Alqalam Journal of Medical and Applied Sciences. 2026;9(2):962-968
https://doi.org/10.54361/ajmas.269425

Original article

Urologists 'Perspectives on Clean Intermittent Catheterization in Libya: A National Survey

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Abstract
Clean intermittent catheterization (CIC) is considered the gold standard for the management of neurogenic bladder and chronic urinary retention; however, its implementation remains challenging in developing healthcare systems. This national cross-sectional survey aimed to assess Libyan urologists 'awareness, clinical practice patterns, and perceived barriers related to CIC. A structured, anonymous questionnaire was distributed to practicing urologists across Libya, and data were analyzed using descriptive statistics and chi-square tests. Sixty-three urologists participated, with an overall CIC familiarity rate of 79.4%, which differed significantly by professional level ($p = 0.015$). Only 31.7% reported consistent availability of CIC supplies. The most frequently reported barriers were catheter unavailability (65.1%), patient resistance (57.1%), and lack of patient awareness (46.0%). Urologists were primarily responsible for patient education in 81.0% of cases. Despite adequate knowledge among clinicians, significant systemic and logistical barriers continue to limit effective CIC implementation. Coordinated national efforts focusing on guideline development, structured training, and stabilization of supply chains are essential to improve CIC uptake and patient outcomes in Libya. Despite good CIC familiarity among Libyan urologists, significant systemic barriers limit implementation. National guidelines, structured training, improved access to supplies, and broader public engagement are essential to expand CIC use and improve patient outcomes.
Keywords. Clean Intermittent Catheterization, Neurogenic Bladder, Libya, Healthcare Barriers.

Introduction

Clean Intermittent Catheterization (CIC) is the first- line treatment for most lower urinary tract dysfunctions, especially neurogenic bladder and chronic retention [1,2]. Since it was introduced by Lapides in 1972, CIC has revolutionized the management of neurogenic lower urinary tract dysfunction (NLUTD), offering significant advantages over indwelling catheterization, including reduced infection rates, preservation of renal function, and improved quality of life [3,4]. The clinical benefits of CIC are well-established in the international literature. Properly implemented CIC programs have been shown to reduce urinary tract infection rates, prevent upper urinary tract deterioration, and significantly improve patient quality of life compared to alternative bladder management strategies [5,6]. The technique allows patients to maintain bladder emptying while preserving the natural storage and voiding cycle, thereby reducing the risk of complications associated with chronic indwelling catheterization [7].

Even with known advantages, putting CIC into practice remains difficult in less developed health settings. Where funds run short, training is weak, deliveries get delayed, yet local beliefs also resist change - these factors block effective use of CIC in poorer nations [8,9]. These challenges are particularly pronounced in regions experiencing healthcare system instability, where the infrastructure necessary for comprehensive neurogenic bladder management may be limited or inconsistent [10]. Libya, like many developing countries, faces unique challenges in healthcare delivery that may impact the implementation of specialized urological procedures such as CIC. The country's healthcare system has experienced significant disruption in recent years, with implications for medical education, supply chain management, and clinical practice standards [11]. Understanding the current state of CIC knowledge and practice among Libyan urologists is crucial for developing targeted interventions to improve neurogenic bladder management in this context. Evidence across nations indicates effective CIC adoption depends on several elements: instruction for medical staff, guidance for patients and their helpers, consistent access to supplies, while also relying upon health system regulations [14,15]. Success often ties to how much care providers understand and feel about the process; research highlights that doctors who know more and trust the method tend toward better outcomes [16,17]. Learning how to manage care makes a real difference when using CIC methods. When patients and those who help them learn together, they stick to routines better and face fewer problems [18,19]. Still, teaching these skills needs health workers with proper preparation, spaces suited for instruction, along with steady follow-up - things often missing where resources are tight [20].

The economic implications of CIC implementation are particularly relevant in developing healthcare systems. While the initial costs of establishing CIC programs may be substantial, long-term economic benefits through reduced complication rates and improved patient outcomes have been demonstrated in multiple healthcare contexts [21,22]. Understanding the cost-effectiveness of CIC implementation in the Libyan context requires assessment of current practices and identification of implementation barriers.

Received*: 15-02-2026 -* ***Accepted****: 13-04-2026 -* ***Published****: 21-04-2026*

Despite medical guidance, personal background shapes how people view clean intermittent catheterization. Because inserting a tube into the body touches on deep beliefs about modesty and health, some hesitate even when advised. How one was raised, what values matter most, affects willingness to follow treatment plans [23]. Support works best when doctors listen first, then tailor advice without assuming everyone sees care the same way. Adjusting education to match cultural views helps build trust slowly over time [24]. This study represents the first comprehensive assessment of urologists' perspectives on CIC implementation in Libya. What comes out of this work fits into global knowledge about putting CIC into place where medical resources are limited. It sets a base for what studies and decisions might follow in this part of urology care.

Methods

Study design

This cross-sectional survey study was conducted to evaluate the awareness, practices, and barriers related to Clean Intermittent Catheterization (CIC) among practicing urologists in Libya.

Questionnaire development

The study employed a structured questionnaire-based approach to gather comprehensive data on current CIC implementation practices. The research was designed to provide both quantitative and qualitative insights into the current state of CIC practice and to identify specific areas for improvement in neurogenic bladder management.

Data collection

A structured questionnaire was distributed to urologists across Libya through the Libyan Urological Association, covering four thematic sections: demographics and professional background, knowledge and familiarity with clean intermittent catheterization (CIC), clinical practice patterns, and challenges with suggested improvements. The demographic section gathered information on professional level, years of experience, and practice setting, while the knowledge section assessed awareness and familiarity with CIC. The clinical practice section explored current patterns of use, patient volumes, and supply availability, and the final section identified barriers to implementation along with recommendations for improvement. In total, 63 responses were collected and analyzed descriptively, providing valuable insights into the current state of CIC practice among Libyan urologists.

Statistical Analysis

Data analysis was performed using SPSS version 28.0 (IBM Corp., Armonk, NY, USA). All data were cleaned and checked for completeness before analysis. Missing data patterns were examined, and cases with more than 20% missing data were excluded from the analysis.

Results

Response Rate and Participant Background

The response rate was approximately 35-40% included urologists at various career stages based on the estimated urologist population, which is considered acceptable for physician surveys in challenging healthcare environments. The demographic characteristics of the respondents are presented in (Figure 1). The respondents represented a broad spectrum of career stages, reflecting diversity in professional experience. Among the 63 urologists who completed the survey, nearly half (44.4%) reported having less than five years of practice, while 30.2% had between five and ten years of experience. A smaller proportion (25.4%) had been in practice for more than a decade. This distribution highlights the inclusion of both early-career and seasoned professionals, thereby ensuring that the findings capture perspectives across different levels of expertise.

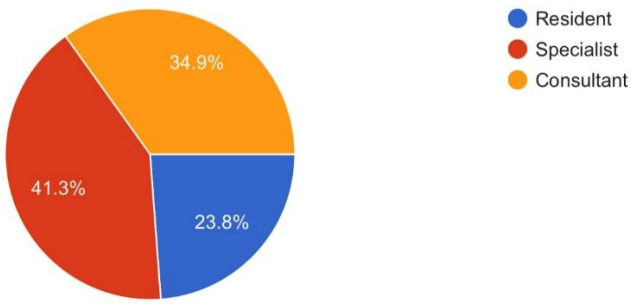

Figure 1. Professional Level and Years of Experience Distribution Among Respondents (n=63)

Received*: 15-02-2026 -* ***Accepted****: 13-04-2026 -* ***Published****: 21-04-2026*

https://doi.org/10.54361/ajmas.269425

Understanding and Familiarity with CIC

Overall, 50 of 63 respondents (79.4%) reported being familiar with CIC procedures. This familiarity rate is encouraging and suggests that basic knowledge of CIC is widespread among Libyan urologists. However, familiarity varied significantly by professional level ($x^2 = 8.42$, $p = 0.015$), with consultants and specialists showing higher familiarity rates compared to residents. The significant difference in familiarity by professional level suggests that experience and advanced training contribute to CIC knowledge. The relatively low familiarity rate among residents (46.7%) indicates a need for enhanced training during residency programs.

The findings revealed that among the fifty respondents familiar with clean intermittent catheterization (CIC), the most frequently cited indication was neurogenic bladder, reported by 94% of participants. Spinal cord injury was the second most common reason, noted by 90%, followed by chronic urinary retention at 84%. Post-operative bladder dysfunction was identified by 76%, while spina bifida accounted for 70%. These results suggest that urologists in this setting demonstrate familiarity with CIC indications that closely mirror global standards. Their reported practices align with accepted protocols and reflect a clear understanding shaped by real-world clinical outcomes, underscoring both the relevance and consistency of CIC use in contemporary urological care.

Clinical Practice Patterns

Among respondents familiar with CIC (n=50), the distribution of patients currently on CIC therapy revealed significant variation in clinical experience and patient loads. Low case numbers could mean either that few people actually need clean intermittent catheterization (CIC) or that something is getting in the way of using it. Only 22% of urologists look after more than ten CIC patients, which hints that the technique isn't being tapped as often as it could be.

Supply Availability and Access

CIC supply availability emerged as a critical issue, with significant variation across healthcare facilities and practice settings. This finding represents one of the most concerning aspects of current CIC implementation in Libya. Regular availability of CIC supplies was reported by only 18.2% of urologists working in public hospitals compared with 91.7% in private facilities. Just 31.7% of urologists said they could reliably get CIC supplies where they work, showing how hard it is to access needed tools. Since more than one- third of clinics lack these items altogether, treating patients well becomes much harder.

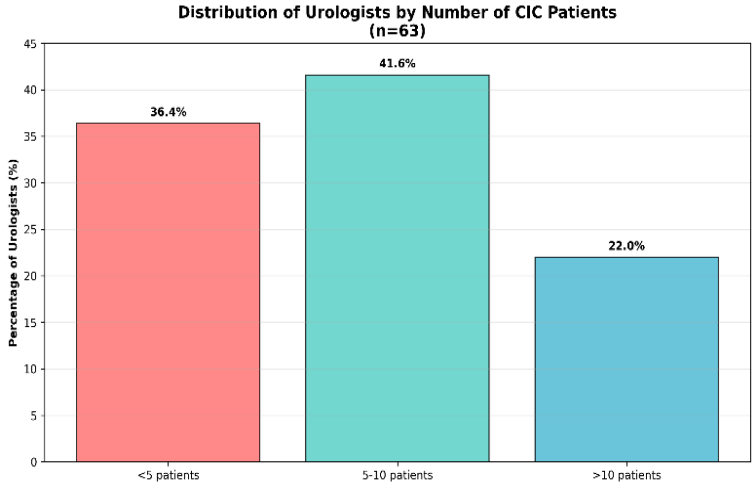

Figure 2. CIC Supply Availability at Healthcare Facilities

Patient Education and Training Responsibility

The responsibility for CIC patient education was predominantly assigned to urologists, reflecting both the specialized nature of the procedure and potential limitations in multidisciplinary team approaches. The heavy reliance on urologists for patient education (81.0%) may create bottlenecks in care delivery and suggests limited involvement of other healthcare professionals in CIC programs. This pattern may reflect either inadequate training of nursing staff or limited availability of specialized continence nurses.

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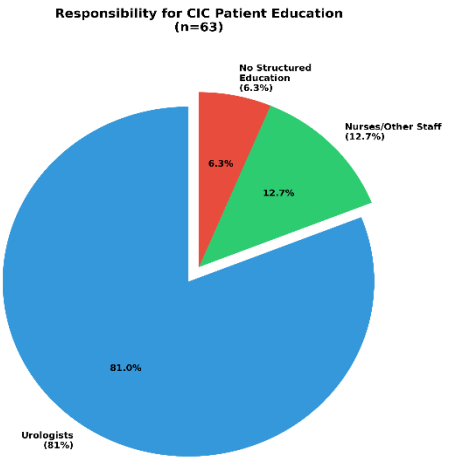

Figure 3. Responsibility for CIC Patient Education

Implementation Challenges and Barriers

Supply problems stood out when people listed what made CIC hard to put into practice. Picking more than one answer was possible because real-world obstacles soften overlap and mix. The most frequently reported challenge was catheter/supply unavailability (65.1%), which aligns with the supply availability data presented earlier. Patient resistance (57.1%) and lack of patient awareness (46.0%) represent significant psychosocial and educational barriers that require targeted interventions.

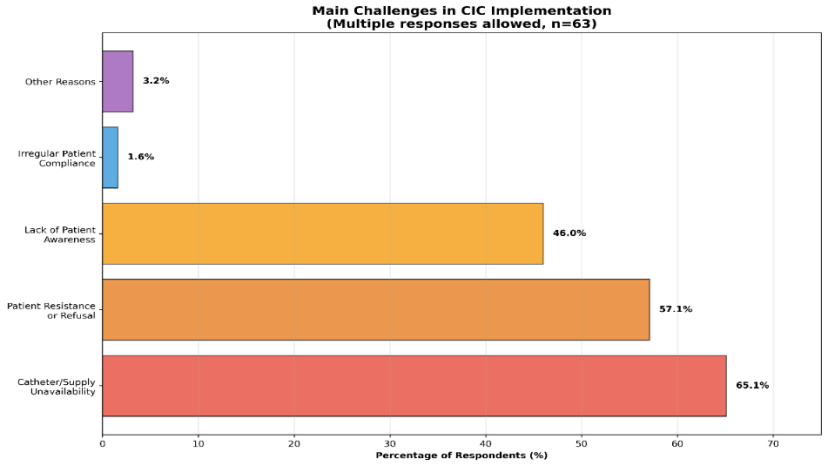

Figure 4. Main Challenges in CIC Implementation (Multiple Responses Allowed, n=63)

Discussion

This study is the first complete survey of how urologists in Libya view the use of Clean Intermittent Catheterization. It shows that doctors know the method well, but they face clear system-wide blocks that match the problems seen in other developing health services. The data give a detailed picture of how CIC is used today and point to exact areas that need change so that patients with neurogenic bladder receive better care in Libya. About 79.4% of Libyan urologists know about clean intermittent catheterization. This proportion matches international standards, particularly considering the challenges faced by healthcare systems in developing countries. This finding contrasts with the general pattern described by Przydacz et al. (2017), who noted that care of neurogenic bladder patients in emerging regions is often inadequate due to limited knowledge and resources [25]. The significant variation in familiarity by professional level (residents: 46.7%, specialists: 92.3%, consultants: 86.4%, p = 0.015) suggests that experience and training duration positively influence CIC knowledge, which aligns with established medical education principles. However, the 20.6% unfamiliarity rate, especially among residents (53.3%), highlights that training programs should be further improved during medical education and residency. This finding is in line with what has been observed worldwide, where poor education is still considered to be the main barrier to better care of neurogenic bladder patients in developing countries [26]. Since most of the unfamiliarity is among junior practitioners, it means that if they get the right kind of education at the beginning of their careers, it could have a big impact on the general CIC usage rates.

The recognition of the correct CIC use by the most familiar urologist (neurogenic bladder: 94.0%, spinal cord injury: 90.0%, chronic urinary retention: 84.0%), leading to the questionnaire, appears to be very

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consistent with the international guidelines and the practice based on evidence [27]. It is reasonable to assume that when the urologists are knowledgeable about CIC, they have an accurate understanding of the suitable applications that can easily be used as a basis for work on implementation improvement. One of the most shocking findings of our research is that only 31.7% of the urologists stated that they had a regular supply of catheters. This finding places Libya within the broader global context of healthcare inequality described by Krassioukov et al. (2024), who have identified supply shortages as the major barrier to intermittent catheterization care at the highest level throughout the world [28]. The very high number (65.1%) of urologists who marked the unavailability of catheters as the main challenge in the implementation is a clear indicator of how critical this problem is. This pattern is particularly problematic for neurogenic bladder patients, who require long-term, consistent access to catheterization supplies to prevent serious complications such as urinary tract infections, renal deterioration, and bladder stones [29]. The economic implications are significant, as inadequate CIC management leads to increased healthcare costs through emergency interventions and complication management, creating a false economy that ultimately strains already limited resources. from overstretched healthcare systems [28]. This economic argument provides a compelling case for policymakers to prioritize CIC supply availability as a healthcare investment rather than an expense.

The dramatic disparity in supply availability between public hospitals (18.2%) and private facilities (91.7%) raises serious concerns about healthcare equity and access to essential medical care. This finding suggests that economic factors play a determining role in CIC access, potentially violating the principle that healthcare should be available based on medical need rather than ability to pay. This disparity aligns with Article 25 of the Convention on the Rights of Persons with Disabilities, which states that persons with disabilities have the right to the highest attainable standard of health without discrimination [30]. We found that 81% of urologists assumed the primary responsibility for CIC patient education, which points to a strength as well as a possible weakness of the current system. On the one hand, physicians led education guarantees not only clinical accuracy but also medical oversight. On the other hand, concentrating a vast majority of responsibilities in the hands of one person might create bottlenecks in patient care and, hence, reduce the overall effectiveness of educational programs. The Malaysian study by Sidhu et al (2024) showed that well-organized, multidisciplinary approaches to CIC education might enhance patient adherence and outcomes [31].

In Libya, the heavy reliance on urologists for patient education likely reflects the limited availability of trained nurses or allied healthcare professionals with expertise in CIC. Such a scenario is typical in developing healthcare systems where specialist physicians frequently take on tasks that could be satisfactorily done by nursing staff or continence advisors with the appropriate training. Instituting well-structured training programs for nurses and other healthcare workers would be a major step in expanding educational capacity, which in turn would enable urologists to concentrate on complex clinical decision-making. The 46% of urologists who identified lack of patient awareness as a significant barrier aligns with global observations about the importance of comprehensive patient education in CIC success. Sidhu et al. (2024) found that patients who experienced fewer catheterization difficulties showed better adherence ($p = 0.007$), emphasizing the critical role of proper initial education and ongoing support [31]. The suggestion by 77.8% of our respondents for enhanced patient and caregiver education reflects an understanding of this fundamental principle.

The limited involvement of other healthcare professionals in CIC education (only 12.7% involving nurses or other staff) represents a missed opportunity for comprehensive care delivery. International best practices emphasize the importance of multidisciplinary teams in neurogenic bladder management, with specialized nurses often playing key roles in patient education and ongoing support [32]. Developing the capacity of nursing staff and other healthcare professionals could significantly improve the reach and effectiveness of CIC education programs. The identification of patient resistance or refusal as a barrier by 57.1% of respondents highlights the complex psychosocial aspects of CIC implementation that extend beyond technical and supply considerations. This finding resonates with international literature documenting the multiple challenges faced by individuals with neurogenic lower urinary tract dysfunction, including emotional, psychological, and social barriers to catheterization [28]. Cultural factors may play a particularly important role in patient acceptance of CIC in the Libyan context. The intimate nature of catheterization, combined with cultural sensitivities around bodily functions and privacy, may contribute to patient resistance. Krassioukov et al. (2024) emphasized that individuals with neurogenic bladder face countless daily challenges that limit lifestyle choices, including stigma and social isolation [28]. Addressing these concerns requires culturally sensitive educational approaches that acknowledge patient fears and provide appropriate support systems.

The Malaysian study's finding that caregiver-performed catheterization was associated with better adherence compared to self-catheterization ($p = 0.039$) suggests that family involvement may be crucial for successful CIC implementation [31]. This finding is particularly relevant in the Libyan context, where family-centered healthcare approaches are culturally valued. The suggestion by 77.8% of our respondents for enhanced caregiver education reflects an intuitive understanding of this dynamic. The identification of cultural and social barriers by 19.0% of respondents, while relatively lower than other barriers, still

Received*: 15-02-2026 -* ***Accepted****: 13-04-2026 -* ***Published****: 21-04-2026*

represents a significant concern that requires targeted intervention. Developing culturally appropriate educational materials and approaches, involving religious and community leaders in awareness campaigns, and creating peer support networks could help address these barriers and improve patient acceptance of CIC recommendations.

Conclusions

This research highlights that urologists in Libya, particularly senior practitioners, demonstrate a strong understanding of clean intermittent catheterization (CIC), with their knowledge aligning well with international standards. However, systemic challenges remain a major obstacle, most notably the shortage of catheter supplies in public hospitals, which hinders proper application of the procedure and contributes to disparities in patient care. To address these issues and strengthen CIC practice, several measures are proposed. National CIC guidelines should be developed and formally integrated into routine urology practice to ensure consistency. Training programs need to be offered systematically to healthcare providers, equipping them with the necessary skills and confidence.

Conflict of interest. Nil

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Received: *15-02-2026* - ***Accepted***: *13-04-2026* - ***Published***: *21-04-2026*

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Received: *15-02-2026* - ***Accepted***: *13-04-2026* - ***Published***: *21-04-2026*