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Prevalence and indications of long-term indwelling urinary catheter among out-patients attending urology clinic at a tertiary hospital in Northwestern Tanzania

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Abstract

Background: People living with long-term indwelling urinary catheterization at home are increasing globally. Few studies on prevalence have been done globally and none in Sub-Saharan Africa. This study investigated the prevalence and indications of long-term indwelling urinary catheterization (IUC) at home in Northwestern Tanzania and to determine the reasons for staying long with an indwelling urinary catheter after diagnosis of benign prostatic hypertrophy was confirmed.

Methods: This was a cross-sectional study conducted at urology clinic at Bugando Medical Centre, a referral hospital in the Northwestern Zone of Tanzania. The study population included 2112 patients attending the urology clinic from December 2016 to September 2017 with different conditions. From this population, 202 out-patients living with a long-term IUC either suprapubic or urethral were conveniently selected. A review of hospital records of these 202 out-patients was done using a pre-tested checklist. Patients were interviewed to collect additional information. Data were analyzed using STATA version 13 (college station, Texas). Descriptive statistics were used for categorical variable, whereas median [inter quartile range (IQR)] was used for continuous variables.

Results: The prevalence of out-patients living at home with an IUC was 9.6% (202/2112), CI (8.4–10.8). Age ranged from 18 to 95 years with the median age of 69 [IQR 61–77] years. Males 195 (96.5%) formed the majority of participants. A total of 111 (54.9%) had catheters for \geq six weeks and 123 (60.9%) had their catheters changed at least once. Common indications were benign prostatic hypertrophy (BPH), 129 (63.9%) and urethral stricture 34 (16.8%). Reasons for the long stay with an IUC at home, especially for those without National Health Insurance Fund (NHIF) 49 (94.2%) were endless appointments 23 (52.3%), no money to pay for surgery 9 (20.5%) and medical conditions 7 (16%). Only 3 (0.1%) were under NHIF and were treated promptly.

Conclusion: Prevalence of long-term IUC in Northwestern Tanzania is high. Improved health care system is required to lower the high prevalence of long-term IUC at home through training of more urologists and these patients to be under the scheme of NHIF.

Keywords: Indications, Indwelling urinary catheterization, Long-term, Prevalence, Tanzania

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1 Background

Indwelling urinary catheterization is a common procedure for managing patients with lower urinary problems worldwide including Tanzania. People having a

long-term indwelling urinary catheterization (IUC) may experience problems such as urethral trauma, catheter blockage, urinary tract infection (UTI), encrustation and stone formation, urine leakage, painful bladder spasms and autonomic dysreflexia [1–4]. All these problems may affect their quality of life and they are mainly related to the duration of catheterization [1, 2]. The indications for catheterization may lead a patient to live with a short-term or long-term indwelling urinary catheterization [5].

Although there is adequate empirical evidence regarding indwelling catheter management in acute and long-term care settings, there is limited information about home care [2]. Few studies have been done regarding prevalence of patients living with long-term indwelling urinary catheterization globally [6]. In America, the prevalence of catheter use in individuals receiving home care services was 4.5% [7], whereas in the UK, the prevalence of long-term catheter use was 3% of people living in the community [3]. Prevalence of catheter use among older people receiving home care in 11 European countries was 5.4% (range 0% to 23%) [6, 8]. Factors that contribute to low prevalence of long-term catheter use in developed countries include good health care system with adequate infrastructure and adequate number of qualified urologists and nurses [9, 10]. Patients in the Sub-Saharan Africa (SSA) are usually on long-term catheterization until they are attended by an urologist [11]. This is also compounded by financial constraints to meet the cost for surgery and the presence of comorbidity [6, 12].

In a low or poor economy, patients remain on indwelling urinary catheters longer than indicated, due to inability to afford the definitive treatment, or the health facility may also lack the required equipment and expertise for prompt definitive treatment [9]. Regular change of catheters is not always possible and therefore patients begin regular hospital visits accompanied usually by a close relative. The burden of this phase of treatment could be enormous [7].

Good consideration for patients living with long-term indwelling urinary catheter at home is the catheter size. As regards to catheter size, evidence-based studies have recommended the use of catheter with the smallest diameter 14–16F. Catheter with a 5 ml balloon provides good drainage. Large catheters (> 16F) distend the urethra and can irreparably damage the urethra and bladder neck as well as contribute to spasms and leakage [2, 13, 14]. Frequency of catheter change depends on individual need. However, guidelines that have been developed advocate that long-term catheterization should be changed at least every 30 days [2, 13].

There is no study from the Sub-Saharan Africa including Tanzania which has investigated on the prevalence of patients with long-term IUC living at home. The absence

of this information prompted us to carry out this study. The aims of the current study were to determine the prevalence of long-term catheter use among out-patients living with long-term IUC at home in Northwestern Tanzania, commonest indication and the reasons for staying long with an IUC after the diagnosis of benign prostatic hypertrophy (BPH). These data are important in formulating preventive strategies to reduce IUC associated complications.

2 Methodology

2.1 Study design and setting

This was a descriptive cross-sectional study conducted from December 2016 to September 2017 in the Northwestern part of Tanzania. Tanzania has a total population of over 56 million people. Approximately, 1/3 of the Tanzanians live in urban and 80% of the population live in the rural areas and work in agriculture [15]. The study site was at Bugando Medical Centre (BMC) which is a consultant, tertiary and a teaching hospital in Northwestern Lake Zone. It has a bed capacity of 1,000 with nine (9) out-patient clinics including the urology clinic where this study was conducted. Its catchment areas included Mwanza, Simiyu, Mara, Kagera, Shinyanga, Geita, Tabora, and Kigoma.

2.2 Participants and eligibility criteria

The study population included adult out-patients 18 years and above with long-term IUC who voluntarily consented to participate in the study. For out-patients who had a catheter in situ less than 14 days were excluded. A sample size was estimated by Kish Lisle formula (1965). Since no study on prevalence has been done in the Sub-Saharan Africa including Tanzania to determine the prevalence of patients with IUC; the estimated percentage used was assumed to be higher (15%) as patients were coming from a low resource country resulting in a minimum sample size of 196 patients living with long-term IUC. The study population at the clinic included 2112 patients who attended urology clinic with different conditions between December 2016 and September 2017. From this population, 202 patients living at home with a long-term IUC (more than 14 days) were conveniently recruited non-repetitively for a period of nine months prospectively. During the recruitment process, the socio-demographic and clinical characteristics of the patients were obtained as per attached pre-tested checklists (checklist 1 and 2) through reviewing their hospital records and interviewing them. Those patients with mobile phones during the recruitment process were listed down. A list of patients with telephone numbers and a schedule for calling and interviewing them was made. They were requested to have a further interview with them through

their mobile telephone numbers, while at home in order to get information regarding the reasons for the long stay with an IUC after the diagnosis of BPH was made. The reason for conducting the interview at home was to minimize the amount of time they could spend on the day of their clinic visit and they agreed. Those earmarked for the interview were informed that on the day of the interview they were requested to be in a quiet place where there were no interruptions. For recording purposes, the researcher had a notebook and a pen to write down the objective information since there was no computer assisted telephone interviewing (CATI). In case the patient talked in low voice, he was asked to raise the voice and even repeat the point when it seemed not clear to the researcher. Since there is no study done to ascertain the reasons for the long stay with an IUC after the diagnosis of BPH; we thought it was important carry out this interview to determine the reasons for best possible solutions. To avoid bias in asking questions, a concise objective checklist for the interview was made using interview guide and structured questionnaire to gather patient's information (see attached interview guide). An interview conducted lasted for ten to fifteen minutes using the researcher's own cell phone. In order not to count the same patient twice during subsequent visits, a mark was put on the patient's file using coloured stickers.

2.3 Data analysis

Data were analyzed using STATA (Statistical Software Package for Statistics and Data) version 13(college station, Texas). Descriptive statistics such percentages, frequencies were used for categorical variables, whereas median [inter quartile range (IQR)] was used for continuous variables. Long-term IUC according to our study was defined as having an indwelling Foley's urinary catheter > 14 days continuously [16].

3 Results

A total of 2112 patients were seen at the urology clinic between December 2016 and September 2017. Of these, 202 were living at home with a long-term IUC, giving a prevalence of 9.6% (202/2112), CI (8.4–10.8) see Fig. 1. The age of 202 patients ranged from 18 to 95 years with the median age of 69 [IQR 61–77] years. The majority 195(96.5%) were males see Table 1. The slightly majority 111 (54.9%) had their catheters for ≥ six weeks and 123 (60.9%) had their catheters changed at least once during the study see Table 1. The most common indications were BPH, 129 (63.9%) and urethral stricture 34 (16.8%) See Table 1. The major reasons for the long stay with an indwelling urinary catheter at home after being diagnosed with benign prostatic hypertrophy were endless appointments (laboratory results missing, inadequate

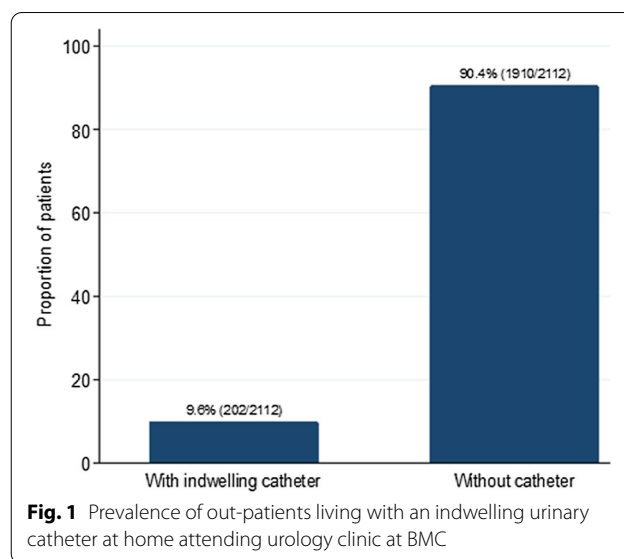


Fig. 1 Prevalence of out-patients living with an indwelling urinary catheter at home attending urology clinic at BMC

working facilities, many patients, full beds) 23(52%), no money to pay for surgery 9(20%) and medical conditions 7 (16%). Those who were not treated under National Health Insurance Fund (NHIF) were 49(94%) and those under NHIF were 3(0.1%). Major outcomes resulting from reasons identified were: 6/44(14%) went to be treated to other hospitals, 3/52(6%) died (reported by close relatives) See Table 2.

The total number of patients with cell phones who were listed for the interview was 52. This was due to the absence of cell phone numbers in the majority of the patients' files. Those who were reached for cellphone interview were 44(84.6%). Summary of responses of the patients for the reasons of long stay with an IUC after the diagnosis of BPH are seen in Table 2.

4 Discussion

The present study has established 9.6% prevalence of patients living with long-term IUC at home in the Northwestern Tanzania. The study was conducted at urology clinic at Bugando Medical Centre, a consultant, tertiary and a teaching hospital in the Northwestern part of Tanzania. Its catchment areas included 8 regions (Mwanza, Simiyu, Mara, Kagera, Shinyanga, Geita, Tabora, and Kigoma). Patients with long-term IUC came from these regions. In other clinics of the Bugando Medical Centre (medical, surgical, gynecology), during this study, we did not find any patient with long-term IUC. Therefore, we feel that this is not a unit prevalence nor a hospital prevalence but a prevalence of the Northwestern Tanzania which is in Tanzania. Since no such study has been done before according to the reviewed literature, this is the first study that has shed light on the magnitude of the

Table 1 Sociodemographic and clinical characteristics of out-patients with long-term indwelling urinary catheters living at home enrolled in the study

Patient characteristics	Number (n)/median	Percentage (%) /IQR
Median age in years	69	61–77
Sex		
Males	195	96.5
Females	7	3.5
Residence		
Outside Mwanza	117	57.9
Mwanza	85	42.1
Marital status		
Married	187	92.6
Single	15	7.4
Occupation		
Peasant	136	67.3
Retired	29	14.4
Petty trader	26	12.9
Civil servant	11	5.5
Education		
Illiterate	43	21.3
Primary level	116	57.3
Secondary education	29	14.4
College and above	14	6.9
Type of catheter		
Urethral catheter (Foleys)	120	59.4
Suprapubic catheter (Foleys)	82	40.6
Catheter size		
14 FR	1	0.5
16 FR	18	8.9
18 FR	79	39.1
20 FR	79	39.1
21–26 FR	15	7.4
Obscure (sizes were not visible due dirtiness of the catheter)	10	4.9
Catheter material: latex silicon coated		
Catheter change		
Patients whose catheters were changed	123	60.9
Patients whose catheters were not changed	79	39.1
Duration of catheter in situ (weeks)		
3–5 weeks	91	45.1
≥ 6 weeks	111	54.9
Comorbidity		
No	144	71.3
Yes	58	28.7
Indications for catheterization		
Benign prostate hypertrophy	129	63.9
Urethral stricture	34	16.8
Urine retention	24	11.9
Urinary incontinence	13	6.4
Due to benign prostate enlargement		

Table 2 Summary of most common reasons for out-patients staying long with IUC after being diagnosed with BPH

Most common reasons for out-patients staying long with IUC after being diagnosed with BPH	Frequency (n)	Percent (%)
Endless appointments (lab results missing, inadequate working facilities, many patients, beds full)	23	52
No money to pay for surgery	9	20
Medical problems	7	16
Few specialists	5	11
Scheme of treatment		
Self(from own pocket)	49	94
National Health Insurance Fund(NHIF)	3	0.1
Action taken by the patient		
Attended other hospital	6	14
Went to traditional healer	1	0.02%
Adverse outcome(death)	3	6

problem in Tanzania; in particular in the Northwestern part of Tanzania where patients with long-term IUC live in the homes.

Globally, studies on the prevalence of catheter users in the community are very limited. In a study done in U.K. in 11 European countries, the prevalence of catheter use at home care was 5.4%, whereas in U.K was 3% in people living in the community [3, 6]. To the best of our knowledge, no study from the sub-Saharan Africa has investigated this problem after searching various literature from reputable databases using key words: Prevalence patients living “long-term indwelling catheter” Africa, Sub-Saharan Africa and Tanzania. The prevalence obtained in this study is significantly high compared with the findings in the UK (5.4%) and America (4.5%). Reasons for low prevalence in IUC usage in developed countries could be attributed to good health care system, adequate infrastructure and adequate number of qualified urologists. This is contrary to Sub-Saharan Africa including Tanzania. There are many practicing urologists in the United States, about 12,186 urologists having a median number of 70 patient visits in a week [9]. In addition, in these developed countries they have certified home health agencies that provide community-based services to patients living with long-term IUC [17]. Visiting nurses in these countries are taking charge of catheter management at home and ensure the best patient outcomes in preventing associated complications. According to evidenced-based study that was done at BMC in the year 2009 to 2010, there were 423(13.8%) booked for urological operations and 67(2.2%) cancellation of urological operation [18]. Financial constraints to meet the

cost for surgery, the presence of comorbidity and endless appointments as evidenced in this study could also be contributing factors. The majority of participants were peasants with educational background—primary school level, residing outside Mwanza where accessibility to urological services was not easy for them. According to a study done by Khalaf [12], the presence of comorbidity could also influence the duration of time of living with an IUC.

As regards to indications for living with long-term IUC at home, the study has revealed that endless appointments resulting from having too many patients with few urologists, poor infrastructure leading to loss of laboratory results, missing reagents (for PSA), poor financial status and the presence of medical conditions were the major reasons for a long stay with an indwelling urinary catheter at home. As regards to the poor financial status, this study has revealed that the majority of these patients were not under the National Health Insurance Fund 49/52 (94.2%) making them to be very vulnerable to meet the cost for surgery. Very few were under NHIF 3/44 (0.1%). These findings are similar to other studies done in other countries in Sub-Saharan Africa like Zambia where patients took long time not less than four months before they were attended by an urologist and even after before they underwent surgery [11]. Surprisingly, this study has also revealed a new phenomenon, whereby due to endless appointments some patients went to traditional healers 1(0.02%), some went to other hospitals 6(11.5%) and few lost their lives 3(5.8%) before being attended. Although the number of these episodes is small due to the small number of patients interviewed yet, they send significant messages as regards to what these patients go through and what the health care system needs to do in this regard. Big studies of this kind need to be done to get a bigger picture of what these patients are going through; also studies on the outcomes of their decisions of going to other hospitals and to traditional healers. Furthermore, the majority were older males having medical conditions leading to cancellation for surgery making them stay with IUC for prolonged period of time. This could lead to more risks for their health and even affect their quality of life. These findings are similar with other studies which identified the same [11, 19]. Common indications identified in other studies for long-term IUC were enlarged prostate, urinary retention, incontinence, spinal cord injury and stroke [20, 21].

Most of the patients in this study had their catheters in situ for more than 6 weeks. The socio-demographic and the clinical characteristics of these patients could be contributing factors for the long duration of having the catheter in situ. The majority was above 60 years old, therefore, prone to BPH, urethral strictures and other

comorbidities due to their physiological changes that are taking place during this time of old age. The consistent finding during the literature review was scientific evidence discouraging the use of long-term indwelling urinary catheters for more than 30 days as this was a high risk factor for UTI [22–28]. However, according to recent study Cochrane database of systematic reviews on policies for replacing long-term IUC in adults; long-term catheterization is > 14 days [29]. When considering replacing long-term IUC, the rule of thumb is individualizing catheter changes in best practice.

4.1 Study limitations

The number of patients interviewed through the phone at home was small due to the absence of cell phone numbers in the majority of the patients' files and those who were earmarked for telephone interview were not reached. As a result, a lot of useful information was missing which would be important in setting strategies to overcome the problems and issues like going to the traditional healers or to lower level hospitals.

Some of the patients who had telephone numbers in their files did not belong to them; they were their relatives' telephone numbers who had escorted them and among them were no longer living with the patient during this interview. This was a limitation in getting information from the patient. Once this was found to be the case, the relative was thanked and did not continue with the interview.

5 Conclusion

This is the first study in the Sub-Saharan Africa particularly in Northwestern Tanzania that has shown the prevalence of long-term IUC due BPH is high. Improved health care system is required to lower the high prevalence of long-term IUC at home through training of more urologists and these patients to be under the scheme of NHIF. A multicenter study is warranted to establish the prevalence rate and associated complications of living with long-term IUC at home in Tanzania and in other Sub-Saharan African countries.

Abbreviations

BMC: Bugando medical centre; BPH: Benign prostatic hypertrophy; CREC: CUHAS/BMC research ethics and review committee; IUC: Indwelling urinary catheterization; NHIF: National Health Insurance Fund; SSA: Sub-Saharan Africa; UTI: Urinary tract infection.

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Authors' contributions

ALMN made substantial contributions to conception, design, acquisition of data, data analysis, interpretation of data and drafting of the first manuscript and correction of the sent back manuscript. RML, BRK and SEM made

substantial contributions in conception, design, data analysis, interpretation of data and critically revised the manuscript and the manuscript that was sent back for major revisions. TWK and JRM made substantial contributions in critically revising the manuscript and the manuscript that was sent back for major revisions. All authors have read and approved the manuscript.

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Availability of data and materials

The data are available upon request and the request should be made to the Director of Research and Innovation Catholic University of Health and Allied Sciences.

Ethics approval and consent to participate

We obtained approval for the study from the joint Catholic University of Health and Allied Sciences (CUHAS)/Bugando Medical Centre (BMC) Research Ethics and Review Committee (CREC) with ethical clearance number-CREC/152/2016. Written informed consents were obtained from every study participant. All participants were asked to sign informed consent prior enrolment.

Consent for publication

Not applicable.

Competing interests

None declared. None declared.

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References

- Nnabugwu II, Udeh EI, Enivwenae OA et al (2014) Reducing the burden of regular indwelling urinary catheter changes in the catheter clinics: the opinion of patients and relatives on the practice of self-catheterization. *Patient Preference Adherence* 8:1179
- Emr K, Ryan R (2004) Best practice for indwelling catheter in the home setting. *Home Healthcare Now* 22:820–828
- Prinjha S, Chapple A (2013) Living with an indwelling urinary catheter. *Nurs Times* 109(12):14
- Davey G (2015) Troubleshooting indwelling catheter problems in the community. *J Commun Nurs* 29:67–71
- Tan E, Ahluwalia A, Kankam H, Menezes P (2019) Urinary catheterization 1: indication. *Br J Hosp Med (Lond)* 80:9
- Getliffe K, Newton T (2006) Catheter-associated urinary tract infection in primary and community health care. *Age Ageing* 35:477–481
- Herter R, Kazer MW (2010) Best practices in urinary catheter care. *Home Healthcare Now* 28:342–349
- Godfrey H (2008) Living with a long-term urinary catheter: older people's experiences. *J Adv Nurs* 62:180–190
- American Urological Association (2015) The state of the urology workforce and practice in the United States. Linticum, Maryland
- Maeda S, Takiuti T, Komatsu T et al (2015) Efficacy of the 'long-term urinary catheter management training program': a pilot study. *Int J Urol Nurs* 9:92–100
- Labib M, Spasojevic N (2013) Problem of catheter associated urinary tract infections in Sub-Saharan Africa. Recent Advances in the Field of Urinary Tract Infections. Department of Surgery, School of Medicine. University of Zambia
- Khalaf I (2004) Providing urological training in Africa. *African J Urol* 10:175–177
- Senes V, Hendricks MB, Morrison M et al (2015) Clinical practice guidelines: suprapubic catheter replacement. Pitman, Guset User
- Walliman L (2017) Managing indwelling catheters in community settings. *Primary Health Care*. 27:34
- Lugossy AM (2020) Tanzania Country profile. [raid-aid.org](https://www.aid-aid.org)
- Geng V, Cobussen-Boekhorst H, Farrell J (2012) Catheterization. Indwelling catheters in adults. Urethral and suprapubic. Evidence-based guidelines for best practice in urological health care. [Repository.udl.cat](https://www.repository.udl.cat)
- Maeda S, Takiuti T, Kohno Y et al (2017) Catheter blockage factors in patients cared for in their own home requiring long-term urinary catheterization. *Int J Urol Nurs* 11:52–59
- Chalya P, Gilyoma J, Mabula J et al (2011) Incidence, causes and pattern of cancellation of elective surgical operations in a university teaching hospital in the Lake Zone. *Tanzania Afr Health Sci* 11:438–443
- Smith JM (2003) Indwelling catheter management: from habit-based to evidence-based practice. *Ostomy/Wound Manag* 49:34–45
- Warren JW (2001) Catheter-associated urinary tract infections. *Int J Antimicrob Agents* 17:299–303
- Madigan E, Neff DF (2003) Care of patients with long-term indwelling urinary catheters. *Online J Issues Nurs* 8:7
- Wilde MH, McMahon JM, Crean HF et al (2017) Exploring relationships of catheter-associated urinary tract infection and blockage in people with long-term indwelling urinary catheters. *J Clin Nurs* 26:2558–2571
- Ikegami Y, Yoshida K, Imaizumi T et al (2016) Life-threatening urethral hemorrhage after placement of a Foley catheter in a patient with uroseptic disseminated intravascular coagulation due to chronic urinary retention induced by untreated benign prostatic hyperplasia. *Acute Med Surg* 3:407–410
- Gould CV, Umscheid CA, Agarwal RK et al (2010) Guideline for prevention of catheter-associated urinary tract infections 2009. *Infect Control Hosp Epidemiol* 31:319–326
- Stickler DJ (2008) Bacterial biofilms in patients with indwelling urinary catheters. *Nat Clin Pract Urol* 5:598–608
- Bagchi I, Jaitly NK, Thombare V (2015) Microbiological evaluation of catheter associated urinary tract infection in a Tertiary Care Hospital. *People J Sci Res* 5:13
- Zachou A, Mteta KA, Gueye S (2018) An academic year in Sub-Saharan Africa: the clinical experience of a british urology registrar. *African J Urol* 24:248–253
- Calleja E (2012) Indwelling urethral catheters in adults. *J Malta College Pharm Pract* 18:33–35
- Cooper FP, Alexander CE, Sinha S et al. (2016) Policies for replacing long-term indwelling urinary catheters in adults. *Cochrane Database Syst Rev* 7:CD011115

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