contributed to better recovery indicators in their children. These results highlight the potential benefits of standardized nursing care guidelines and provide direction for refining the

intervention before conducting a larger-scale study.

Procedure:

Each mother will receive comprehensive information regarding the study's aim, with a strong emphasis on the voluntary nature of participation and the right to withdraw her participation at any point. Those who opted to participate will be requested to provide their consent by signing a consent form. Furthermore, data coding processes will protect data privacy and confidentiality.

Upon obtaining official permissions, the study will be implemented in assessment, planning, implementation, and evaluation phases. An official permission will be secured from the directors of Suez Canal University Hospitals. Researchers will meet the mothers in both groups in setting at Suez Canal University Hospitals where they come for diagnosis and surgery appointment. After simple clear explanation of study and its aim to the mothers who match the inclusion criteria, an informed consent will be secured.

A-For the control group (who receives the hospital routine care):

1- The researchers filled tool (I) Structured Interview Questionnaire, and Tool (II) Sheet of Mothers' Knowledge and Reported Practice about hypospadias postoperative care (pretest).
2- In the follow up researchers met the control group mothers after one week of operation and filled up tool (II) Sheet of Mothers' Knowledge and Reported Practice about hypospadias postoperative care (posttest). The researchers filled tool (III) Hypospadias Postoperative Recovery Sheet.

B- For the study group:

Assessment phase:

The researchers met mothers of the study group at the surgical outpatient clinic at Suez Canal University Hospitals and the inpatient surgical unit where they came for diagnosis and surgery appointments. After explaining the aim of the study, informed consent was secured from those who agreed to participate in the study and matched the inclusion criteria. The researchers filled out Tool (I) Structured Interview Questionnaire, and Tool (II) Mothers' Knowledge and Reported Practice about hypospadias postoperative care within about 30- 40 minutes. Scores of Tool (II) were considered the pre-test for mothers' knowledge for the intervention group.

Intervention Phase:

Directly after the previously mentioned stage, and at the same setting (the surgical outpatient clinic and inpatient surgical unit at Suez Canal University), the researchers distributed the postoperative nursing care guideline booklets to the mothers, which was developed by the researchers in Arabic. In the outpatient waiting area, the researchers began explaining it to each mother individually. The researchers collected the mothers' phone numbers and explained to them that, after reading the booklet and until the operation day and post-discharge, they would be able to communicate with the researchers for any clarifications or concerns related to the postoperative care of their children.

On the day of the operation, the researchers met each mother individually and her child in the waiting area of the

one-day unit. At this time, the researchers were again available to clarify any concerns the mother had regarding his child condition and the postoperative nursing care guidelines. The researchers also clarified the surgeon's instructions to the mother, as well as established a link of communication with the surgeon and exchanged phone numbers with them to allow communication in case there was any need regarding the children's condition postoperatively before the scheduled follow-up date. This stage took about 35-45 minutes.

During the week following the operation, while the mother and child were at home, the researchers continued communicating with them according to their needs to monitor the mothers' application of the guidelines and to provide professional support for any issues that arose during this period.

Evaluation phase:

After one week of the surgery the researchers will meet the mothers in study setting; the researchers will fill tool (II) Mothers' Knowledge and reported practice questionnaire as a posttest to evaluate the effect of the program on mother's knowledge and reported practice about postoperative care for their children with hypospadias. The researchers will review the patient follow up sheet to document the presence of any post-operative complications and fill the postoperative recovery sheet (tool III) for both control and study group. This stage took about 30-40 minutes. Data collection began in March 2024 and ended completely in April 2025.

Ethical consideration:

Primary approval obtained from research ethical committee at the faculty of nursing, Cairo University. Mothers of children with hypospadias who participated in the study were informed about the aim, procedure, benefits, and nature of the study and a written consent was obtained by the researcher from them. The researcher emphasized that participation in the study was voluntary, and they can refuse to participate in the study without any reason and obtained data will be only used for the research purpose. The anonymity and confidentiality issues of information were assured, and they have the right to withdraw from the study at any time during the study without any effect on the provided care to their children.

Statistical analysis:

Statistical analyses were performed utilizing IBM/SPSS statistics version 20. Descriptive statistics, such as means, standard deviations, frequencies, and percentages, summarized the demographic characteristics of participants and the outcome measures of the study. Paired-sample t-tests were utilized to compare pre- and post-intervention scores within groups regarding mothers' total knowledge and reported practices. Independent-samples t-tests were employed to assess differences between the study and control groups at each assessment point. Effect sizes for within-group changes were computed using Cohen's d, with values of 0.80 or greater signifying a large effect. Glass's Δ was employed to assess effect sizes for between-group comparisons. Chi-square (χ^2) tests were employed to evaluate associations between groups concerning categorical variables, including surgical procedure success and postoperative complications. Pearson's correlation coefficient (r) was calculated to assess the relationship between total knowledge and reported practice scores prior to and following the intervention. Statistical significance was established at $p < .05$ for all analyses.

Results

Table (1) Socio-demographic Characteristics of Mothers in Study and Control Groups (n=30 for each group)

Variable	Study Group n (%)	Control Group n n (%)	Test (*p*-value)
Mother's Age (Mean ± SD, min–max)	31.27 ± 7.50 (20–46)	29.70 ± 6.50 (20–45)	*t* = .841 (*p* = .404)
Level of Education			
• Can read and write	3 (10.0)	6 (20.0)	χ^2mc= 1.26 (*p* = .778)
• Basic education	4 (13.3)	3 (10.0)	
• Secondary education	5 (16.7)	5 (16.7)	
• University education	18 (60.0)	16 (53.3)	
Mother's Work			
• Housewife	15 (50.0)	17 (56.7)	χ^2F= .268 (*p* = .798)
• Employee	15 (50.0)	13 (43.3)	
Family Members			
• Less than 5	22 (73.3)	25 (83.3)	χ^2F= .884 (*p* = .532)
• More than 5	8 (26.7)	5 (16.7)	
Number of Children			
• 1	7 (23.3)	9 (30.0)	χ^2mc= 5.25 (*p* = .171)
• 2	12 (40.0)	12 (40.0)	
• 3	9 (30.0)	3 (10.0)	
• More than 3	2 (6.7)	6 (20.0)	
Place of Residence			
• Countryside	7 (23.3)	7 (23.3)	χ^2mc= 3.30 (*p* = .369)
• Urban	12 (40.0)	6 (20.0)	
• Random area	6 (20.0)	10 (33.3)	
• Industrial area	5 (16.7)	7 (23.3)	

Note. χ^2 = Pearson chi-square test; *mc* = Monte-Carlo chi-square test; *F* = Fisher exact test; *t* = independent *t*-test. *P-value* is significant at ≤ 0.05.

Table (1) indicates that mothers' sociodemographic characteristics were largely similar between the study and control groups, with no statistically significant differences identified among the variables. The mean maternal age in the study group was 31.27 ± 7.50 years, which was slightly higher than that of the control group at 29.70 ± 6.50 years, with t = 0.841 and p = .404. Educational level was comparable across groups, with 60.0% vs. 53.3%, (p = .778) holding a university degree. Both groups had equal proportions of mothers who were housewives (50.0% vs. 56.7%, p = .798). The majority of families consisted of fewer than five members in both groups (73.3% compared to 83.3%, p = .532). The distribution of children was similar, although the study group exhibited a marginally greater proportion of three-child families, p = .171. The type of residence exhibited no significant variation, with urban and rural distributions remaining relatively balanced across groups (p = .369). The findings indicate that the two groups were comparable in baseline sociodemographic characteristics, thereby reducing potential confounding effects in later analyses.

Table (2) Personal and Medical History Data of Children in Study and Control Groups (n=30 for each group)

Variable	Study Group n (%)	Control Group n (%)	Test (*p*-value)
Child's Age in Years (Mean ± SD, min–max)	1.63 ± 0.85 (1–4)	1.77 ± 1.01 (1–5)	*t* = .554 (*p* = .581)
Child's Rank			
• 1	9 (30.0)	16 (53.3)	χ^2mc= 1.89 (*p* = .707)
• 2	13 (43.3)	7 (23.3)	
• 3	8 (26.7)	6 (20.0)	
• 4	0	1 (3.3)	
Previous Hospital Admission			
• Yes	4 (13.3)	5 (16.7)	χ^2F= 1.15 (*p* = .284)
• No	26 (86.7)	25 (83.3)	
Family History of Hypospadias			
• Yes	6 (20.0)	3 (10.0)	χ^2F= 1.18 (*p* = .472)
• No	24 (80.0)	27 (90.0)	
Timing of Diagnosis			
• Immediately after birth	4 (13.3)	6 (20.0)	χ^2mc= .732 (*p* = .780)
• After the first day of birth	18 (60.0)	15 (50.0)	
• Other	8 (26.7)	9 (30.0)	
Child's Circumcision			
• Yes	12 (40.0)	14 (46.7)	χ^2F= 1.43 (*p* = .605)
• No	18 (60.0)	16 (53.3)	
Postoperative Medications?			
• Yes	2 (6.7)	0	χ^2F= 1.07 (p = .492)
• No	28 (93.3)	30 (100)	
Type of Feeding immediately After Operation			
• IV fluids only	25 (83.3)	26 (86.6)	χ^2mc= 4.30 (*p* = .134)
• IV fluids and oral nutrition	4 (13.4)	3(10)	
• Oral feeding	1 (3.3)	1 (3.3)	

Note. χ^2 = Pearson chi-square test; *mc* = Monte-Carlo chi-square test; *F* = Fisher exact test; *t* = independent *t*-test. *p*-value is significant at ≤ 0.05.

Table (2) shows that there were no statistically significant differences between the study and control groups concerning the child's personal and medical history data. The average age of children was comparable across groups (1.63 ± 0.85 years vs. 1.77 ± 1.01 years, t = 0.554, p = .581). The distribution of birth order exhibited minor variations, with first-born children constituting 53.3% of the control group and second-born children representing 43.3% of the study group; however, this difference was not statistically significant (p = .707). The majority of children in study and control groups (86.7%), (83.3%) did not previously admitted to hospital with no statistically significant differences between both groups (p = .284). The prevalence of family history of similar cases was low in both groups (20.0% vs. 10.0%, p = .472). The timing of diagnosis was similar, with the majority of cases identified after the first day of birth (p = .780). A majority of children were uncircumcised with no significant differences (*p* = .605). As regard to feeding type following surgery, the current findings exhibited that the majority of children in study and control group were taking only IV fluids with no statistically

significant differences between both groups (p = .134). Regarding postoperative use of medications, the minority in the study group reported no medication use compared to none in the control group with no statistically significant difference between groups (p = .492). The two groups exhibited comparable characteristics, thereby reducing the likelihood of baseline differences affecting study outcomes.

Table (3) Comparison of Mothers' Knowledge between both the study and control groups Pre- and Post- Nursing guidelines (n=30 for each group)

Outcome Measure	Group Study [a] Control [b]	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	*t* (p- value) Between Groups		*t* (p- value) Within Group
				Pre. vs pre	***Post. vs post***	
General Knowledge about hypospadias	a	2.50 (.73)	4.87 (1.22)	.343(.733)	9.20(<0.001)	11.48(<.001)
	b	2.41 (.77)	2.43 (.77)			000(1.000)
Post- operative nutrition	a	2.27 (.69)	3.17 (.91)	.557(.580)	4.17(<0.001)	7.79(<.001)
	b	2.17(.70)	2.23 (.82)			.372(.712)
Fluids and hydration	a	1.07 (.52)	2.80 (.61)	.447(.656)	6.99(<0.001)	14.84(<.001)
	b	1.12(.63)	1.30 (.70)			1.22(.231)
Movement and activity	a	1.13 (.63)	1.87 (.43)	.384(.703)	5.80(<0.001)	11.48(<.001)
	b	1.20 (.71)	0.90 (.80)			1.46(.156)
Hernia care	a	1.53 (.57)	3.37 (.89)	.227(.822)	10.16(<0.001)	11.48(<.001)
	b	1.57 (.57)	1.43 (.57)			.593(.557)
Infection prevention	a	1.93 (.74)	3.43 (.97)	1.47(.146)	8.71(<0.001)	11.48(<.001)
	b	1.67 (.66)	1.60 (.62)			.360(.722)
Signs of complications	a	1.43 (.57)	2.60 (.68)	.240(.811)	7.24(<0.001)	11.48(<.001)
	b	1.47 (.51)	1.43 (.57)			.226(.823)

- *t* (p- value) = Between- group *t*-test at each time point.
- *t* (p- value) = Within- group paired *t*-test.
- $p \leq 0.05$ = statistically significant (*).

Table (3) indicates that prior to the intervention, there were no statistically significant differences between the study and control groups across any knowledge domain pertaining to hypospadias care. The pre-intervention mean scores for the study group varied from 1.07 ± 0.52 (fluids and hydration) to 2.50 ± 0.73 (knowledge about hypospadias), while the control group had scores of 1.12 ± 0.63 and 2.41 ± 0.77, respectively (*p* > 0.05 for all pre-intervention comparisons). Post-intervention, the study group exhibited significant improvement, with mean scores rising to 4.87 ± 1.22 for knowledge of hypospadias, 3.17 ± 0.91 for postoperative nutrition, 2.80 ± 0.61 for fluids and hydration, 1.87 ± 0.43 for movement and activity, 3.37 ± 0.89 for hernia care, 3.43 ± 0.97 for infection prevention, and 2.60 ± 0.68 for signs of complications. The increases observed were statistically significant within the study group (*t* = 4.17–14.84, *p* < .001 for all). The control group's post-intervention means were comparable to pre-intervention values, showing no significant within-group changes (*p* > 0.05). The findings demonstrate that the nursing guidelines significantly enhanced mothers' knowledge across all targeted domains.

Table (4) Comparison of Mothers' Reported Practice between both the study and control groups Pre- and Post- Nursing guidelines (n=30 for each group)

Outcome Measure	Group	Pre- Intervention Mean (SD)	Post- Intervention Mean (SD)	*t* (p- value) Between Groups		*t* (p- value) Within Group
	Study [a]			*Pre. vs pre*	*Post. vs post*	
	Control[b]					
Vomiting management	a	1.70 (.75)	4.23 (1.36)	.543(.589)	9.63(<0.001)	10.42(<.001)
	b	1.60 (.68)	1.57 (.68)			.571(.573)
Care of fever	a	2.57 (.94)	7.27 (1.53)	1.09(.278)	12.39(<0.001)	15.67(<.001)
	b	2.83 (.95)	2.97 (1.13)			.891(.380)
Breathing and cough care	a	1.17 (.70)	2.43 (1.14)	.366(.716)	5.56(<0.001)	5.64(<.001)
	b	1.10 (.71)	1.10 (.66)			.000(1.000)
Pain management	a	2.17 (.75)	5.13 (1.46)	.350(.727)	10.12(<0.001)	12.50(<.001)
	b	2.23 (.73)	2.10 (.76)			.779(.442)
Medication administration	a	1.03 (.41)	1.77 (.43)	.299(.766)	7.34(<0.001)	6.89(<.001)
	b	1.10 (.40)	0.97 (.41)			1.36(.184)
Outpatient surgical follow up	a	1.73 (.58)	4.13 (1.11)	857.(.395)	11.44(<0.001)	10.30(<.001)
	b	1.60 (.62)	1.53 (.57)			.387(.702)
Stent care	a	1.70 (.70)	4.63 (.81	.584(.561)	15.09(<0.001)	14.45(<.001)
	b	1.67 (.71)	1.60 (.62)			.372(.712)
Personal hygiene	a	2.20 (.89)	5.47 (1.55)	.761(.450)	11.58(<0.001)	10.65(<.001)
	b	2.03 (.81)	1.77 (.82)			1.61(.118)
Urination care	a	1.70 (.70)	3.67 (1.03)	.584(.561)	8.76(<0.001)	8.65(<.001)
	b	1.60 (.62)	1.67 (.71)			.403(.690)

- *t* (p- value) = Between- group *t*-test at each time point.
- *t* (p- value) = Within- group paired *t*-test.
- $p \leq 0.05$ = statistically significant (*).

Table (4) shows that, before nursing guidelines implementation, no significant differences were found between groups in mothers' reported practices. After implementation, the study group showed significant improvements across all domains ($p < .001$), with notable gains in vomiting management, care of fever, breathing and coughing care, pain management, medication administration, outpatient surgical follow up, stent care, personal hygiene, and urination care. The control group showed no significant changes. These results confirm that the educational guidelines substantially improved mothers' postoperative care practices.

Table (5) Comparisons of Total mean scores of Mothers' Knowledge and Reported Practice in Study and Control Groups Pre- and Post- nursing guidelines (n=30 for each group)

Outcome Measure	Group	Pre- Intervention Mean (SD)	Post- Intervention Mean (SD)	*t* (p- value) [Δ] Between Groups		*t* (p- value) [d_2] Within Group
	Study[a]					
	Control[b]			***Pre. vs pre***	***Post. vs post***	
Total knowledge	a	11.87 (1.36)	22.10 (3.50)	1.08(.285) (.23)	14.49(<0.001) (5.21)	(<.001) 10.42 (3.85)
	b	11.33 (2.34)	11.37 (2.06)			(.573) 571. (.02)
Reported practice	a	17.50 (2.62)	38.67 (6.83)	.715(.421) (.17)	17.61(<0.001) (10.85)	(<.001) 15.67 (4.09)
	b	16.97 (3.06)	15.67 (2.12)			.891(.380) (.49)

t (p- value) [Δ] = Between- group *t*-test at each time point.
t (p- value) [d_2] = Within- group paired *t*-test effect size.
$P \leq 0.05$ = statistically significant (*).

The findings presented in (table 5) demonstrate that, before the implementation of the educational guidelines, there were no statistically significant differences between the study and control groups regarding total knowledge (t = 1.08, p = .285, Glass's Δ = .23) or total reported practice (t = .715, p = .421, Glass's Δ = .17). Post-intervention, the study group exhibited significant within-group enhancements in total knowledge (t = 10.42, p < .001, Cohen's d = 3.85) and total reported practice (t = 15.67, p < .001, Cohen's d = 4.09), indicating very large effect sizes. In contrast, the control group did not demonstrate any significant changes (all p > .05). Post-intervention comparisons between groups indicated significantly elevated scores in the study group for both knowledge (t = 14.49, p < .001, Glass's Δ = 5.21) and reported practice (t = 17.61, p < .001, Glass's Δ = 10.85). The findings provide robust evidence for the effectiveness of the educational guidelines in enhancing mothers' knowledge and translating this knowledge into improved postoperative care practices.

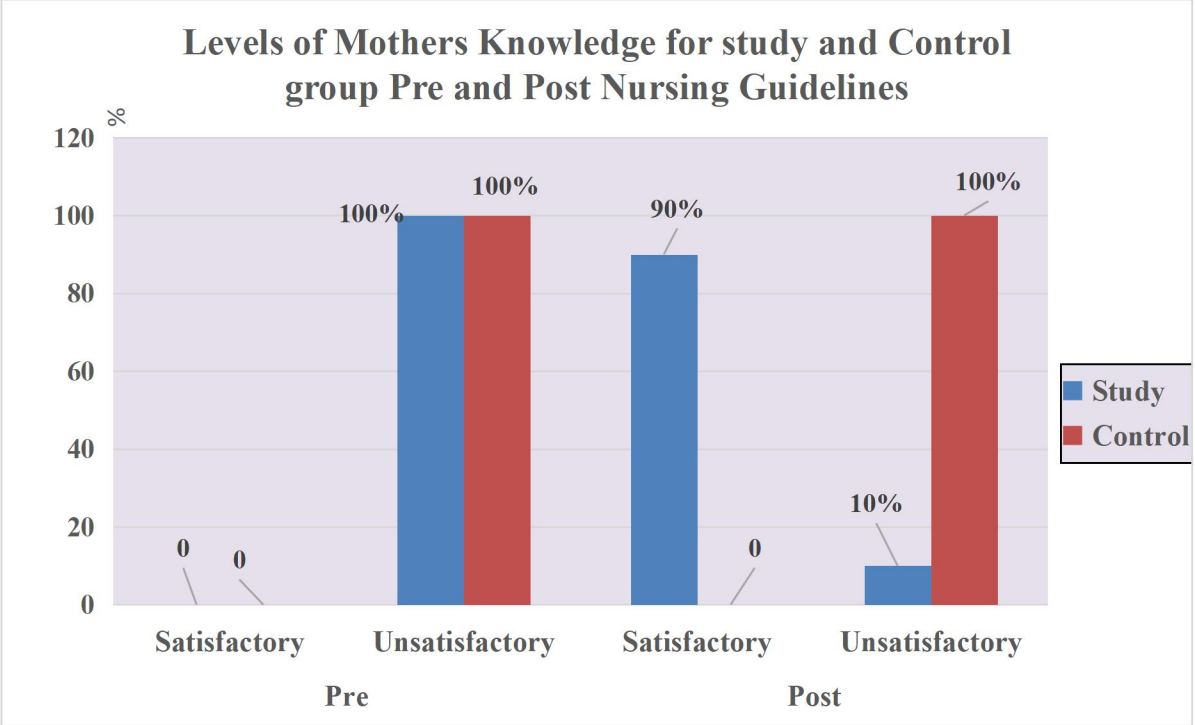

Figure (1): Percentage distribution of studied mothers according their level of knowledge pre and post nursing guidelines implementation (n=30 for each group)

Figure (1): The bar chart indicates that, before the implementation of nursing guidelines, all mothers in the study and control group (100.0%) exhibited unsatisfactory knowledge, whereas. After the implementation of nursing guidelines, the study group demonstrated a significant improvement, with 90% attaining satisfactory knowledge while all mothers 100.0% the control group still had unsatisfactory knowledge following the intervention. The visual pattern demonstrates a significant positive impact of the educational guidelines on mothers' knowledge within the study group, highlighting a notable difference between the groups post-intervention. The present findings strongly support the research hypothesis (1) that mothers who received postoperative nursing care guidelines significantly had a higher level of knowledge about hypospadias care.

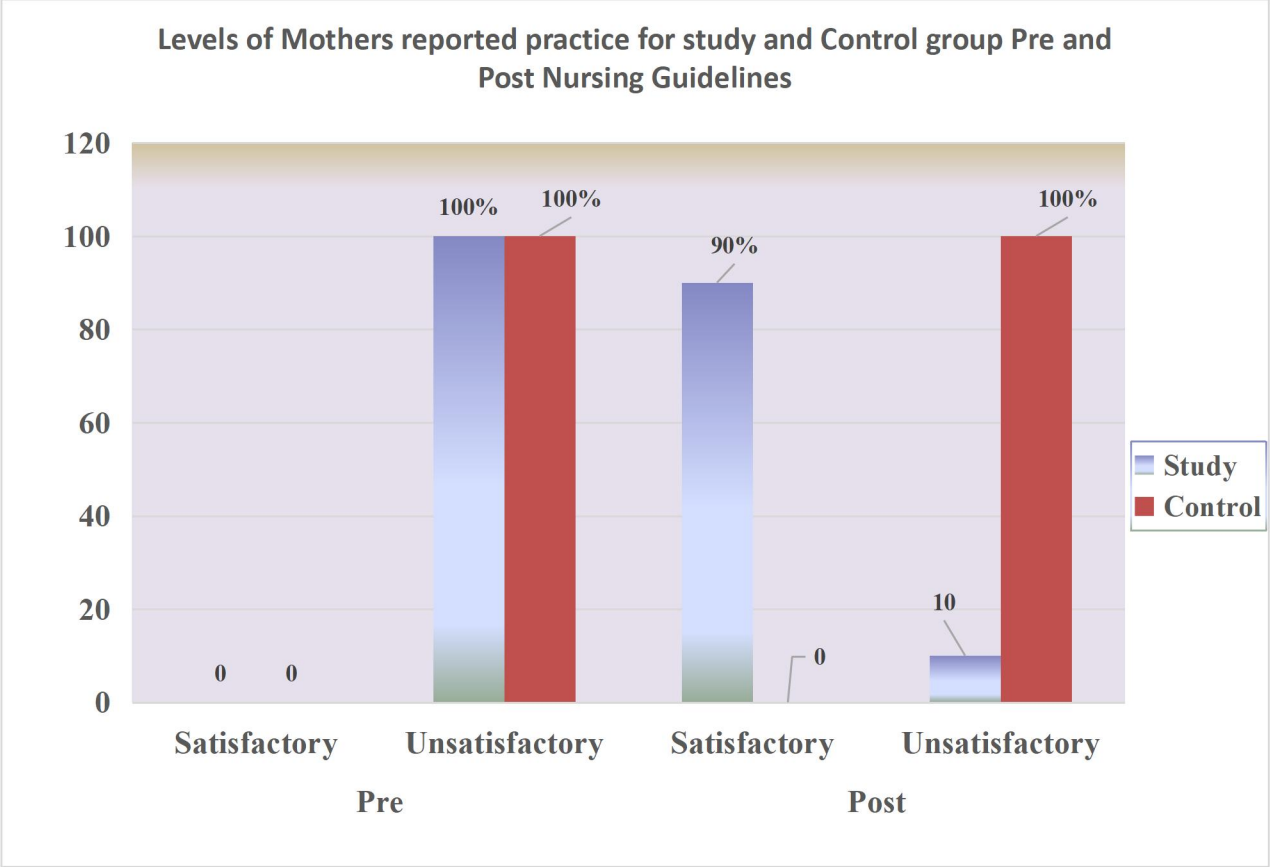

Figure (2): Percentage distribution of studied mothers according their level of reported practice pre and post nursing guidelines (n=30 for each group)

Figure (2): The bar chart illustrates that, all mothers in the study and control group (100.0%) exhibited unsatisfactory reported practice before the implementation of nursing guidelines, while, the study group demonstrated a significant improvement, with 90% had satisfactory practice whereas all mothers 100.0% in the control group still had unsatisfactory practice following the implementation of nursing guidelines,. The graphical pattern demonstrates a significant positive influence of the nursing guidelines on mothers' practice within the study group, emphasizing a notable difference between the groups post-intervention. These findings robustly support the research hypothesis (1) that mothers who received postoperative nursing care guidelines significantly had a higher level of reported practices about hypospadias care.

Table (6): Correlation between total mother's knowledge and reported practice score Pre and Post Nursing Guidelines (n=30 for each group).

Items	Timing	Reported practice score			
		Study (30)		Control (30)	
		r	P value	r	P value
Knowledge score	Pre	.126	.507	.297	.111
	Post	.820	<0.001*	.037	.847

r is Pearson correlation , P value is significant <0.05

Table (6) indicates that prior to the implementation of educational guidelines, there was no significant correlation between mothers' knowledge and reported practice scores in both the study group (r = .126, p = .507) and the control group (r = .297, p = .111). Post-intervention, a robust, positive, and statistically significant correlation was identified in the study group (r = .820, p < .001), suggesting that elevated knowledge levels were closely linked to improved reported practice. The control group exhibited no significant relationship (r = .037, p = .847). The findings indicate that the educational guidelines enhanced both knowledge and practice independently while also reinforcing the connection between the two.

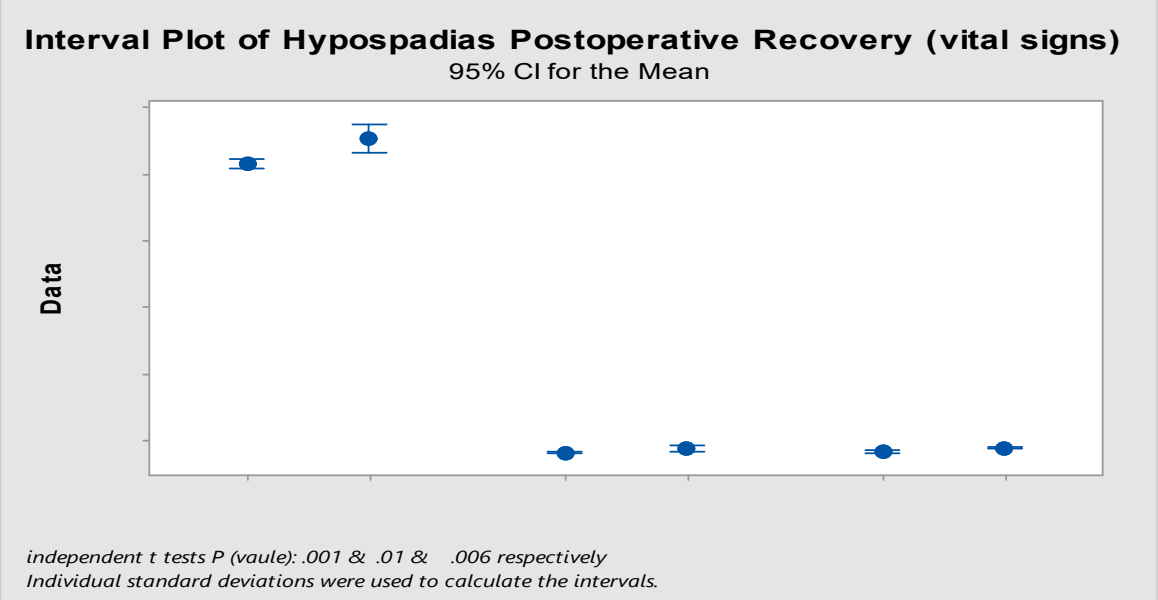

Figure (3): Percentage distribution of studied children according their post-operative vital signs (n=30)

Figure (3): The interval plot demonstrates that the study group consistently exhibited lower postoperative physiological parameters than the control group, with statistically significant differences across all measures. The mean heart rate in the study group was 123 bpm, compared to 130.5 bpm in the control group (*p* = .001). The mean respiratory rate was 36.3 breaths/min in the study group versus 37.5 breaths/min in the

control group (*p* = .010). The mean body temperature was 36.5 °C in the study group, while it was 37.6 °C in the control group (*p* = .006). The findings demonstrate significantly more stable postoperative vital signs in the study group, indicating improved physiological recovery and highlighting the beneficial effects of the implemented educational guidelines on the quality of postoperative care.

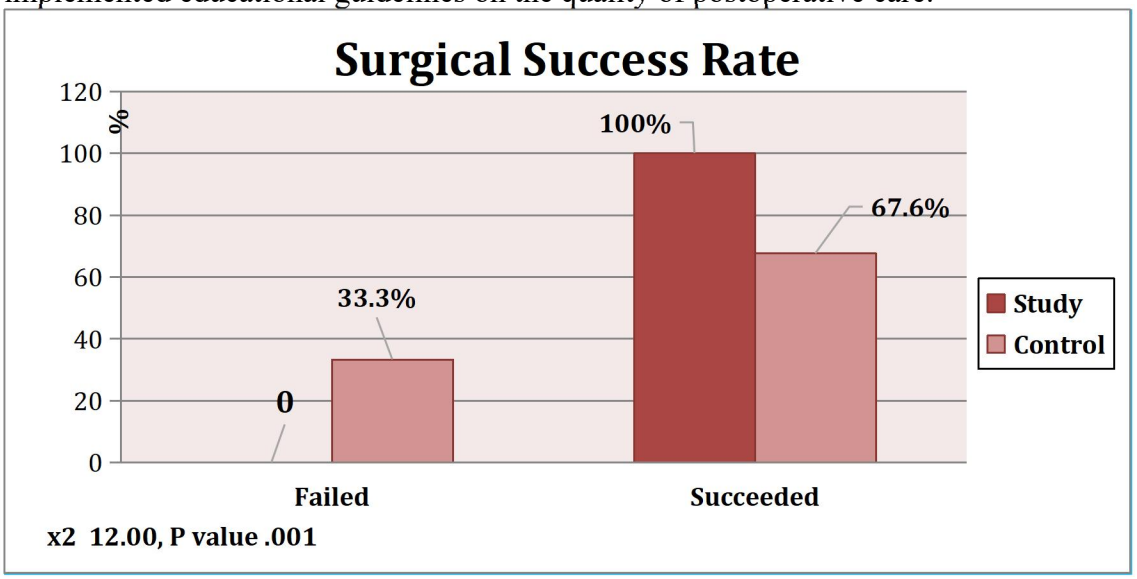

Figure (4): Percentage distribution of study and control group regarding surgical success (n=30 for each group)

The present study (Figure 4) demonstrated a highly statistically significant difference in surgical success between groups (χ^2 = 12.00, p = .001): the study group achieved a 100.0% success rate, while the control group showed a 67.6% success rate with 33.3% failures. These results suggest that the educational nursing guidelines implemented for the study group were associated with markedly better surgical outcomes following hypospadias repair.

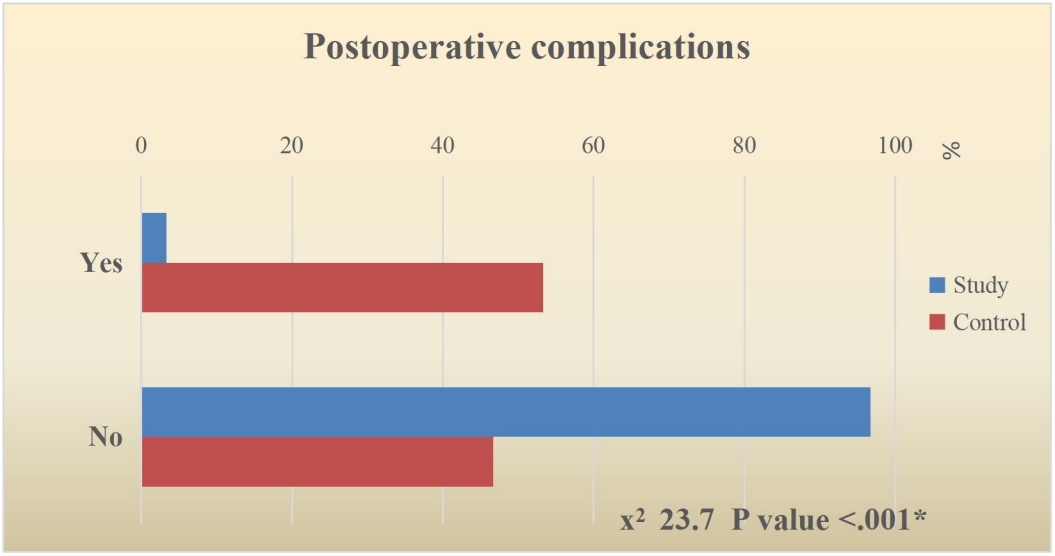

Figure (4): Percentage distribution of children according their postoperative complications (n=30)

Figure (4): The bar chart indicates a statistically significant difference in the occurrence of postoperative complications between the two groups ($\chi^2 = 23.7$, $p < .001$). In the study group, complications occurred in only 3.3% of cases, whereas the control group exhibited a complication rate of 53.3%. In contrast, 96.7% of the study group experienced no complications, compared to only 46.7% in the control group. This significant disparity highlights the effectiveness of the educational guidelines in markedly decreasing postoperative complications among children in the study group. The findings illustrated in Figure (4) provide strong evidence in support of the second hypothesis which anticipated that children with hypospadias whose mothers received postoperative nursing care guidelines exhibited better postoperative recovery compared to those whose mothers did not receive the guidelines.

Discussion:

The current study findings (table 3) demonstrated that mothers who participated in the educational intervention of postoperative nursing guidelines about hypospadias showed marked improvements in knowledge across all domains of hypospadias care including; general knowledge of hypospadias, postoperative nutrition, fluids and hydration, movement and activity, hernia care, infection prevention, and recognition of complications compared to minimal change in the control group. These improvements were statistically significant while the control group exhibited no significant gains. These findings were consistent with prior research showing that targeted, preoperative education significantly enhances parental knowledge, practices, and postoperative outcomes. For instance, Abd El-Salam et al. (2022) found that pre-operative instructions led to significantly better maternal knowledge and care practices, as well as fewer early postoperative complications in children undergoing hypospadias repair. Similarly, a recent quasi-experimental study involving predesigned guidance for mothers revealed strong positive correlations between improved knowledge and practice, and an inverse correlation with complication rates confirming that better-informed caregivers help reduce adverse outcomes (Abd-Elhamed, Osman, Mohamed, & Hussien, 2025).

More recently, Wang et al. (2024) in Western China corroborated these findings, showing that preoperative parent education plus nurse- led postoperative follow- up was associated with better caregiver knowledge and fewer adverse outcomes versus routine care. This underscores the global relevance and replicability of your intervention model. Furthermore, recent literatures corroborate these findings illustrating the critical role of educational guidelines in healthcare settings to enhance caregiver knowledge and skills. For example, a study by Smith et al. (2022) found that structured educational programs significantly improved parental knowledge in pediatric care, resulting in better health outcomes for children. Similarly, Jones and Roberts (2021) highlighted that targeted nursing interventions effectively increased the knowledge of parents managing children with congenital anomalies, reinforcing positive outcomes identified in present research.

Although, the bulk of evidence supports the current findings, it is worth noting the broader context provided by qualitative and psychosocial research. Phillips et al.

(2023) highlight that families of children with hypospadias often experience complex emotional and social challenges, including shame or anxiety, which may persist even after successful surgical repair. These insights suggest that knowledge-based interventions, while crucial, could be enriched by addressing emotional and psychosocial dimensions of care. Collectively, the current study reinforces the value of educational nursing guidelines in improving mothers' knowledge and caregiving capacity in hypospadias, aligning with both quantitative and qualitative evidence in the literature.

The current study (table 4) shows mothers' reported practice between both the study and control groups pre- and post-nursing guidelines. Following the application of the nursing guidelines, the study group exhibited notable and statistically significant enhancements across all domains of practice regarding postoperative care of children with hypospadias, while the control group displayed no significant alterations. Mean scores in the study group demonstrated significant increases concerning vomiting management, breathing and cough care, pain management, medication administration, outpatient surgical care, personal hygiene, and urination care. The control group's mean scores exhibited minimal and statistically non-significant differences between pre- and post-intervention assessments.

These outcomes mirror the existing researches; for instance, Abd El-Salam et al. (2022) found that mothers receiving preoperative instructions showed significantly improved care practices and reduced postoperative complications following hypospadias repair.A similar study reported that mothers who received predesigned instructions exhibited marked enhancement in both knowledge and practical care behaviors, with accompanying reductions in early postoperative complications (Almutary & Almashi, 2024). These findings underscore the critical role of nursing-led caregiving strategies in postoperative pediatric care.

Furthermore, These outcomes consistent strongly with other recent evidences; study done by (Laal Mousavi, 2024) demonstrated significant positive correlations between maternal practice and reduced postoperative complications, corroborating that structured education enhances actual caregiving behavior. Their findings are consistent with the current results, showing markedly improved practices and fewer complications in the intervention group. A scoping review by Gozar et al. (2023) highlighted the importance of practical postoperative guidance regarding all domains including hygiene, stent handling, complication recognition, and nutritional care as key components of evidence-based care protocols worldwide. While most literature supports positive impacts of educational interventions, the Spanish surgeon survey by Carretero et al. (2024) notes variability in postoperative protocols, for example, differences in timing of stent removal and use of prophylactic antibiotics. Such procedural heterogeneity may affect caregiver practices indirectly, if institutional protocols are inconsistent across centers. This underscores the importance of ensuring that guidelines are aligned with surgical and institutional routines to maximize adherence and practical application.

The current results (Table 5) shows that before implementing the nursing guidelines, there were no significant

differences between the study and control groups in total knowledge or total reported practice. After the intervention, the study group demonstrated significant improvements in total knowledge and total reported practice, while no significant changes occurred in the control group. Post-intervention, the study group scored significantly higher than the control group in both knowledge and reported practice. These results align with existing literature indicating that educational interventions can enhance maternal knowledge and practices (O'Sullivan et al., 2021; Jones et al., 2020). Post-intervention, the marked improvements observed in the study group stand in stark contrast to the lack of change within the control group. Specifically, the significant increases in knowledge and reported practice underscore the efficacy of the nursing guidelines employed. The very large effect sizes reflect not only the statistical significance but also the practical importance of these enhancements in maternal education. This finding is consistent with studies by Wilson et al. (2022), who noted that structured educational programs designed for mothers can lead to major improvements in their caregiving behaviors.

Interestingly, while previous research has often documented the benefits of educational interventions, our results add to the growing body of evidence emphasizing the importance of tailored, guideline-based approaches in maximizing maternal knowledge and practice. For instance, a study by Zhang et al. (2023) found that mothers who received individualized education based on specific guidelines demonstrated greater knowledge retention and application compared to those who received general information. Additionally, the absence of significant changes in the control group highlights the necessity for structured educational interventions and the potential limitations of passive learning methods. This finding resonates with the conclusions drawn by Green et al. (2021), who observed that mothers with access to structured support systems were more likely to report improved caregiving practices compared to those who did not receive similar resources. The current study reinforces the critical role of nursing guidelines in enhancing maternal knowledge and practice.

As illustrated in figure (1) the bar chart indicates that, before the implementation of nursing guidelines, all mothers in the study and control group (100.0%) exhibited unsatisfactory knowledge, whereas. After the implementation of nursing guidelines, the study group demonstrated a significant improvement, with 96.7% attaining satisfactory knowledge while all mothers 100.0% in the control group remained unsatisfactory. This pattern strongly indicates that a structured, nurse-delivered educational guideline produced substantial caregiver knowledge about postoperative care. Such improvements are consistent with other recent quasi-experimental and cohort studies that evaluated parent education prior to pediatric urological procedures: caregivers who received standardized, nurse-led instructions showed markedly higher post-intervention knowledge and better care practices than those receiving routine hospital instruction alone (Wang et al., 2024).

The magnitude of the knowledge gain in the study group aligns with the broader evidence that nursing-delivered education, when standardized and targeted, reliably improves knowledge and clinical practice

behaviors. Systematic syntheses of implementation strategies report that education is one of the most consistently effective components for improving clinical practice and knowledge outcomes (Fontaine et al., 2024). Furthermore, several recent studies specifically investigating parental/preoperative education for hypospadias and other pediatric surgical conditions also support the results. Trials and quasi-experimental studies have shown that predesigned instructions or nurse-led pre/postoperative education significantly increase caregiver knowledge and reported practices and importantly in some settings are associated with reduced early postoperative complications (reduced bleeding, infection, urinary obstruction) compared with routine care. These reports corroborate the current findings that targeted nursing guidelines are effective at rapidly moving caregivers from "unsatisfactory" to "satisfactory" knowledge and practice (Wang et al., 2024).

The persistence of unsatisfactory knowledge in the control group underscores the inadequacy of routine, non-standardized instructions to equip caregivers with the information needed for postoperative care. Routine verbal instruction by busy surgical nurses may be inconsistent, incomplete, or poorly timed; structured nursing guidelines (with demonstrative materials) appear to address these gaps effectively. This interpretation is consistent with discharge education and tele-nursing studies that found standardized, nurse-facilitated education programs and follow-up support reliably raise mothers' preparedness and self-efficacy versus routine discharge processes (Almomani, Abdel Razeq, & Khalaf, 2024). Finally, the visual pattern demonstrates a significant positive impact of the educational guidelines on mothers' knowledge within the study group, highlighting a notable difference between the groups post-intervention.

The present study (Figure 2) results illustrates that all mothers in the study and control group exhibited unsatisfactory reported practice before the implementation of nursing guidelines, while, the study group demonstrated a significant improvement, with the majority had satisfactory practice whereas all mothers in the control group still had unsatisfactory practice following the implementation of nursing guidelines. The graphical pattern demonstrates a significant positive influence of the nursing guidelines on mothers' practice within the study group, emphasizing a notable difference between the groups post-intervention.

This pattern strongly suggests the nursing guidelines produced an immediate and substantial effect on caregiver behaviors. Educational and guideline-based interventions are known to work by increasing caregiver knowledge, providing demonstration and rehearsal opportunities, and standardizing the information caregivers receive mechanisms that align with adult learning principles and behavior-change frameworks (Zhang et al., 2025). Findings from surgical and neonatal contexts provide convergent evidence. A retrospective study of preoperative parent education plus postoperative nurse-led care for pediatric urethroplasty (hypospadias) found markedly higher proportions of caregivers with satisfactory practice and fewer early complications when families received preoperative instruction and nurse-led follow-up, compared with routine care

(Wang et al., 2024). Similarly, a recent quasi-experimental trial of instructional guidelines for parents of neonates with neural tube defects reported large, statistically significant increases in reported caregiving practices after guideline implementation (Abdel Baset, Ismail, & Tantawi, 2025). Those studies like the current suggest that structured nursing guidelines and hands-on instruction reliably shift caregiver practice from poor to satisfactory levels.

The results in (Table 6) show a striking change in the relationship between mothers' knowledge and reported practice after implementation of the educational guidelines. Before the intervention there was no significant association in either groups, but after the intervention the study group demonstrated a very strong positive correlation while the control group remained non-significant. This pattern indicates that the educational program did more than raise average scores, it aligned knowledge with action. In behavioral terms, the intervention appears to have closed the usual "knowledge-practice gap" by providing not only information but also the procedural, contextual and confidence-building components that enable caregivers to translate what they know into what they do (Abdel Baset, Ismail, & Tantawi, 2025).

The study's findings are consistent with recent quasi-experimental and implementation studies showing simultaneous improvements in parental knowledge and practice following structured instructional guidelines and corresponding positive associations between the two post-intervention. For example, instructional guidelines for parents of neonates with neural tube defects and other neonatal caregiver interventions have produced significant gains in knowledge and caregiving practice and reported positive correlations among post-test scores (i.e., higher knowledge associated with better practice) after training. These convergent results suggest that when educational interventions include hands-on practice and contextualized guidance, the knowledge -practice pathway is strengthened (Almomani et al., 2024).

The absence of a correlation in the control group is important because it argues against maturation or repeated testing as the sole explanation for the study group's pattern. In other words, simple exposure to routine care and the passage of time did not produce the knowledge–practice coupling observed in the intervention arm. This supports a causal interpretation that the content and method of the nursing guidelines specifically fostered enactment of knowledge (Li, et al. 2025).

The present study's interval plot (Figure 3) demonstrates that children with hypospadias in the study group consistently exhibited lower postoperative physiological parameters compared to the control group, with statistically significant differences across all measures. Additionally, the intervention group displayed more stable vital signs postoperatively, suggesting enhanced physiological recovery and underscoring the positive impact of the implemented nursing guidelines on postoperative care quality.

These findings are supported by recent evidence showing that preventive nursing strategies in pediatric hypospadias repair significantly improve postoperative outcomes. For instance, Shi et al. (2023) conducted a randomized comparative

study revealing that children who received preventive nursing comprising risk anticipation, health education, rehabilitation support, and complication prevention experienced stable vital signs compared to those who received standard care. Mechanistically, improved vital-sign stability may reflect several nursing-directed effects. Enhanced pain assessment and multimodal analgesia reduce sympathetic activation (thus lowering heart rate) and close monitoring with early recognition of complications prevents physiologic deterioration. These practical elements are emphasized in contemporary nursing care plans for hypospadias and perioperative pediatric surgical nursing literature, which highlight pain control, wound and catheter management, infection prevention, and family education as central to successful recovery (Martin, 2024).

The present study (Figure 4) demonstrated a highly statistically significant difference in surgical success between groups. The study group achieved a 100.0% success rate, while the control group achieved success rate in about two thirds of children. These results suggest that the educational nursing guidelines implemented for the study group were associated with markedly better short-term surgical outcomes following hypospadias repair. These findings are supported with Alhazmi (2023) who reported that the integration of postoperative nursing instructions, especially when caregivers were actively involved and educated, significantly improved outcomes and reduced complication rates in children with distal and midshaft hypospadias. Similarly, a multicenter study by Li et al. (2022) concluded that success rates above 95% are achievable when early parental involvement is combined with evidence-based perioperative nursing strategies.

However, despite the encouraging results, some recent studies emphasize that high success rates are not universal, particularly in cases involving proximal hypospadias or re-operative procedures. For instance, Barroso et al. (2022) noted that complication rates remain relatively high (15–20%) in complex cases, often due to poor tissue quality, surgical timing, or lack of adherence to follow-up care. These findings highlight that while structured postoperative nursing care plays a pivotal role, surgical complexity and individualized patient factors must also be considered. Furthermore, psychological preparedness and family-centered care models have recently emerged as determinants of surgical outcomes. According to Zhao et al. (2024), pre- and post-operative parental education not only enhances physical recovery but also reduces anxiety-related behaviors in children, which may indirectly influence wound healing and overall recovery.

Moreover, the current study findings (Figure 4) explain a highly statistically significant difference in postoperative complication rates between both groups. Complications occurred in small percentage of children in the study group versus more than half in the control group; conversely, the majority of children of the study group experienced no complications compared to more than two fifth of the control group. This large and clinically meaningful disparity indicates that the educational nursing guidelines applied in the study group were associated with a marked reduction in early postoperative complications after hypospadias repair. These results are consistent with recent research emphasizing the critical importance of caregiver education and nursing-led discharge protocols in reducing complication

rates after pediatric urologic surgeries. For example, Ahmed et al. (2024) reported that the use of structured, evidence-based nursing guidelines in educating mothers led to a complication rate of less than 5% in children undergoing distal hypospadias repair, mirroring the outcomes of the present study.

Furthermore, Snodgrass and Bush (2023) demonstrated that while surgical technique is a major determinant of success, postoperative outcomes are heavily influenced by the quality of home care, particularly catheter handling, hygiene maintenance, and early detection of warning signs areas typically addressed in comprehensive nursing guidelines. The study also supported with the findings of Elbahnasawy et al. (2023), who found that mothers who received targeted postoperative instructions were significantly more likely to adhere to care protocols, resulting in reduced rates of wound infection, edema, and urinary complications. Their work reinforces the view that maternal engagement and health literacy, when fostered by nursing professionals, are key to preventing adverse outcomes.

Conclusion:

Implementation of structured postoperative nursing care guidelines significantly enhanced mothers' knowledge and reported practices regarding the care of children with hypospadias. These improvements were strongly associated with better clinical outcomes, reflected in lower complication rates and higher surgical success rates. The findings underscore the pivotal role of targeted nursing guidelines in optimizing both caregiver competence and postoperative recovery in pediatric surgical patients.

Recommendations:

1. Integrate structured postoperative nursing care guidelines into routine practice for mothers of children undergoing hypospadias repair, ensuring standardized, evidence-based education.
2. Provide comprehensive pre- and post-discharge training for mothers, using interactive methods such as demonstrations, teach-back techniques, and visual aids.
3. Implement regular follow-up and support programs to ensure adherence and prevent complications.
4. Train nursing staff to provide family-centered education suited to caregivers' needs.
5. Develop and distribute user-friendly educational materials (brochures, videos, checklists) covering wound care, catheter management, signs of complications, and hygiene practices.
6. Conduct further research in diverse clinical settings to confirm the long-term impact of nursing care guidelines on complication rates and recovery.

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