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Gross Hematuria and Urinary Retention among Men from a Nationally Representative Survey in Sierra Leone

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Abstract

Objectives—To estimate the prevalence of gross hematuria and urinary retention among men in Sierra Leone and report on barriers to care and associated disability. Gross hematuria and urinary retention are classic urologic complaints that require medical attention for significant underlying pathology, but their burden has not been quantified in a developing country.

Methods—A cluster randomized, cross-sectional household survey was administered in Sierra Leone using the Surgeons OverSeas Assessment of Surgical need tool as a verbal head-to-toe examination. A total of 2 respondents in each of 25 households in 75 clusters were surveyed to assess surgical needs. Data on questions related to blood from the penis and the inability to urinate

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for men >12 years of age were included in the present analysis to determine the period and point prevalence of hematuria and urinary retention.

Results—From 3645 total respondents, 1054 (28.9%) were men >12 years old included in the analysis. Period and point prevalence of gross hematuria were 21.8 per 1,000 (95%CI 13.0-30.7) and 12.3 per 1,000 (95%CI 5.7-19.0), respectively, and for urinary retention they were 19.9 per 1,000 (95%CI 11.5-28.4) and 4.7 per 1,000 (95%CI 0.5-8.9), respectively. Lack of financial resources was the major barrier to care. Disability assessment showed 19.1% were not able to work as a result of urinary retention and 34.8% felt ashamed of their gross hematuria.

Conclusions—The results provide a prevalence estimate of gross hematuria and urinary retention for men in Sierra Leone. Accessible medical and surgical care will be critical for early intervention and management.

Keywords

hematuria; urinary retention; Sierra Leone; prevalence; health surveys

Introduction

The prevalence of common urological complaints in low and middle income countries (LMICs) has not been quantified. However, urologic diseases account for approximately 25 million disability-adjusted life years worldwide, evenly split between benign and malignant conditions according to the recent update to the Global Burden of Disease Study [1]. Lack of attention to global urological care, and surgical care needs in general, may be partially due to common misconceptions about the breadth of the problem and belief that there are no sustainable or cost-effective solutions [2,3].

Gross hematuria and urinary retention are two classic urological complaints, more common among men, that are universally thought to require medical attention [4,5]. Studies in high-income countries have focused on the prevalence of asymptomatic microscopic hematuria, which ranges from about 9-18%, because patients with gross hematuria usually seek prompt medical care leading to a low prevalence [4]. The rate of finding a serious urologic disease for patients with asymptomatic microscopic hematuria is 2.3% with only 0.5% due to bladder cancer or renal cell carcinoma [6]. Gross hematuria is much more concerning and may be secondary to an infectious etiology or nephritic/nephrotic conditions, but causes such as a renal calculus or malignancy require evaluation for potential surgical intervention. The epidemiologic etiologies of gross hematuria in Africa seem to have shifted in the past 50 years from schistosomiasis as the most common culprit to malignancy in the modern era [7,8]. However, there is no estimate for the general prevalence of gross hematuria in any LMIC.

Similarly, there are a number of acute and chronic causes of urinary retention with the rate of acute urinary retention in the United States estimated at 4.5 per 1,000 person-years, based on 82 cases (1.34%) in 6,100 men included from the Health Professionals Follow-Up Study [9]. One recent population-based study of 950 men in West Africa found the prevalence of benign prostatic hyperplasia (BPH), a common cause of urinary retention, may be higher

among older Ghanaian men compared to older American men [10]. This, however, is likely balanced by the shorter life expectancy of men in LMICs. Again, no estimate for the general prevalence of urinary retention from any cause is available in a LMIC.

Sierra Leone is a country of six million ranking near the bottom on the human development index [11]. The vast majority of patients, even in cities, pay out of pocket for care provided by a mix of governmental, private, and non-governmental organizations with traditional medicine programs also sponsored by the Ministry of Health and Sanitation. Free care for children <5 years and pregnant and breastfeeding women was enacted in 2010 but is still disseminating. Surgical care, in particular, is provided about equally by local surgeons and mission or non-governmental hospitals. The goal of the present study was to estimate the period and point prevalence of gross hematuria and urinary retention in a nationally representative sample in Sierra Leone using the Surgeons OverSeas Assessment of Surgical need (SOSAS) tool. We also report on healthcare-seeking behaviors and lingering disability among affected individuals.

Patients and Methods

Study Design

The details of the SOSAS survey, instruction manual, and implementation in Sierra Leone has been previously described (<http://www.surgeonsoverseas.org/resources.html>) [12,13]. SOSAS was collaboratively developed by an international group of experts to estimate the prevalence of conditions requiring surgical attention and resulting disability in LMICS. The study was approved by the Sierra Leone Ministry of Health and Sanitation, the Ethical and Scientific Review Committee of Sierra Leone, and the Research Ethics Committee of the Royal Tropical Institute in Amsterdam, Netherlands. All participants provided informed consent. A household-to-household population-based survey was conducted in a cluster-randomized, cross-sectional fashion across the country of Sierra Leone.

A total of 75 study clusters, stratified by district and urban-rural population distribution, were randomly selected from 9671 enumeration sites in Sierra Leone. Twenty-five households within each cluster were randomly selected, and two members of each household, not limited by sex or age, were randomly selected to undergo a verbal head-to-toe exam with the SOSAS questionnaire. The sample size was estimated based on a pilot study and scaled up by a small design-factor of 1.3 [12]. The sample was self-weighted by interviewing the same number of individuals in each cluster [14]. The current analysis is limited to men >12 years of age.

Enumerators were nursing and medical students closely overseen by a supervisor from both the College of Medicine and Allied Health Sciences and Statistics Sierra Leone. SOSAS data collection was conducted with handheld tablets after a one week training on interview techniques, random sampling, proficiency in iPad® use, and extensive debriefing on questionnaire content. Households were randomly selected in each enumeration area based on the number of dwelling structures, and enumerators identified all members of the household before using a random number generator to select respondents. At least three

separate household visits were attempted to interview the selected individual if not available initially.

Survey Data

Data collection was conducted from January to February 2012. Demographics included age, sex, ethnicity, education level, and location and transportation details to health facilities. Ethnicity included groups with distinct tribal origins, customs, and languages. The two largest groups, about 30% each of the population, are the Mende (Southern and Eastern Provinces) and Temne (Northern Province and Western Area). Gross hematuria was assessed with a question related to “bleeding (from the penis)” and urinary retention was based on any episodes of “inability to urinate.” Potential history of trauma was assessed as well as any lingering disability in the following categories: no disability; I feel ashamed; I’m not able to do the work I used to do; I need help with transportation; and I need help with daily living activities. Healthcare received, if any, was noted, and barriers to obtaining medical attention were elicited. Statistical analyses were conducted in STATA software v. 12.0 (STATA Corp, College Station, TX, 2011) to assess rates of hematuria and urinary retention. Urban-rural comparisons were performed with χ^2 tests for categorical variables and t tests for continuous variables.

Results

Survey data from 1843 (98%) of 1875 targeted households were included in the analysis. Inconsistencies in gathered data excluded twenty-five households, missing information excluded five, and lack of consent excluded two [13]. A total of 3645 respondents (99%) were tabulated of 3686 expected interviews because only one member was interviewed in 41 households. There were 1054 men >12 years of age included in the study with a median age of 32 years (range 13 to 82) and roughly 60% living in a rural area, compatible with Demographic Health Survey data from Sierra Leone [15]. Significant sociodemographic differences existed between urban and rural clusters with residents of urban areas being younger, more educated, and more often literate (Table 1). Urban respondents also reported shorter transportation time to health facilities and were more likely to be able to afford the trip. Overall median transportation times were 0.5 (range 0 to 7) hours, 1.75 (range 0.25 to 25.5) hours, and 4 (range 0.25 to 31) hours to primary, secondary, and tertiary health facilities.

Gross Hematuria

The overall period prevalence (men affected during their lifetime up to the point of interview) of gross hematuria was 21.8 per 1,000 men (95%CI 13.0-30.7; 2.18%) with a point prevalence (men affected at the actual time of interview) of 12.3 per 1,000 men (95%CI 5.7-19.0; 1.23%) based on those noting it to be a current problem. The onset of hematuria was within the past month for 39.1% of cases and most (60.9%) attempted to seek medical attention (Table 2). Lack of financial resources was the most common reason for not seeking or obtaining surgical care (43.5%) while eight individuals (34.8%) who sought care felt that surgery was not needed (Figure 1). Four individuals (17.4%) received some type of procedure. Disability assessment showed eight individuals (34.8%) felt ashamed

about their problem, seven of which were currently experiencing gross hematuria (Figure 2). Not being able to work or needing help with activities of daily living were less common lingering disabilities.

Five cases (21.7%) reported the gross hematuria began after trauma. Four of these were after a fall with one individual also reporting a wound in the groin. One was after a pedestrian or bicycle crash. Five cases (21.7%) also reported abdominal pain or distention.

Urinary Retention

The period prevalence of urinary retention was 19.9 per 1,000 men (95%CI 11.5-28.4; 1.99%) with a point prevalence of 4.7 per 1,000 men (95%CI 0.5-8.9; 0.47%). The onset of urinary retention was over a year ago for most men (57.1%) with many seeking medical attention (61.9%) and/or consulting a traditional healer (71.4%) (Table 2). Similar to cases of gross hematuria, lack of money for care was the most common reason for not obtaining surgical attention (47.6%), but eight individuals (38.1%) seeking care did not feel surgery was needed (Figure 1). On disability assessment, four individuals (19.1%) reported not being able to work, but most (76.2%) felt they did not experience any lingering disability from urinary retention (Figure 2).

Three cases (14.3%) also reported a solid mass in the groin, and three others (14.3%) reported a reducible mass in the groin.

Discussion

Burden of Disease

The results of SOSAS in Sierra Leone estimated the period and point prevalence of gross hematuria and urinary retention among men. Based on the estimates and the country's population distribution, the numbers extrapolate to 38,000 men in Sierra Leone experiencing gross hematuria with 21,000 current cases, and 35,000 experiencing urinary retention with 8,000 currently reporting symptoms. The cumulative lifetime incidences would be even higher than the prevalence rates reported as many men in the sample were relatively young, representative of the current population structure of the country [15]. Estimating the burden of disease will aid efforts to strengthen the health system. Health facilities have been in the process of reconstruction since the end of the Sierra Leone Civil War in 2002. Measures of disease burden can guide planning for the quantity of personnel and supplies needed to treat particular conditions. Furthermore, attracting global health funding in LMICs, more and more of which is from private sources, often depends on demonstrating a need for care [16].

The need for urological care in LMICs is compounded by the fact that the number of urologists in African countries, often 1 per several million, is orders of magnitude less than in high-income countries (e.g. 1 per 30,000 in the United States) [2,17]. Sierra Leone has only one trained urologist (TBK) for six million residents. Furthermore, the urban-rural divide also creates a barrier to care for patients in more rural portions of the country. Lack of funds for care was the most commonly cited barrier to care with differences in lingering disability by complaint. As expected, the proportion of physical limitations for patients with gross hematuria was low, but 34.8% did feel ashamed about their condition. Most patients

who had experienced urinary retention reported no lingering disability (76.2%), likely due to resolution of an acute event, but a proportion (19.1%) could no longer work. Building surgical capacity and infrastructure to perform major and minor procedures, including simple catheterization, will be needed to help address these needs and prevent progression of the underlying pathology.

Gross Hematuria

The prevalence of gross hematuria in high-income countries is largely unknown due to prompt medical attention. Some studies mistakenly quote it as 2.5% based on a 1986 report on occult hematuria in the United Kingdom, but the occult hematuria was detected by dipstick and confirmed microscopically [18]. While rates of serious disease with asymptomatic microscopic hematuria, with a prevalence of 9-18%, are low, gross hematuria requires a workup often leading to medical or surgical treatment [4,6]. In this background, a point prevalence of 1.2% and period prevalence of 2.2% for gross hematuria in Sierra Leone represent a significant number of men needing medical attention. One contributor might be the misplaced belief in some communities that hematuria is a form of gonorrhea that is viewed favorably to signal a man's potency. While no other studies have estimated the prevalence of gross hematuria in a LMIC for comparison, it is interesting to consider reports on changes in case-mix over time for patients presenting with the sign.

Urinary schistosomiasis was previously the most common etiology of gross hematuria in Africa [7]. It leads to significant morbidity and was associated with 45% of bladder cancers reported at a hospital in Tanzania [19]. Reports from the early 1990s suggested that simply asking about subjective gross hematuria could serve as a screen for urinary schistosomiasis with improvements in sensitivity by adding clinician observation and reagent strips [20,21]. Studies over time, all based on individual clinics or hospitals in Nigeria, have shown schistosomiasis has become an uncommon cause of gross hematuria in the country with the emergence of BPH and urologic malignancies [8,22,23]. A clinic series of 100 adult patients found BPH, trauma, infection, malignancy, and calculi to account for 90% of cases [22]. Hospital-based studies show roughly 30% of cases are due to BPH and 30% to urological malignancies [8,23]. Interesting disease-specific reports have demonstrated that over 40% of renal cell carcinomas present with the class triad of gross hematuria, flank pain, and a palpable mass and that the composition of urinary stones are moving toward that observed in industrialized countries [24,25]. Reasons for the shift in etiologies could be broad including continued contributions of schistosomiasis (perhaps now more effectively treated) leading to greater risk of bladder cancer, increased life expectancy, genetics, and changing environmental exposures.

Urinary Retention

There are a number of potential causes for urinary retention in men, and one limitation of the current study is the inability to differentiate acute and chronic urinary retention. However, many cases were likely acute episodes because the proportion of men reporting current symptoms (4.7 per 1,000) was much lower than those stating they had ever experienced the inability to urinate (19.9 per 1,000 men). Episodes of acute urinary retention are associated with significant mortality as shown in a study of men admitted to National Health Service

hospitals in England with their first episode of retention [26]. Relatively young men (45-54 years old) were found to have a 1-year mortality of 4.1% with spontaneous and 9.5% with precipitated acute urinary retention. Mortality would, arguably, be even higher for a population without access to care. We were unable to quantify mortality due to retention using SOSAS leading to an underestimated period prevalence estimate as a result of survivor bias where the proportion of individuals dying (from acute retention) are missed in the estimate.

Common causes of urinary retention in men include BPH, detrusor muscle weakness or neurologic conditions, various infectious etiologies, anatomic strictures and stenoses, and bladder calculi [5]. BPH is an emerging problem in the aging population of sub-Saharan Africa. The prevalence of BPH in Ghana among 50-74 year olds may be 35-62% with 19.9% of men experiencing lower urinary tract symptoms [10]. A series in Senegal showed urethral stricture disease, another cause of urinary retention, is often a sequelae of endemic gonococcal urethritis [27]. Notably, some communities in Sierra Leone believe acute urinary retention to be a form of punishment meted out by aggrieved women on men and called “GBAGBA” in most local languages. Traditional healers are known to work with the women and perform elaborate ceremonies to attempt to resolve the problem. However, they might also serve as an intermediary to conventional care as it is increasingly recognized as a high mortality condition, which might account for some proportion of men not seeking healthcare (38.1%). Being able to address the numerous etiologies for urinary retention will require general efforts to strengthen the health systems of LMICs with emphasis on both medical and surgical care. Additionally, it might be a relevant future research question to find out more specifics on how traditional healers deal with this complaint as 70% consulted one.

Limitations

Limitations of the present study deserve mention and are largely those inherent to survey data. Ethical and logistical concerns excluded the possibility of physical examination during home visits though the survey was conducted with medical and nursing students. However, although assessed verbally, complaints of gross hematuria and urinary retention deserve an evaluation by a urologist or skilled medical doctor. The data is cross-sectional and related to self-reported signs and symptomatology, which does not allow the estimation of incidence or enumeration of diagnoses responsible for the symptoms. At the same time, it does provide the first representative, population-based assessment of the prevalence of two common urologic complaints in a LMIC using ground-level data. Lastly, there is potential for inter-rater variability in administering the survey, but all enumerators were trained together in a uniform fashion and administered the survey in the same time frame.

Conclusions

Gross hematuria and urinary retention are urologic complaints associated with significant underlying pathology requiring medical or surgical attention. SOSAS in Sierra Leone provided the first nationally representative estimate for the prevalence of these conditions in a LMIC along with insight into healthcare-seeking behavior, cost as a major barrier, and

lingering disability. Better quantifying the burden of urologic and surgical disease in LMICs will aid in determining healthcare and disease-related priorities to improve access and increase surgical capacity for major and minor procedures.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations and Acronyms

BPH	benign prostatic hyperplasia
LMICs	low and middle income countries
SOSAS	Surgeons OverSeas Assessment of Surgical Need

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Figure 1.

Health care received and reasons for not obtaining care among men with gross hematuria or urinary retention. Surgeons OverSeas Assessment of Surgical Need, Sierra Leone 2012.

Figure 2.

Lingering disabilities reported by men with gross hematuria or urinary retention. Surgeons OverSeas Assessment of Surgical Need, Sierra Leone 2012.

Table 1

Demographics of the study population showing differences by urban and rural location. Surgeons OverSeas Assessment of Surgical Need, Sierra Leone 2012.

	Overall		Urban		Rural	
	Value	(SD or %)	Value	(SD or %)	Value	(SD or %)
N^a	1054	-	435	(41.3)	619	(58.7)
Age	35.2	(18.0)	31.8	(16.6)	37.6	(18.6)
Ethnicity						
<i>Mende</i>	371	(35.2)	108	(24.8)	263	(42.5)
<i>Temne</i>	292	(27.7)	127	(29.2)	165	(26.7)
<i>Other</i>	391	(37.1)	200	(46.0)	191	(30.8)
Transport Time (hours)^b						
<i>Primary^c</i>	1.1	(2.1)	0.8	(2.7)	1.4	(1.6)
<i>Secondary</i>	3.0	(4.3)	1.6	(3.5)	4.0	(4.6)
<i>Tertiary</i>	5.1	(5.0)	2.7	(3.1)	6.7	(5.4)
Money for Transport^d						
<i>Yes</i>	301	(28.6)	165	(37.9)	136	(22.0)
<i>No</i>	715	(67.8)	245	(56.3)	470	(75.9)
Education						
<i>None</i>	439	(41.7)	78	(17.9)	361	(58.4)
<i>Primary</i>	124	(11.8)	42	(9.7)	82	(13.3)
<i>Secondary</i>	403	(38.3)	251	(57.7)	152	(24.6)
<i>Higher</i>	87	(8.3)	64	(14.7)	23	(3.7)
Literacy	612	(58.5)	347.0	(80.1)	265.0	(43.2)

^a All males >12 years of age

^b Travel + wait time to each hospital type by setting

^c Primary=health facility without operating room; Secondary=health facility with operating room; Tertiary=health facility with operating room and at least one surgical specialist

^d Transportation to a tertiary health facility

Table 2

Survey results for onset of symptoms and health care-seeking behavior from the identified cases of men with gross hematuria or urinary retention. Surgeons OverSeas Assessment of Surgical Need, Sierra Leone 2012.

	Hematuria		Retention	
	Value	SD or %	Value	SD or %
N	23	-	21	-
Age	33.3	(17.0)	38.5	(20.6)
Location	13	(56.5)	14	(66.7)
Timing (onset)	9	(39.1)	3	(14.3)
<i>Rural</i>	8	(34.8)	6	(28.6)
<i><1 month</i>	6	(26.1)	12	(57.1)
<i>1-12 months</i>	13	(56.5)	5	(23.8)
<i>>12 months</i>	14	(60.9)	13	(61.9)
Current Problem	8	(34.8)	15	(71.4)
Healthcare Sought				
Traditional Healer				

^aPrimary=health facility without operating room; Secondary=health facility with operating room; Tertiary=health facility with operating room and at least one surgical specialist