

Prevalence and predictors of lower urinary tract symptoms in Solomon Islander adult men

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Abstract

Background: Despite growing interest in the prevention of lower urinary tract symptoms (LUTS) globally and in the Asia-Pacific region, population-based evidence is limited in the smaller Pacific Island countries such as in the Solomon Islands. This study aimed to investigate the prevalence and describe the risk factors associated with moderate to severe LUTS among Solomon Islander men.

Methods: A cross-sectional survey was conducted among 400 men aged ≥ 18 years living in Honiara, Solomon Islands. LUTS were assessed using the International Prostate Symptom Score (IPSS). The association between moderate to severe LUTS and sociodemographic, health conditions and health-related factors were estimated using logistic regression adjusted for age.

Results: Overall, 13.8% reported moderate LUTS, and 0.8% reported severe LUTS. Frequent night-time urination was the most commonly reported LUTS. The adjusted odds of moderate to severe LUTS decreased with increasing level of education. The odds increased among men reporting elevated psychological distress, increased stressful events in the past 12 months and depression.

Conclusions: About one in six Solomon Islander men experience moderate to severe LUTS, having a negative impact on their mental health and general well-being.

Keywords

Solomon Islands, men, lower urinary tract symptoms, education, Honiara

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Introduction

Globally, about 45.8% of men aged ≥ 20 years experienced some lower urinary tract symptoms (LUTS) in 2018.^{1,2} LUTS can be broadly classified into three broad conditions, including: storage (increased daytime frequency, nocturia, urgency, urinary incontinence), voiding (slow stream, splitting or spraying, intermittent, hesitancy, straining, terminal dribble) and post-micturition (feeling of incomplete emptying, dribbling).³ There are variations in the estimated prevalence of LUTS from country to country. Findings from epidemiological studies in several Asian countries have reported a high prevalence of LUTS ranging from 39.7% to 83.4% among

men aged ≥ 40 years.^{1,4–7} Studies conducted in Australia reported a prevalence ranging from 19.4% to 21.9% among men aged ≥ 40 years.^{8,9}

LUTS can affect men's well-being and quality of life (QoL). Several studies in the UK, USA, Sweden and

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elsewhere have reported that men with moderate to severe LUTS seem to have a significant risk of depression, chronic diseases, sexual dysfunction and general poor health status.^{10–13} Furthermore, men with LUTS are likely to experience mental-health issues and poor QoL. For example, studies in Asia demonstrated that men with moderate to severe LUTS were at high risk of depression and poor QoL, and this had a negative impact on their general well-being.^{4,7,14–16} An Australian study reported a bidirectional association between LUTS and depression and anxiety in men aged ≥ 35 years.⁹

The extent of LUTS in Solomon Islander men remains unknown. This study examines the prevalence of LUTS in Solomon Islander men aged ≥ 18 years and predicts the relationships between LUTS and sociodemographic conditions, mental health, adverse life experiences and individual behavioural practices.

Methods

Study population

The methodology, recruitment and response rates have been described in detail elsewhere.^{17,18} In brief, this paper used a cross-sectional survey design, and data on LUTS were collected from 400 men aged 18–70 years from a cohort of community-dwelling men in Honiara, Solomon Islands.

Study instrument

The participants were interviewed using a standard questionnaire, which covers the following: demographic characteristics, general health checklist, Adverse Childhood Experiences International Questionnaire (ACE-IQ), Kessler Psychological Distress Scale (K-10), World Health Organization (WHO) well-being index (WHO-FIVE), health-related quality of life (SF-6D) and the International Prostate Symptom Survey (I-PSS). The instrument was translated using the WHO forward and backwards process.¹⁹ The pretested instrument scales attained a high reliability coefficient of $\alpha > 0.7$.

Data collection

Three local male registered nurses were recruited and trained as research assistants. A house-based door-to-door approach was used to administer a face-to-face interview questionnaire. The interviews were held at homes or any places around the house where the participants felt comfortable and private. The researchers also ensured that participants who needed support were provided with information on available services. At the end of each interview, the completed instrument was placed in an envelope to demonstrate the confidentiality of the information collected.

Assessment of LUTS

The seven-item I-PSS was used to assess the presence of LUTS.²⁰ Participants were asked to rate the severity of each LUTS, including incomplete emptying, frequency, intermittency, urgency, weak streaming, straining and nocturia in the past four weeks. A six-point Likert scale (0=not at all, 1=less than one in five times, 2=less than half of the time, 3=about half of the time, 4=half of the time, 5=almost always) was used to measure the severity of LUTS.

Data analysis

Descriptive statistics were performed on demographic characteristics and the prevalence of each LUTS at a 95% confidence interval (CI). Univariable logistic regression was employed to examine associations between LUTS and demographic factors, social behaviours, adverse life experiences, mental health and co-morbid health problems. Multivariate logistic regression was performed to predict the strength of association by adjusting for age. All statistical analyses were performed using IBM SPSS Statistics for Windows v22 (IBM Corp., Armonk, NY).

Results

Sociodemographic characteristics of participants

Overall, almost half (48.5%) of the participants were men aged 18–29 years. About 24.0% and 28.0% of the participants were in the age range 30–39 years and ≥ 40 years, respectively (Table 1).

Prevalence of LUTS

In total, 58 (14.6%) of participants reported experiencing moderate to severe LUTS (Table 2). Among these participants, 13.8% had moderate symptoms, and 0.3% had severe LUTS. Men aged >30 years experienced slightly higher LUTS compared to younger men aged 18–29 years. About 1 in 10 (10.0%) men experienced incomplete emptying of the bladder. A high proportion of older men experienced this symptom compared to younger men. About 9.0% of men reported having trouble starting and stopping the urinary stream (intermittency) in the study, and 15.0% of men experienced the symptom of urgency or having difficulty postponing urination. Younger men reported experiencing difficulty postponing urination more than men aged >30 years. The symptom of a weak stream was slightly higher in young men compared to men aged >30 years, while straining and waking during the night to urinate were common among older men aged >30 years compared to younger men. Further, slightly more than a third (33.0%) of males had woken at night to urinate at least once in the past four weeks before the survey (Table 2).

Table 1. Sociodemographic characteristics of respondents.

Sociodemographic factors	Age in years		
	18–29	30–39	40+
<i>Marital status</i>			
Single	164 (93.7)	9 (5.1)	2 (1.1)
Married	25 (12.4)	75 (37.1)	102 (50.5)
Divorced/defecto	5 (21.7)	10 (43.7)	8 (34.8)
<i>Employment status</i>			
Student	113 (93.4)	5 (4.1)	3 (2.5)
Employed	52 (28.9)	63 (35.0)	65 (36.1)
Unemployed	29 (29.3)	26 (26.3)	44 (44.4)
<i>Education level</i>			
No/primary education	10 (13.5)	20 (27.0)	44 (59.5)
Secondary/vocational	108 (62.8)	34 (19.8)	30 (27.4)
College/university	76 (49.4)	40 (26.0)	38 (24.7)

Factors associated with LUTS

The multivariate regression analysis predicted that poor/fair health (odds ratio (OR)=2.69, 95% CI 1.78–5.67) and experiencing depression (OR=2.73, 95% CI 1.15–6.54) were positive predictors of LUTS (Table 3). On the other hand, the odds of experiencing LUTS decreased with a higher level of education (OR=0.31, 95% CI 0.13–0.80). Interestingly, men who currently chewed betel quid had reduced odds of reporting moderate to severe LUTS in the current study (OR=0.21, 95% CI 0.09–0.47).

Furthermore, men reporting moderate to severe LUTS had increased odds of scoring high on psychological distress (OR=1.16, 95% CI 1.09–1.24). Similarly, participants who reported experiencing more stressful life events in the past 12 months had increased odds of reporting moderate to severe LUTS (OR=1.13, 95% CI 1.01–1.26; Table 4).

Knowledge, attitudes and concerns about prostate diseases

In this group of men, 346 (86.6%) did not know about the function of the prostate gland. Similarly, 335 (83.3%) did not know where the prostate gland is located in the body. Moreover, only 16.4% of men with moderate to severe LUTS had visited a health-care facility with problems relating to prostate function in the 12 months before the survey. On the other hand, more than half (55.0%) of the participants were concerned about prostate cancer.

Discussion

Many previous studies have focussed on the prevalence of LUTS in Europe, the USA and Asia, with minimal data available for the small Pacific Island countries. This study is the first population-based study on LUTS among men in the Solomon Islands. The survey revealed that 14.6% of men reported moderate to severe LUTS. The overall prevalence in this study is low compared to studies in Asia, Australia and other countries.^{1,6,7,8,21–22} Previous studies have suggested that the prevalence of LUTS increases as men age. This trend was not observed in the current study, as the prevalence of LUTS was almost the same in younger men (18–29 years) as it was in older men (≥ 30 years). This finding is consistent with a previous study conducted among Australian aboriginal men.²³ This finding may also indicate that younger men were more open to talking about sensitive issues such as LUTS compared to the older men in the study.

Consistent with other studies, men in the current study who reported medical problems such as diabetes, heart diseases, high blood pressure and depression were likely to report moderate to severe LUTS in the univariate analysis.^{4,24–27} Such findings were extended to the associations between moderate to severe LUTS and low level of education, psychological distress, increased recent stressful life events (in the past 12 months) and adverse childhood experiences. However, in the multivariable analysis after adjusting for age, only poor health status, depression, psychological distress, chewing betel quid and level of education were found to be independently associated with

Table 2. Prevalence of low urinary tract symptoms by age groups.

Symptoms of prostate function	Overall, <i>n</i> (%)	Age in years	
		18–29, <i>n</i> (%)	30+, <i>n</i> (%)
Incomplete emptying			
Never	360 (90.0)	181 (93.3)	179 (83.9)
Sometimes	30 (7.5)	10 (5.2)	20 (9.7)
Always	10 (2.5)	3 (1.5)	7 (3.4)
Frequency (<2 hours)			
Never	343 (85.8)	164 (84.5)	179 (86.9)
Sometimes	48 (12.0)	25 (12.9)	23 (11.2)
Always	9 (2.5)	5 (2.6)	4 (1.9)
Intermittency (stop/start mood)			
Never	365 (91.3)	177 (91.2)	188 (91.3)
Sometimes	29 (7.2)	13 (6.7)	16 (7.8)
Always	6 (1.5)	4 (2.1)	2 (1.0)
Urgency			
Never	340 (85.0)	163 (84.0)	177 (85.9)
Sometimes	39 (9.8)	21 (10.8)	18 (8.7)
Always	21 (5.3)	10 (5.2)	11 (5.3)
Weak stream			
Never	352 (88.0)	171 (88.1)	181 (87.9)
Sometimes	38 (9.5)	18 (9.3)	20 (9.7)
Always	10 (2.5)	5 (2.6)	5 (2.4)
Straining			
Never	370 (92.5)	178 (91.8)	192 (93.2)
Sometimes	24 (6.0)	14 (7.2)	10 (4.9)
Always	6 (1.5)	2 (1.0)	4 (1.9)
Nocturia			
Never	370 (67.5)	135 (69.6)	135 (65.5)
Sometimes	118 (29.5)	54 (27.8)	64 (31.1)
Always	12 (3.0)	5 (2.6)	7 (3.4)
Prevalence of prostate symptoms			
None	342 (85.5)	166 (85.6)	176 (85.4)
Moderate	55 (13.8)	27 (13.9)	28 (13.6)
Severe	3 (0.8)	1 (0.5)	2 (1.0)

Table 3. Factors associated with moderate to severe lower urinary tract symptoms.

Variable	Univariate analysis		Multiple logistic regression	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Age (years)				
18–29	1.00			
30+	1.01 (0.6–1.8)	0.971		
Marital status				
Unmarried	1.00		1.00	
Married	0.75 (0.43–1.30)	0.301	0.32 (0.11–0.89)	0.047
Level of education				
None/primary	1.00			
Secondary/vocational/university	0.48 (0.26–0.91)	0.024**	0.31 (0.13–0.80)	0.002**
Employment status				
Students	1.00			
Employed	1.08 (0.56–2.08)	0.819	2.02 (0.78–5.23)	0.146
Unemployed	1.00 (0.47–2.16)	0.984	1.64 (0.49–5.56)	0.423
Health status				
Good	1.00			
Poor/fair	2.99 (1.64–5.46)	0.001***	2.69 (1.78–5.67)	0.009**
Diabetes				
No	1.00			
Yes	3.78 (1.42–10.03)	0.008**	3.36 (0.89–12.65)	0.073
Heart disease				
No	1.00			
Yes	4.13 (1.03–9.52)	0.044**	1.42 (0.27–4.87)	0.933
High blood pressure				
No	1.00			
Yes	2.34 (1.07–5.11)	0.034**	0.75 (0.23–2.44)	0.631
Depression				
No	1.00			
Yes	3.42 (1.77–6.62)	0.001***	2.73 (1.15–6.45)	0.022**
Sexually transmitted infection				
No	1.00			
Yes	1.59 (0.82–3.09)	0.171	1.30 (0.53–3.20)	0.563

(Continued)

Table 3. (Continued)

Variable	Univariate analysis		Multiple logistic regression	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Malaria				
No	1.00			
Yes	0.88 (0.50–1.55)	0.657	0.81 (0.41–1.59)	0.545
Dengue fever				
No	1.00			
Yes	1.24 (0.57–2.71)	0.582	0.49 (0.18–1.36)	0.173
Alcohol				
No	1.00			
Yes	0.98 (0.53–1.81)	0.955	1.88 (0.84–4.20)	0.123
Drugs				
No	1.00			
Yes	1.33 (0.56–3.17)	0.521	1.45 (0.53–3.97)	0.475
Smoking				
No	1.00			
Yes	0.53 (0.30–0.93)	0.027**	0.58 (0.24–1.24)	0.156
Chewing betel quid				
No	1.00			
Yes	0.46 (0.2–0.85)	0.012**	0.21 (0.09–0.47)	0.001***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

OR: odds ratio; CI: confidence interval.

Table 4. Adverse life experiences associated with moderate to severe lower urinary tract symptoms.

Variable	Univariate analysis		Multiple logistic regression	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Psychological distress	1.16 (1.10–1.23)	0.001***	1.16 (1.09–1.24)	0.001***
Stressful life events (12 months)	1.23 (1.1–1.35)	0.001***	1.13 (1.01–1.26)	0.041**
Stressful life events (ever)	1.01 (0.92–1.10)	0.890	0.98 (0.69–1.39)	0.899
Adverse childhood experiences	1.30 (1.14–1.48)	0.001***	1.08 (0.92–1.27)	0.354
Mental well-being	0.98 (0.97–1.00)	0.001***	0.99 (0.98–1.01)	0.427
Health-related quality of life	2.10 (0.17–25.42)	0.561	2.23 (0.15–34.10)	0.546

*** $p < 0.001$; ** $p < 0.001$; * $p < 0.05$.

LUTS. Chewing betel quid was found to be protective against moderate to severe LUTS. This finding is contradictory to previous studies in animals documented in a review, which reported chewing betel quid caused prostate

enlargement because of the increasing concentration of sialic acid in the seminal vesicles.²⁸ This again may be due to the small sample size and the low prevalence of men experiencing moderate to severe LUTS in the current

study. However, the finding is important, taking into consideration the high prevalence of chewing betel quid in the Solomon Islands. The finding may also occur due to the different cultural setting in the Solomon Islands as noted in other studies. It may be that the high level of general well-being among the men in the study mediated this finding. Future research may be required to reconfirm this finding in a larger sample size across different parts of the Solomon Islands, although it is well recognised that chewing betel quid is significantly associated with prostate enlargement and infertility (sperm mortality, sperm count, sperm abnormality) among long-term usage in men.²⁸

The presence of moderate to severe LUTS in men reporting poor/fair health and having depression are in line with previous studies.^{1,6} Moreover, an increased level of education was associated with reduced odds of reporting LUTS among the respondents.²⁹ Interestingly, LUTS showed a significant negative association with health-seeking behaviour. This finding indicated that most men in the study were less likely to seek professional help for LUTS, which can be explained by the low level of awareness, the influence of culture and men not being bothered by these sexual problems as observed in the study. This finding has an important implication for culturally appropriate clinical and health promotion targeting men in the community.

Finally, this study is among the first to investigate LUTS in the Pacific Island countries, including the Solomon Islands. It examined a highly sensitive and hard-to-reach issue in men. The findings help to increase our understanding and provide a stepping stone for future investigations on similar topics.

However, there were some limitations encountered during the development and interpretations of the findings from the study. First, the self-reported assessment of LUTS may be subject to recall bias. Second, the sample was not large and was limited to Honiara in the Solomon Islands. Although this capital city is multicultural and includes residents from all provinces of the Solomon Islands, our sample is not representative of the social diversity in the country. A larger study on both men and women across all provinces in the Solomon Islands needs to be conducted.

Conclusions

LUTS were present in almost one in six Solomon Islander men aged ≥ 18 years in this study. Nocturia was the most commonly reported LUTS. Several factors were confirmed to be associated with LUTS in men. The high proportion of respondents with LUTS who did not seek health care may indicate a need to increase awareness of LUTS and the importance of early diagnosis.

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Ethical approval

The Solomon Islands National Health Ethics Review (HRC1307) and Queensland University of Technology Human Research Ethics (1400000073) Committees approved the study.

Informed consent

Informed consent was obtained from all participants.

Guarantor

P.S.C.L.

Contributorship

P.S.C.L. and N.D. researched the literature and conceived the study. P.S.C.L. wrote the first draft of the manuscript. N.D. review the first draft. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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