

# Assessment of Physicians' Knowledge of Clean Intermittent Urinary Self-Catheterization in an African Country: The Case of Senegal

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## Abstract

**Introduction:** Clean intermittent self-catheterization is the gold standard for the management of urinary retention. But its use remains limited in our practice. **Objective:** We are conducting this study to assess physicians' knowledge of its practice in order to promote its promotion. **Material and Methods:** We conducted a cross-sectional, prospective, descriptive and analytical study in two hospitals in Dakar for two months. The resident doctors were interviewed on the basis of a questionnaire developed based on the recommendations of the French Society of Physical Medicine and Rehabilitation (SOFMER). **Results:** 54 medical residents returned the questionnaire. 63% of physicians surveyed defined the clean intermittent self-catheterization as a sterile intermittent self-catheterization. 70.9% of the doctors surveyed had cited urinary retention as an indication for the clean intermittent self-catheterization; 53.7% advocated sterile gloves for the catheterization; 29.6% proposed a frequency of one to two times and 2 to 4 catheterizations per day. 70.4% of doctors recommended indicating Cytobacteriological examination of urine in case of symptoms of urinary tract infection. Antibiotic therapy from the outset was offered by 83.3% of doctors in case of symptoms of urinary tract infection under intermittent self-sounding. 59.3% were unaware of clean intermittent self-catheterization. **Discussion and Conclusion:** Apart from the indications, the clean intermittent self-catheterization remains unknown by resident doctors and its practice remains to be mastered, hence the need to establish a course on its practice at the faculty of medicine.

## Keywords

Knowledge, Intermittent Self-Catheterization, Doctors, Africa

## 1. Introduction

Introduced by Lapidès in the management of neurological retentionist bladders in spinal cord injuries in 1972 [1], intermittent self-catheterization has become the gold standard for the management of any situation of complete or incomplete chronic urinary retention regardless of neurological, urological, gynecological, digestive, psychological or other origin, whatever the etiology, whatever the sex and age [2]. However, its use remains very confidential to some doctors specializing in urology, physical medicine and neurology [3]. It is the introduction of a probe of any type, self-lubricated or previously lubricated or dry, short, long, straight, curved, at the urethral meatus to the bladder at each sensation of urination (4 - 6 times a day) by the patient himself or by a third party (heteroprobing), when the patient is unable to self-probe because of quadriplegia or cognitive disorders or if he is minor. It is the introduction of a probe of any type, self-lubricated or previously lubricated or dry, short, long, straight, curved, at the urethral meatus to the bladder at each sensation of urination (4 - 6 times a day) by the patient himself or by a third party (heteroprobing), when the patient is unable to self-probe because of quadriplegia or cognitive disorders or if he is minor. There are 2 types of intermittent probing: clean intermittent probing, the most commonly used consisting of reusing the probe after use followed by washing with soap and water, and sterile intermittent sampling or No touch consisting of the use of single-use probes [4] [5]. Its advantages are the prevention of urinary tract infections thanks to the principle that the frequency of urination is more important than sterility [1]. Indeed, urinary retention or the indwelling catheter increases the intraparietal pressures of the bladder leading to parietal ischemia, responsible for the risk of infection much more than the bacterial factor itself [3] [5]. It also decreases the risk of mechanical complications on the upper urinary tract [3] [5]. Other advantages are the improvement of the comfort and autonomy of the patient thanks to the control of continence by reducing the risk of stress incontinence, overflow and urgency, the resumption of sexual activity [6]. The disadvantages are the same as for the indwelling survey, namely urethral trauma urethrorrhage, urethral strictures and urinary tract infection, but this risk is very low compared to the indwelling survey [7] [8]. This method is well accepted in developed countries [9]. However, there are few studies in Africa from where we carry out this study which aims to evaluate the knowledge of doctors on their own intermittent bladder self-catheterization in order to promote its practice, these doctors being the main actors in its promotion among patients.

## 2. Materials and Methods

### 2.1. Study Framework

Our study took place at the teaching hospital center of Fann and the Aristide Le Dantec General Hospital.

## 2.2. Type and Period of Study

This was a cross-sectional, descriptive, and analytical study that took place from April 8 to June 8, 2021, over a two-month period.

## 2.3. Study Population

Our study involved Neurology, Neurosurgery, Urology, Pediatrics and Endocrinology residents working in the aforementioned hospitals.

Inclusion criteria: All medical residents in Neurology, Neurosurgery, Urology, Pediatrics from the Fann University Hospital and Dantec Dakar.

Non-inclusion criteria: physicians who refused to answer questionnaires were not included in our study.

Sample Size Calculation: We made an exhaustive selection of residents who gave their consent to participate in the study. In the departments surveyed, we obtained at least a third of the workforce. All levels were represented.

Study variables: Study variables were specialty, number of years of experience in the specialty, definition of clean intermittent self-catheterization (CISC), indications, objectives of CISC, CISC technique, complications, knowledge of the method.

## 2.4. Methods

Collection technique and tools: We used a questionnaire to collect the data before saving it on an Excel sheet to facilitate its processing and analysis. This questionnaire was developed based on the recommendations of the French Society of Physical Medicine and Rehabilitation (SOFMER) on the therapeutic education of patients under self-surveys published in October 2009 [10].

Statistical analysis plan: we used SPSS version 22 software for statistical analysis. The confidence interval was calculated at 95% and the significance level was 0.05. Chi<sup>2</sup>, Pearson and Anova tests were used to correlate and compare results.

Ethical considerations:

We obtained informed consent from physicians to complete the questionnaire. Respect for anonymity was observed.

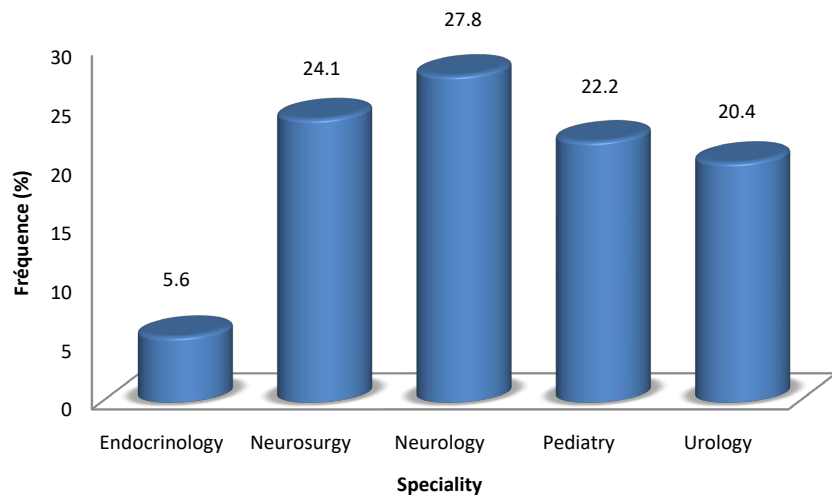
## 3. Results

### 3.1. Distribution of Residents by Location of Practice and Specialty

At the end of the research, 54 medical residents completed the questionnaire. Among them, 30 residents worked at the Fann University Hospital, *i.e.* a frequency of 55.6% and 24 residents were at the Aristide Le Dantec General Hospital, *i.e.* 44.4%. Neurology residents were more represented (27.8%), followed by neurosurgery residents (24.1%). Urology residents accounted for 20.4%. **Figure 1** shows the distribution of residents by specialty.

### 3.2. Distribution by Year of Training

The 4th year was the most represented (29.6%) followed by the first year (25.9%).



**Figure 1.** Distribution of physicians by department.

Grades 5 and 7 were less represented at 3.7% and 1.9% respectively. The other levels were: 2nd year 20.4% and 3rd year 18.5%.

### 3.3. Definition

Regarding the definition of clean intermittent self-catheterization, 63% of resident physicians believe that it is sterile intermittent catheterization. Only 13% said it was a non-sterile intermittent catheterization. The correct answers did not depend on specialty ( $p = 0.243$ ) or year of training ( $p = 0.133$ ). The distribution by definition is shown in **Figure 2**.

### 3.4. Indications for the Clean Intermittent Self-Catheterization

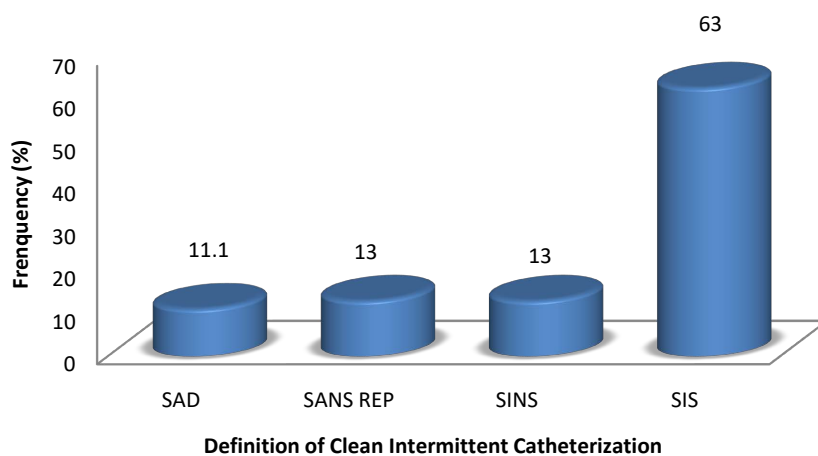
In terms of indications, 70.9% of residents did cite urinary retention as an indication for intermittent self-catheterization. Other indications were rarely cited. The indications of the clean intermittent self-catheterization are shown in **Figure 3**.

### 3.5. Objectives

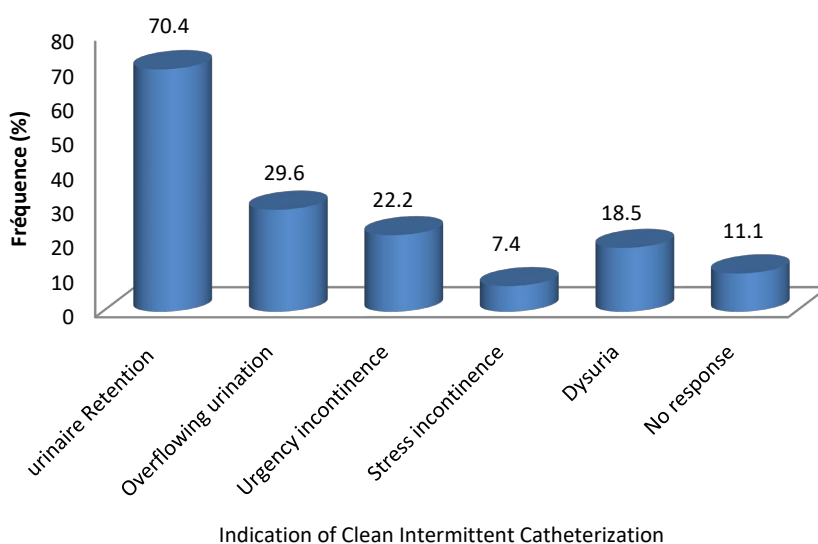
Regarding the objectives of the clean intermittent self-catheterization, 68.5% aimed for complete bladder emptying. Improved quality of life was cited by 64.8% of residents. Other objectives such as protecting the upper urinary tract and controlling urinary tract infections were less cited. The objectives of Clean Intermittent Self-Catheterization are illustrated in **Figure 4**.

### 3.6. What Should Be Used for Perineal and Hand Washing before the Practice of Clean Intermittent Self-Catheterization?

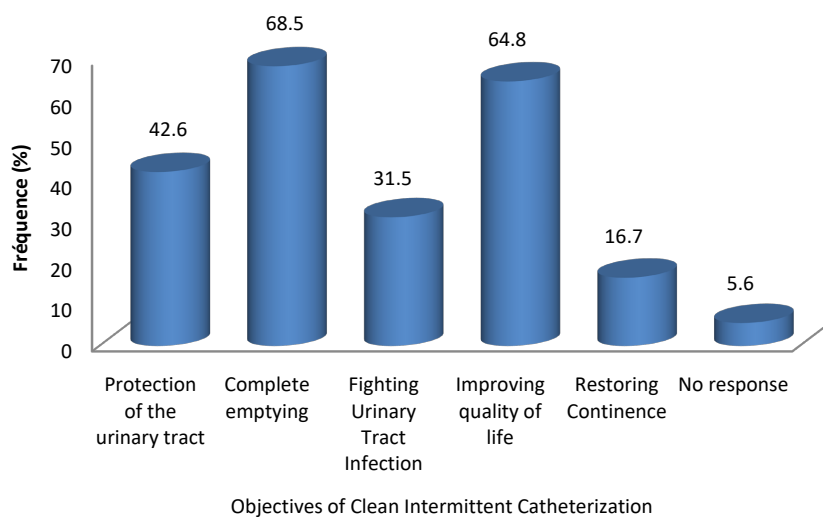
Regarding aseptic measurements used prior to clean intermittent self-catheterization, 53.7% preferred sterile gloves. Antiseptics were preferred by 50% of doctors. Soap and water came in last place with 46.3%. Perineum and hand cleaning techniques are illustrated in **Table 1**.



**Figure 2.** Definition of clean intermittent self-catheterization.



**Figure 3.** Indications for clean intermittent self-catheterization.



**Figure 4.** Objectives of clean intermittent self-catheterization.

**Table 1.** Cleaning techniques of the perineum and hands.

<i>Aseptic tool</i>	<i>Number</i>	<i>Percentage</i>
<i>Soap and water</i>	25	46.3
<i>Antiseptic</i>	27	50
<i>Sterile gloves</i>	29	53.7

### 3.7. Frequency of Clean Intermittent Self-Catheterization per Day

With regard to the daily frequency of self-catheterization, 29.6% of physicians cited a frequency of one to two and 2 to 4 times, respectively. Only 16.7% cited the frequency of 4 to 6 intermittent self-catheterizations per day. The frequency of clean intermittent self-catheterization is shown in **Figure 5**.

### 3.8. When to Request an Cytobacteriological Examination of Urine?

Concerning the indications for cytobacteriological examination of urine (CBEU), 70.4% of doctors recommended indicating Cytobacteriological examination of urine in case of symptoms of urinary tract infection. The indications of the Cytobacteriological examination of urine are illustrated in **Table 2**.

### 3.9. What Would You Do When Faced with a Symptomatic Urinary Tract Infection (UTI) in a Patient on Clean Intermittent Catheterization?

Antibiotic therapy from the outset was proposed by 83.3% of doctors in case of symptoms of urinary tract infection under intermittent self-catheterization. Increasing the frequency of self-catheterization and diuresis were less frequently cited, by 14.8% and 5.6% of physicians, respectively. **Table 3** represents the different interventions proposed by doctors in case of suspected urinary tract infection.

### 3.10. Duration of Antibiotic Therapy

Regarding the duration of antibiotic therapy, 42.6% had recommended 10 days of antibiotic therapy in case of symptomatic urinary tract infection under self-catheterization. For more than 30% of physicians, antibiotic therapy of 5 days or less was sufficient. A duration of 15 days was less proposed, in 18.5% of residents. Duration of antibiotic therapy was not related to specialty ( $p = 0.217$ ). The duration of antibiotic therapy is shown in **Figure 6**.

### 3.11. Fear of Clean Intermittent Self-Catheterization

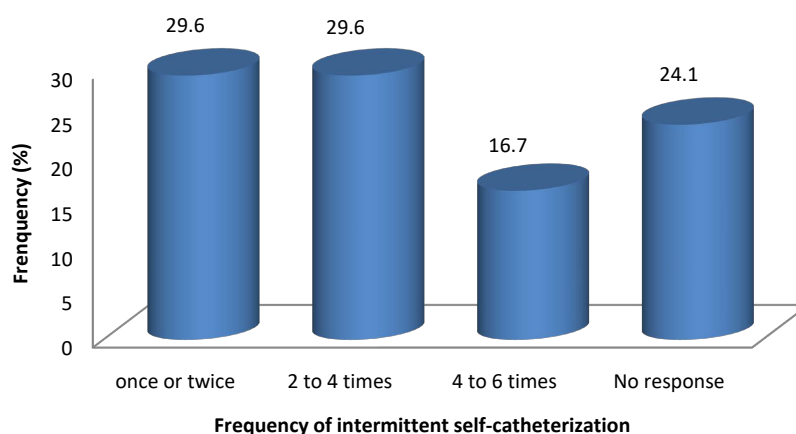
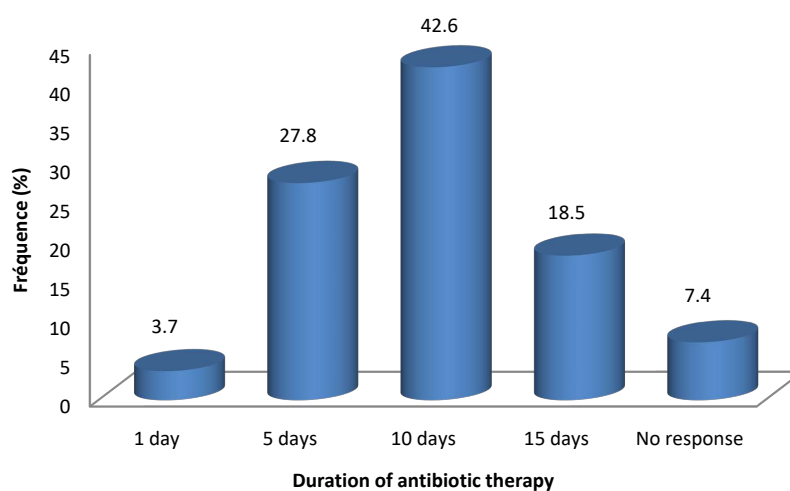
Regarding the fear of method, 61.1% did not fear the method. This fear did not depend on specialty ( $p = 0.958$ ) or year of training ( $p = 0.206$ ). Of the 38.9% who feared clean intermittent self-catheterization, 3 (5.6%) reported a risk of complications, 1 (1.9%) reported that self-catheterization was unpleasant. 10 (18.5%) reported a risk of urinary tract infection. The reason for this concern was not related to specialty ( $p = 0.524$ ).

**Table 2.** Indications of Cytobacteriological examination of urine during intermittent self-catheterization.

<i>Indications of the Cytobacteriological examination of urine</i>	<i>Number</i>	<i>Percentage</i>
<i>Symptoms of Urinary Tract Infection</i>	38	70.4
<i>Any infectious symptoms</i>	19	35.2
<i>Systematic</i>	3	5.6

**Table 3.** What to do in case of symptomatic urinary tract infection.

<i>What to do in the presence of a symptomatic urinary tract infection</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Increase the frequency of self-catheterization</i>	8	14.8
<i>Antibiotic</i>	45	83.3
<i>Diuresis cure</i>	3	5.6
<i>Stop intermittent catheterization</i>	15	27.8
<i>No response</i>	1	1.9

**Figure 5.** Frequency of own intermittent self-catheterization.**Figure 6.** Duration of antibiotic therapy during clean intermittent catheterization.

### 3.12. Complications of Intermittent Self-Catheterization

Haematuria was mentioned as the first complication of intermittent self-catheterization (66.7%) followed by urethral stenosis and urethral perforation (50%). The complications of clean intermittent sampling are illustrated in **Table 4**.

### 3.13. Desire for Training

For the desire for training 79.6% of physicians had expressed a desire for training on clean intermittent self-catheterization.

### 3.14. Prior Knowledge of the Method

Regarding prior knowledge, 59.3% were not aware of the existence of clean intermittent self-catheterization. This prior knowledge was related to the specialty. Indeed, Urology residents had some knowledge of self-catheterization ( $p = 0.022$ ).

81.5% had never followed a patient who was self-catheterizing.

## 4. Discussion

Clean intermittent self-catheterization is the gold standard for retentionist neurological bladder intake [2]. But its use remains limited in our practice. In our study, it is neither known nor mastered by medical residents, regardless of the specialty.

Indeed, regarding the definition, only 13% of residents spoke of a non-sterile intermittent catheterization and for the most part, it was a sterile catheterization. This lack of knowledge was reported by Zouari *et al.* where 18.3% gave an exact definition [10].

Regarding the indications, apart from urinary retention, which was mostly cited by 71% of residents, the others such as stress incontinence, overflow urination and dysuria were not well known. Indeed, clean intermittent catheterization is indicated in all patients with chronic complete or incomplete urinary retention [11]. It should be offered to all patients with bladder emptying defect with significant postvoid residual [12].

Regarding the goals of clean intermittent self-catheterization, the majority focused on complete emptying and improving quality of life, but few talked about protecting the upper urinary tract and preventing urinary tract infections. Lack of awareness of urinary tract infection prevention has been reported [13]. On the

**Table 4.** Complications of intermittent self-catheterization.

<i>Complication</i>	<i>Indwelling catheter (%)</i>	<i>Clean Intermittent Catheterization (%)</i>
<i>Urinary tract infection</i>	51.9	48.1
<i>Haematuria</i>	31.5	66.7
<i>Stenosis</i>	50	50
<i>Perforation</i>	50	50



other hand, the protection of the upper urinary tract was mostly cited in the study by Zouari *et al.* [10]. This difference suggests a heterogeneity in knowledge of intermittent self-catheterization in Africa.

The use of sterile gloves followed by cleaning of the perineum with antiseptics was mostly preferred to the detriment of hand washing with soap and water. This attitude is the same as that found in the literature [10]. Indeed, in Bonniaud's study, 90% of them prescribed an intimate toilet before the survey and 29% sterile gloves, while this is a clean intermittent self-catheterization that must be done after a simple hand washing with soap and water [13]. It is important to note that when it comes to intermittent self-catheterization, the regularity of catheterization is more important than their sterility [1].

The frequency of one to 4 times predominant in our study is low compared to the recommended frequency, which is 4 to 6 times [14]. This lack of knowledge has been observed in the literature. In a French study, 74% of general practitioners considered the frequency of appropriate intermittent self-catheterization to be two and four times a day [13]. They should be performed five to six times a day to allow for regular and complete bladder emptying. The volumes collected at each survey should be less than 400 ml. It is necessary to combine sufficient hydration of at least 1.5 liters per 24 hours, spread over the day [2].

In case of symptomatic urinary tract infection, residents have proposed antibiotic therapy from the outset while it is recommended a course of abundant diuresis before offering antibiotics [14]. In the absence of fever, the suspicion of a urinary tract infection leads to an increase in diuresis, the number of catheterizations and the performance of a CBEU [15].

Concerning the indications for cytobacteriological examination of urine (CBEU), 70.4% of doctors recommended indicating Cytobacteriological examination of urine in case of symptoms of urinary tract infection. The request for cytobacteriological examination of the urine in case of any infectious symptoms and in a systematic manner was less mentioned. This knowledge is mastered by the resident doctors. En effet, Routine CBEU is not required in these patients due to the lack of clinical impact of bacteriuria and spontaneous changes in the microbial flora of the catheterized bladders [2].

Regarding the duration of antibiotic therapy, 31.5% of residents indicated short antibiotic therapy (1 to 5 days). The majority (42.6%) indicated a duration of 10 days and fewer residents proposed a duration of 15 days. Faced with the persistence of clinical signs, an antibiotic treatment adapted to the susceptibility test is prescribed for a short period of time (there is no consensus in the literature on the duration but five days seems to be a reasonable duration) [15]. In the case of a fever greater than or equal to 38.5°C, the duration of antibiotic therapy is longer, often requiring specialist advice. Daily prophylactic antibiotic therapy is not recommended [15].

More than 61% of residents were not afraid of clean intermittent self-catheterization. However, in the absence of adequate awareness, some physicians, like patients, may be afraid of their clean intermittent self-catheterization. Thus, it

has been noted that fear is one of the factors of non-compliance with the clean intermittent self-catheterization that may explain the underuse of this method in our region [16].

Comparing the risk of complication between the indwelling urinary catheter and the clean intermittent selfcatheterization, apart from the risk of infection which was estimated to be lower with the clean intermittent selfcatheterization, hematuria which was cited by 66.7% as a complication of the clean intermittent self-catheterization. Other complications such as urethral stenosis and perforation had the same proportions in both methods. In the literature, urinary tract infection was considered by 87% of general practitioners to be the main complication [13]. Traumatic lesions of the urethra are common but rarely cause fistulas and urethral strictures. These injuries are prevented by the use of self-lubricated catheters [12]. Generally speaking, the complications of clean intermittent self-catheterization are the same as for indwelling urinary catheterization, but the risk is markedly low in clean intermittent self-catheterization [3].

For the désire for training 79.6% of physicians had expressed a desire for training on clean intermittent self-catheterization. General practitioners need additional training on the role of “clean” self-catheterization in preventing urinary tract infections [13].

In terms of prior knowledge, 59.3% were not aware of the existence of clean intermittent self-catheterization. Urology residents had some knowledge of self-catheterization ( $p = 0.022$ ). More than 81% of residents had never followed a patient who was doing clean intermittent self-catheterization. In a study conducted in Senegal, 97% of patients were completely unaware of the existence of clean intermittent self-catheterization [16]. This could explain this lack of knowledge among residents or general practitioners, who are the first resort for patients.

## 5. Conclusion

Self-catheterization is not well known and not mastered by doctors. Its integration into the medical training at the faculty and the awareness sessions with physicians would allow its better knowledge in order to promote its use.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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**Annex****Clean Intermittent Self-Catheterization Knowledge Questionnaire**


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I. Where do you work? (Check only one)

Teaching hospital center of Fann /\_ /      Aristide Le Dantec General Hospital /\_ /

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II. What is your specialty? (Check only one)

Neurology /\_ /      Neurosurgery /\_ /      Urology /\_ /      Endocrinology /\_ /      Pediatrics /\_ /

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III. What is your level in training? (Check only one)

First year /\_ /      Year 2 /\_ /      Year 3 /\_ /      Year 4 /\_ /      Year 5 /\_ /      University Diploma 1 (6<sup>th</sup> year) /\_ /      University Diploma 2 (7<sup>th</sup> year) /\_ /

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IV. What is the definition of clean intermittent catheterization? (Check only one)

In-house catheterization /\_ /      Non-sterile intermittent catheterization /\_ /      Sterile Intermittent Catheterization /\_ /      No response /\_ /

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V. What are the indications for clean intermittent catheterization? (Check one or more answers)

Urinary retention /\_ /      Overflowing urination /\_ /      Urgency incontinence /\_ /      Stress incontinence /\_ /      Dysuria /\_ /      No response /\_ /

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VI. What are the goals of the clean intermittent catheterization? (Check one or more answers)

Protection of the urinary tract /\_ /      Complete emptying /\_ /      Fighting Urinary Tract Infection /\_ /      Improving quality of life /\_ /      Restoring Continence /\_ /      No response /\_ /

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VII. What should be used for perineal and hand washing before the practice of clean intermittent self-catheterization? (Check one or more answers)

Soap and water /\_ /      Antiseptic /\_ /      Sterile gloves /\_ /

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VIII. How often does the poll take per day? (Check one)

1 to 2 times /\_ /      2 to 4 times /\_ /      4 to 6 times /\_ /      No response /\_ /

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IX. When to request a Cytobacteriological Examination of the urine? (Check one)

Symptoms of Urinary Tract Infection /\_ /      Any infectious symptoms /\_ /      Systematic /\_ /

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X. What would you do when faced with a symptomatic urinary tract infection in a patient on clean intermittent catheterization? (Check one or more answers)

Increase survey frequency /\_ /      Antibiotic /\_ /      Diuresis cure /\_ /      Stop Intermittent Catheterization /\_ /      No response /\_ /

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XI. How long does antibiotic therapy last? (Check only one)

1 Day /\_ /      5 Days /\_ /      10 Days /\_ /      15 Days /\_ /      No response /\_ /

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XII. Are you worried about intermittent catheterization? (Check one)

Yes /\_ /      No /\_ /

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XIII. What are the complications of clean intermittent catheterization? (Check one or more answers)

Urinary tract infection /\_ /      Haematuria /\_ /      Stenosis /\_ /      Perforation /\_ /

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XIV. Would you like training on clean intermittent catheterization? (Check only one)

Yes /\_ /      No /\_ /

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XV. Have you ever heard of the clean intermittent catheterization? (Check one)

Yes /\_ /      No /\_ /

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XVI. Have you ever followed a patient using clean intermittent self-catheterization? (Check one)

Yes /\_ /      No /\_ /

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Thank you for your frank cooperation.