TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

QUALITY OF LIFE OUTCOMES FOR PEOPLE WITH SUPRAPUBIC CATHETER VS. INDWELLING URETHRAL CATHETER

ZAHID ULLAH KHAN[1] WAQAR AHMAD*[2], HAMZA KHAN[3], ISRAR ALI KHAN[4]

[1]SPECIALIST REGISTRAR, INSTITUTE OF KIDNEY DISEASES HAYATABAD PESHAWAR
[2*]CONSULTANT, UROLOGY DEPARTMENT, KHALIFA GUL NAWAZ TEACHING HOSPITAL, MTI BANNU
[3]RESIDENT UROLOGIST, UROLOGY DEPARTMENT, LADY READING HOSPITAL PESHAWAR KPK
[4]ASSISTANT PROFESSOR, UROLOGY DEPARTMENT KHALIFA GUL NAWAZ TEACHING HOSPITAL, MTI BANNU

Corresponding Author
Waqar Ahmad
Consultant Urology department, Khalifa Gul Nawaz Teaching Hospital, MTI Bannu
Email: Waqarbarki93@gmail.com

Abstract

Introduction: Long-term urinary catheterization can significantly affect quality of life (QoL). Suprapubic catheter (SPC) and indwelling urethral catheter (IUC) are commonly used, but their impact on QoL and complication rates may differ.

Objective: To compare QoL outcomes and catheter-related complications in patients with SPC versus IUC.

Methodology: A comparative cross-sectional study was conducted at Institute of Kidney diseases Hayatabad Peshawar for a period of six months from March 2025 to August 2025. A total of 140 adult patients requiring long-term catheterization (≥3 months) were enrolled, with 70 using SPC and 70 using IUC. QoL was assessed using the WHOQOL-BREF questionnaire. Catheter-related complications were recorded. Independent t-tests and Chi-square tests compared continuous and categorical variables, respectively. Multivariate linear regression was performed to adjust for confounders including age, gender, comorbidities, duration of catheter use, and complications.

Results: SPC users demonstrated significantly higher QoL scores across all domains: physical (62.8 ± 11.4 vs. 55.6 ± 12.1, $p < 0.001$), psychological (65.1 ± 10.7 vs. 59.3 ± 11.5, $p = 0.002$), social (61.0 ± 12.9 vs. 54.7 ± 13.2, $p = 0.005$), and environmental (64.5 ± 10.9 vs. 58.6 ± 11.3, $p = 0.003$). CAUTIs occurred in 23 (32.9%) SPC users versus 39 (55.7%) IUC users ($p = 0.006$), and urethral trauma occurred only in IUC users 16 (22.9%). Multivariate regression confirmed catheter type as an independent predictor of QoL.

Conclusion: SPC is associated with better QoL and fewer urethral complications compared with IUC, making it a preferred long-term catheterization option in suitable patients, with attention to stoma care.

Keywords: Catheters, Urinary; Quality of Life; Suprapubic Catheterization; Urinary Tract Infections; Cross-Sectional Studies

INTRODUCTION

Urinary catheterization is widely used to manage bladder dysfunction in patients with urinary retention, neurogenic bladder disorders, postoperative needs, and chronic mobility limitations [1]. The two most common long-term catheterization methods are the indwelling urethral catheter (IUC) and the suprapubic catheter (SPC) [2]. Although both achieve continuous urinary drainage, they differ in insertion route, associated risks, and their impact on patient comfort and overall quality of life (QoL) [3].

The indwelling urethral catheter is often selected as it is easy to insert and it is applicable in a short-term [4]. Nevertheless, the chronic use of IUCs is associated with such complications as catheter-associated urinary tract infections (CAUTI), urethral strictures, bladder spasms, discomfort, and deteriorated mobility [5]. These complications tend to go beyond the physical symptoms to influence the psychological and social engagement and reduce the overall QoL [6].

Another method that can be used namely suprapubic catheters is also surgically inserted and placed in the lower abdomen especially in chronic catheter users [7]. The SPCs are linked to the reduction of urethral complications, easier

maintenance, and the increase of comfort in a high number of patients [8]. There are also reports of possible advantages of mobility, hygiene, and sexual functioning [9]. However, SPCs similarly face such issues as stoma infections and complications of the insertion process [10]. The selection of SPC or IUC thus involves the consideration of patient specific needs and long term outcomes [11].

Quality of life has become a central outcome in evaluating urinary catheterization, yet existing research shows mixed findings regarding whether SPCs offer superior QoL compared to IUCs [12]. Evidence remains limited, especially from diverse clinical settings and long-term user populations [13].

A clear gap exists in understanding which catheter type provides better overall quality of life; therefore, this study aims to compare QoL outcomes between users of suprapubic catheters and indwelling urethral catheters.

METHODOLOGY

Study Design and Setting: A comparative cross-sectional study was conducted at Institute of Kidney diseases Hayatabad Peshawar for a period of six months from March 2025 to August 2025. The objective was to determine the quality of life (QoL) outcome in patients who have suprapubic catheters (SPC) and those patients with indwelling urethral catheters (IUC).

Sample Size Calculation: The sample size was calculated using the WHO standard formula for comparing two independent means [14]:

A two-sided α of 0.05, 80% power, and a moderate effect size (Cohen's $d = 0.5$) were assumed. This effect size was supported by previous literature reporting comparable QoL differences between catheter types, which observed an effect size of approximately 0.49 between suprapubic and transurethral catheter users [2]. Based on these parameters, the required sample was 64 participants per group (128 totals). After adjusting for a 10% non-response rate, the final sample size was set at 140 participants (70 per group).

Sample Selection and Participants: A total of 140 adult patients needing long-term urinary catheterization (≥3 months) was randomly recruited into the study by means of the outpatient urology clinics and inpatient wards. The sample was split into two groups with 70 suprapubic catheter (SPC) users in Group A, and 70 indwelling urethral catheter (IUC) users in Group B.

Inclusion and Exclusion criteria: The inclusion criteria consisted of the following: Ages: had to be 18 years or older, suprapubic or indwelling urethral catheter: had to continuously use the catheter which was on at least three months, understanding and answering the questionnaire: had to be able to understand and respond to the questionnaire, signed informed consent: had to be signing an informed consent. The participants had to be excluded because of severe comorbidities, which alone could affect the quality of life (e.g., advanced malignancy), or because of a catheter change in the past two weeks because of infection or other complications.

Data Collection Procedure: The structured questionnaire was applied to gather data which was collected by the trained research staff. The questionnaire included demographic and clinical data, such as age, gender, underlying diagnosis, comorbidities, and catheter use period. History of catheters (complications CAUTIs, catheter blockage, catheter leakage, catheter trauma at stoma, catheter infection), the frequency of catheter changes was also taken. The validated WHOQOL-BREF questionnaire [15] that measures physical, psychological, social, and environmental domains determined the quality of life and the scores were scored between 0-100 whereby a higher score gives better quality of life.

Variables: The independent variable of the research was a type of the catheter suprapubic catheter (SPC) or indwelling urethral catheter (IUC). The WHOQOL-BREF domain scores which comprised physical, psychological, social and environmental domains were the dependent variables. The covariates, which have been taken into account in the analysis, were age, gender, period of catheter use, comorbidities, and catheter-related complications.

Statistical Analysis: SPSS version 26 was used to analyze the data. Mean ± standard deviation was used to summarize continuous variables whereas frequencies and percentages were used to summarize categorical variables. The t -tests were conducted on independent samples and Chi-square tests were conducted to compare the scores of QoL and provide categorical comparisons between groups. To adjust the possible confounding factors (age, gender, comorbidities, and time that the catheter was used in place) the multivariate linear regression analysis were conducted on each QoL domain. A p-value of less than 0.05 was taken as statistically significant.

Ethical Considerations: The Institutional Review Board (IRB) of Hayatabad Medical Complex at Peshawar gave their ethical approval. In order to ensure confidentiality, free and informed consent, participants were assured of free will to leave at any given point.

RESULTS

A total of 140 participants were enrolled, including 70 suprapubic catheter (SPC) users and 70 indwelling urethral catheter (IUC) users. As shown in Table 1, both groups were comparable in terms of mean age (SPC: 63.1 ± 12.8

years; IUC: 59.8 ± 13.5 years, t = 1.60, p = 0.112), gender distribution (SPC: 43(61.4%) males; IUC: 39(55.7%) males, $\chi^2 = 0.46$, p = 0.498), and comorbidities including diabetes mellitus (SPC: 18(25.7%); IUC: 21(30.0%), $\chi^2 = 0.33$, p = 0.566), hypertension (SPC: 26(37.1%); IUC: 24(34.3%), $\chi^2 = 0.12$, p = 0.723), and neurogenic bladder (SPC: 31(44.3%); IUC: 28(40.0%), $\chi^2 = 0.28$, p = 0.598). The only statistically significant difference between groups was

the duration of catheter use, which was longer in SPC users (14.2 ± 4.8 months) compared to IUC users (11.5 ± 5.1 months, t = 3.38, p = 0.001).

Table 1: Baseline Demographic and Clinical Characteristics of Participants (N = 140)

Variable	SPC Group (n = 70)	IUC Group (n = 70)	Test	Test value	p-value
Mean Age (years)	63.1 ± 12.8	59.8 ± 13.5	t-test	t = 1.60	0.112
Male Gender	43 (61.4%)	39 (55.7%)	Chi-square	$\chi^2 = 0.46$	0.498
Duration of Catheter Use (months)	14.2 ± 4.8	11.5 ± 5.1	t-test	t = 3.38	0.001
Diabetes Mellitus	18 (25.7%)	21 (30.0%)	Chi-square	$\chi^2 = 0.33$	0.566
Hypertension	26 (37.1%)	24 (34.3%)	Chi-square	$\chi^2 = 0.12$	0.723
Neurogenic Bladder	31 (44.3%)	28 (40.0%)	Chi-square	$\chi^2 = 0.28$	0.598

Legend: Independent t-test was used for continuous variables (Mean Age: t = 1.60, p = 0.112; Duration of Catheter Use: t = 3.38, p = 0.001). Chi-square test was used for categorical variables (Male Gender: $\chi^2 = 0.46$, p = 0.498; Diabetes Mellitus: $\chi^2 = 0.33$, p = 0.566; Hypertension: $\chi^2 = 0.12$, p = 0.723; Neurogenic Bladder: $\chi^2 = 0.28$, p = 0.598). Statistically significant at $p < 0.05$.

There were significant differences in catheter-related complications. As demonstrated in Figure 1, CAUTI was found in 23(32.9%) of SPC and 39(55.7%) of IUC users ($\chi^2 = 7.51$, p = 0.006), and urethral trauma was only observed in IUC users 16 (22.9%) ($\chi^2 = 18.33$, $p < 0.001$).Stoma infections were exclusive to SPC users 10(14.3%) ($\chi^2 = 10.53$, p = 0.001). Catheter blockage (SPC: 19(27.1%), IUC: 26(37.1%), $\chi^2 = 1.68$, p = 0.195) and leakage (SPC: 12(17.1%), IUC: 18(25.7%), $\chi^2 = 1.56$, p = 0.212) did not differ significantly between groups.

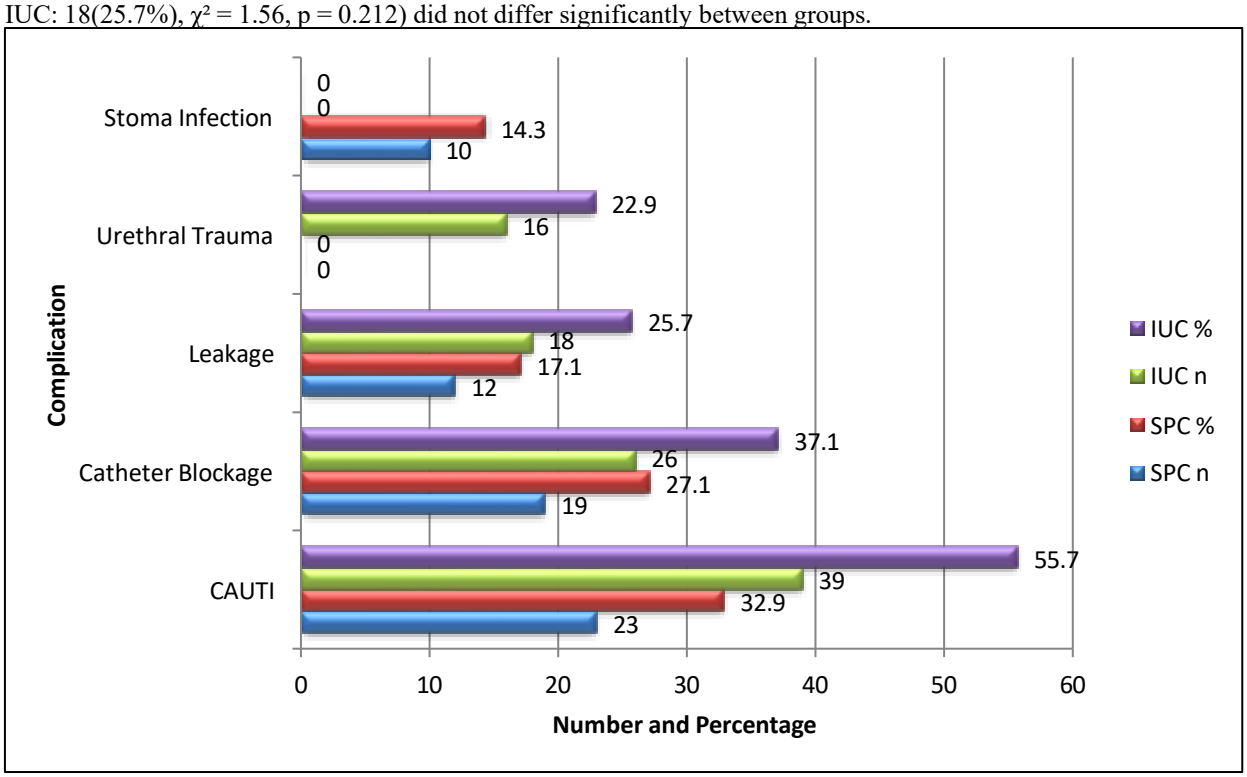

Figure 1: Catheter-Related Complications among Study Participants

Legend: Chi-square test was applied for all categorical variables: CAUTI ($\chi^2 = 7.51$, p = 0.006), Catheter Blockage ($\chi^2 = 1.68$, p = 0.195), Leakage ($\chi^2 = 1.56$, p = 0.212), Urethral Trauma ($\chi^2 = 18.33$, $p < 0.001$), Stoma Infection ($\chi^2 = 10.53$, p = 0.001). Statistically significant at $p < 0.05$.

SPC users demonstrated significantly higher QoL scores compared to IUC users across all WHOQOL-BREF domains. As shown in Table 2, physical domain scores were 62.8 ± 11.4 versus 55.6 ± 12.1 in IUC users (t = 3.63, $p < 0.001$),

psychological scores were 65.1 ± 10.7 versus 59.3 ± 11.5 (t = 3.14, p = 0.002), social scores were 61.0 ± 12.9 versus 54.7 ± 13.2 (t = 2.86, p = 0.005), and environmental scores were 64.5 ± 10.9 versus 58.6 ± 11.3 (t = 3.05, p = 0.003). The largest difference was observed in the physical domain, indicating better physical functioning in SPC users.

Table 2: Comparison of WHOQOL-BREF Quality of Life Domain Scores

QoL Domain	SPC Mean ± SD	IUC Mean ± SD	Test Statistic	p-value
Physical	62.8 ± 11.4	55.6 ± 12.1	t = 3.63	<0.001
Psychological	65.1 ± 10.7	59.3 ± 11.5	t = 3.14	0.002
Social	61.0 ± 12.9	54.7 ± 13.2	t = 2.86	0.005
Environmental	64.5 ± 10.9	58.6 ± 11.3	t = 3.05	0.003

Legend: Independent t-test was used to compare WHOQOL-BREF domain scores: Physical (t = 3.63, p < 0.001), Psychological (t = 3.14, p = 0.002), Social (t = 2.86, p = 0.005), Environmental (t = 3.05, p = 0.003). Statistically significant at p < 0.05.

Multivariate linear regression showed that catheter type remained a significant independent predictor of QoL across all domains after adjusting for age, gender, comorbidities, duration of catheter use, and catheter-related complications. As shown in Table 3, SPC use was associated with higher scores in the physical domain (β = +5.87, 95% CI: 2.98–8.75, t = 4.12, p < 0.001), psychological domain (β = +4.92, 95% CI: 1.85–7.98, t = 3.16, p = 0.002), social domain (β = +5.41, 95% CI: 1.99–8.82, t = 3.20, p = 0.003), and environmental domain (β = +4.73, 95% CI: 1.65–7.82, t = 3.05, p = 0.003), indicating consistent superiority of SPC over IUC.

Table 3: Multivariate Linear Regression for QoL Scores Adjusted for Confounders

QoL Domain	Beta Coefficient (Catheter Type)*	95% CI	Test Statistic	p-value
Physical	+5.87	2.98 – 8.75	t = 4.12	<0.001
Psychological	+4.92	1.85 – 7.98	t = 3.16	0.002
Social	+5.41	1.99 – 8.82	t = 3.20	0.003
Environmental	+4.73	1.65 – 7.82	t = 3.05	0.003

Legend: Multivariate linear regression adjusted for age, gender, comorbidities, duration of catheter use, and complications. Beta coefficients for catheter type indicate SPC superiority: Physical (β = +5.87, t = 4.12, p < 0.001), Psychological (β = +4.92, t = 3.16, p = 0.002), Social (β = +5.41, t = 3.20, p = 0.003), Environmental (β = +4.73, t = 3.05, p = 0.003).

Overall QoL differed significantly between groups. As illustrated in Figure 2, a higher proportion of SPC users achieved high QoL 29(41.4%) compared to IUC users 12(17.1%) (χ^2 = 9.51, p = 0.002), while low QoL was more common among IUC users 30(42.9%) versus 16(22.9%) in SPC (χ^2 = 8.78, p = 0.003). Moderate QoL scores did not differ significantly between groups (SPC: 25(35.7%), IUC: 28(40.0%), χ^2 = 0.29, p = 0.589).

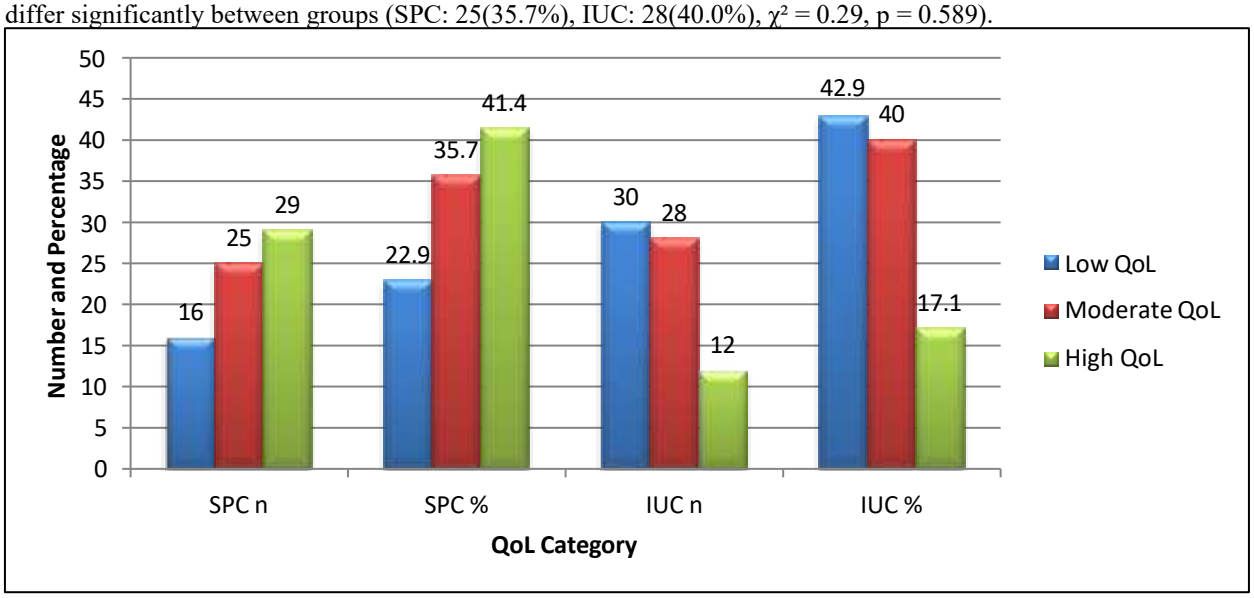

Figure 2: Overall Quality of Life Categories Based on Composite Scores

Legend: Chi-square test applied for all comparisons: Low QoL (χ^2 = 8.78, p = 0.003), Moderate QoL (χ^2 = 0.29, p = 0.589), High QoL (χ^2 = 9.51, p = 0.002). Statistically significant at p < 0.05.

DISCUSSION

This study demonstrated that patients using suprapubic catheters (SPC) had significantly better quality of life compared with those using indwelling urethral catheters (IUC). SPC users reported fewer CAUTIs and no urethral trauma, while stoma infections occurred only in the SPC group. All WHOQOL-BREF domains showed higher scores in SPC users, and catheter type remained an independent predictor of QoL after adjustment for confounders.

Compared with existing literature, these findings align with research showing that SPC use tends to reduce symptomatic infections, urethral irritation, and discomfort compared with long-term urethral catheterization [16]. The same results have been reported by previous researchers who discovered that SPC users feel less restricted in their mobility and more comfortable in their everyday activities, as the scores of physical and environmental factors are also higher here [17].

Moreover, previous studies have demonstrated that urethral catheters frequently have a role in embarrassment, pain, and social limitation, which is the same case with the lower psychological and social scores among IUC users in this study [18]. Other reports also emphasize that patients tend to like SPCs due to the ease of changing catheters and the lack of interference with sexual activity, which determines the increased QoL in our SPC group [19]. Although some sources mention that the QoL benefit can be advantageous in patients with a high degree of comorbidity or near complete immobility, the general trend in the available literature is that SPC is the preferable choice in the majority of long-term catheter users [20].

Limitations and Future Suggestions: The study was also limited because of single-center studies. sectional data, the use of self-reported QoL scores and possible unmeasured. functional and socioeconomic status confounders. At the rate of complications, it was evaluated as. the patient level instead of device-days that can lead to comparison with other studies. Longitudinal multi-centre research-based studies need to be incorporated into future research as it would determine QoL changes across time. time, feature device-day complication rates, investigate cost-effectiveness, and involve. qualitative measurement in order to get a better view of patient experiences and preferences.

CONCLUSION

The Suprapubic catheterization is characterized by a much more improved quality of life than. indwelling urethral catheterization between physical, psychological, social and environmental. domains. Less urethral complications and CAUTIs are observed among the users of SPC, whereas the stoma-related. issues remain manageable. These findings support the consideration of SPC as a preferred long-term catheterization method for suitable patients, with careful monitoring and patient education to minimize stoma complications.

REFERENCES

1. Wiedemann A, Gedding C, Heese M, Stein J, Manseck A, Kirschner-Hermanns R, Karstedt H, Schorn A, Wagner A, Moll V, Unger U. Quality of life for wearers of a suprapubic or transurethral bladder catheter as lifelong permanent care. Der Urologe. Ausg. A. 2021 Oct 4;61(1):18-30. doi.org/10.1007/s00120-021-01642-1
2. Çulha Y, Büyükyılmaz F, Çulha MG. Effects of Different Urinary Catheterization Practices on Urinary Complications and Quality of Life. The New Journal of Urology. 2025 Feb 1;20(1):32-9. doi.org/10.33719/nju1614575
3. Christiaans CH, van Veen FE, Scheepe JR, Blok BF. Patient satisfaction, quality of life, and catheter-related complications in long-term urinary catheter users: a nationwide survey. World Journal of Urology. 2025 Dec;43(1):1-8. doi.org/10.1007/s00345-025-05850-8
4. Youssef N, Shepherd A, Best C, Hagen S, Mackay W, Waddell D, El Sebaee H. The quality of life of patients living with a urinary catheter and its associated factors: a cross-sectional study in Egypt. InHealthcare 2023 Aug 11 (Vol. 11, No. 16, p. 2266). MDPI. doi.org/10.3390/healthcare11162266
5. Barken KB, Vaabengaard R. A scoping review on the impact of hydrophilic versus non-hydrophilic intermittent catheters on UTI, QoL, satisfaction, preference, and other outcomes in neurogenic and non-neurogenic patients suffering from urinary retention. BMC urology. 2022 Sep 19;22(1):153. doi.org/10.1186/s12894-022-01102-8
6. Ndomba AL, Laisser RM, T. Konje E, Silago V, Mwanga JR, Mshana SE. Quality of life among out-patients with long-term indwelling urinary catheter attending Urology Clinic at a Tertiary Hospital in Northwestern Tanzania. Discover Social Science and Health. 2022 Jun 6;2(1):7. doi.org/10.1007/s44155-022-00010-4
7. Rao C, Taheem M, Nnorom I, Veer S, Mahesan T, Faure Walker N, Nitkunan T. Suprapubic catheter insertion: a multicentre review on mortality during short-, medium-and long-term follow-up. The Annals of The Royal College of Surgeons of England. 2025 Jul 25. doi.org/10.1308/rcsann.2025.0058

8. Ndomba AL, Laisser RM, Konje ET, Mwanga JR, Mshana SE. Life with an indwelling urinary catheter: Experiences from male patients attending the Urology Clinic at a Tertiary Hospital in Northwestern Tanzania—A qualitative study. Nursing Reports. 2022 Oct 26;12(4):791-803. doi.org/10.3390/nursrep12040077
9. Christiaans C, van Veen F, Blok B. 218-Patient satisfaction and Quality of Life in long-term urinary catheter users in the Netherlands: a nationwide survey study. Continence. 2025 Jan 1;15:102142. doi.org/10.1016/j.cont.2025.102142
10. Wiedemann A, Weinhofer M, Stein J, Linné C, Kirschner-Hermanns R, Schorn A, Wagner A, Moll V, Unger U, Salem J, Liebald T. Comparison of catheter-associated quality of life in external urinary diversion: nephrostomy vs. suprapubic catheter. Der Urologe. Ausg. A. 2022 Jan 13;61(1):31-40. doi.org/10.1007/s00120-021-01745-9
11. Engelsgjerd S, Kodres-O'Brien S, Choudhury E, Garijo BM, Mason JB, Kowalczyk KJ. Outcomes and safety of suprapubic vs urethral catheterization following pelvic fascia–sparing robotic prostatectomy. Urology Practice. 2024 Mar;11(2):376-84. doi.org/10.1097/UPJ.0000000000000492
12. Hobbs C, Howles S, Derry F, Reynard J. Suprapubic catheterisation: A study of 1000 elective procedures. BJU international. 2022 Jun;129(6):760-7. doi.org/10.1111/bju.15727
13. van Doorn T, Coolen RL, Groen J, Scheepe JR, Blok BF. Quality of life aspects of intermittent catheterization in neurogenic and non-neurogenic patients: a systematic review on heterogeneity in the measurements used. Therapeutic Advances in Urology. 2024 Dec;16:17562872241303447. doi.org/10.7257/2168-4626. 2023.43.4.162
14. Lwanga SK, Lemeshow S. *Sample Size Determination in Health Studies: A Practical Manual*. Geneva: World Health Organization; 1991. https://lib.umku.ac.id/wp-content/uploads/2022/06/Sample-size-determination-in-health-studies-a-practical-manual.pdf
15. Quality Of Life Outcomes for People with Suprapubic Catheter vs. Indwelling Urethral Catheter World Health Organization. Division of Mental Health (1996). WHOQOL-BREF : introduction, administration, scoring and generic version of the assessment : field trial version, December 1996. World Health Organization. World Health Organization. https://iris.who.int/handle/10665/63529
16. Gambrill B, Pertusati F, Hughes SF, Shergill I, Prokopovich P. Materials-based incidence of urinary catheter associated urinary tract infections and the causative micro-organisms: systematic review and meta-analysis. BMC urology. 2024 Aug 30;24(1):186.doi.org/10.1186/s12894-024-01565-x
17. Chou WH, Covinsky K, Zhao S, Boscardin WJ, Finlayson E, Suskind AM. Functional and cognitive outcomes after suprapubic catheter placement in nursing home residents: A national cohort study. Journal of the American Geriatrics Society. 2022 Oct;70(10):2948-57. doi.org/10.1111/jgs.17928
18. Thompson N, Losco G. Understanding suprapubic catheter usage in the Canterbury population. Continence. 2022 Sep 1;3:100509. doi.org/10.1016/j.cont.2022.100509
19. Quallich SA, Thompson T, Jameson J, Wall K, Lajiness MJ, Powley G, Lutz AR, Hemphill J. Management of Patients after Suprapubic Catheter Insertion. Urologic Nursing. 2023 Mar 1;43(2):61-73. doi.org/10.7257/ 2168-4626.2023.43.2.61
20. Jane Hall S, Harrison S, Harding C, Reid S, Parkinson R. British Association of Urological Surgeons suprapubic catheter practice guidelines–revised. BJU international. 2020 Oct;126(4):416-22. doi.org/10.1111/bju.15123