Chronic prostatitis-like symptoms in African males aged 16-19 years

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Introduction: *To estimate the prevalence of chronic prostatitis (CP)-like symptoms in African adolescents, examining the impact of demographic factors, CP-like symptoms (i.e., pain, urinary) and depressive symptoms on quality of life (QoL).*

Materials and methods: *Community dwelling African males aged 16-19 years (M = 16.97; SD = .88; n = 166), attending secondary school participated. CP-like case identification was based on NIH-Chronic Prostatitis Symptom Index definition (NIH-CPSI; pain in perineum and/or with ejaculation and NIH-CPSI total pain score of ≥ 4 [mild] and ≥ 8 [moderate-severe]). The Patient Health Questionnaire (PHQ) assessed depressive symptoms. CP-like point prevalence was estimated and multivariable regressions predicted diminished QoL as screened in the NIH-CPSI QoL domain. Participants were consented by field researchers and all potential participants agreed to complete the measures in classroom setting.*

Results: *Prevalence of at least mild CP-like symptoms by NIH-CPSI case identification was 13.3%, with 5.4% of adolescents reporting moderate-severe symptoms. Greater pain, urinary and depressive symptoms and rural setting of school were associated with diminished QoL, and pain (β = .36) most strongly predicted poorer QoL.*

Conclusions: *As in North American adults and adolescents, African adolescents report CP-like symptom occurrence with pain associated with lower QoL. The data suggest an adolescent CP syndrome is an internationally important and understudied area for future epidemiological and clinical investigations.*

Key Words: chronic prostatitis, adolescent, pain, quality of life

Introduction

Chronic prostatitis (CP) is a urogenital syndrome associated with the hallmark symptoms of pelvic and genital pain/discomfort and variable voiding and sexual ailments that have historically researched in a population of mostly white middle class men. CP prevalence estimates in North American adult males range from 4%-16% reported either by physician or self-reported diagnoses,[1-4] with 6.5%-12% community samples reporting CP-like symptoms.[5-7] Newer estimates suggest that up to 12% of African adult males report CP-like symptoms, indicating that African adult males are reporting CP-like symptoms on par with growing numbers of international estimates.[8]

There is a developing line of research suggesting that CP-like symptoms are prevalent in young males as in older cohorts. Surveys have reported that 10% of North American community dwelling men aged 20-29 were case identified with CP-like symptoms,[6,9] a CP-like prevalence of 6% has been described in 20-year-old South Korean men,[10] while 2% in Australian men aged 18-19 years reported CP-like symptoms.[11] Further, a Chinese sample reported an overall CP-

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like rate of 8.4%, but noted a 1.6% prevalence for ages 15-20 in a small cohort (n = 20).[12] A larger study examining an adolescent Canadian sample reported a point prevalence rate of 8.3% of at least mild CP-like symptoms in 16-19 years, with 3% endorsing moderate to severe CP-like symptoms.[13] Although there are now adult estimates, there are no published data on CP-like symptoms available for adolescent Africans.

CP is a syndrome that is difficult to manage, and is associated with significant pain[14] and depressive symptoms,[15] which are both associated with diminished QoL.[16-18] As in adults, pain and depressive symptoms were also found to negatively impact QoL in Canadian adolescents.[13] The persistence of pain and urinary symptoms is of concern for adolescents identified with CP-like symptoms because under-treated long-standing pain in adolescents is associated with negative physical and psychological outcomes later in life.[19] Earlier identification and multiprofessional treatment in adolescence might reduce symptoms and promote patient adjustment over time, but confirmation for the occurrence and impact of CP-like symptoms is warranted across ethnicities and adolescent ages. This issue may be particularly pressing in Sub-Saharan Africa. Due to low levels of public understanding of urological diseases, a lack of recognition of men's health as a concern or specialty, and a generally limited support from developed countries, the urological education and treatment conditions in Sub-Saharan Africa are described as dismal.[20]

This study's primary aim was to estimate the prevalence of CP-like symptoms in African adolescent males (i.e., 16-19 years), and to examine associations of biopsychosocial factors like pain, urinary symptoms (pain/urinary), and depression[14] on QoL. It was hypothesized that adolescents reporting greater pain and urinary symptoms would also report diminished QoL.[10,13] Additionally, it was hypothesized that depressive symptoms would be associated with poorer QoL, but that they would not have a stronger predictive relationship with poorer QoL when CP-like pain symptoms were simultaneously examined in analyses.[17]

Materials and methods

Patients and procedure

Research assistants had traveled to Kenya for data collection as part of a pre-arranged work/research engagement with the Queen's University Medical Outreach (Kingston, Canada) and Youth Empowerment Strategic Schemes (Nairobi, Kenya) organizations. A 6 week survey collection period was used with 3 weeks in the Migori district of Kenya in the village and school set in Rapogi (Sare-Awendo). The remaining 3 weeks were spent in Nairobi at St. Aloysius mixed secondary schools in Kibera and Kahawa in the district of Nairobi. In each school, there were male only mixed aged classes assigned for the instructional duties of the field researchers. An ethics board approved standardized procedure of survey data collection was used where the study was explained to potential participants and oral consent obtained to aid on confidentiality of responding. All potential participants were approached by the researchers (i.e., convenience sampling) and all students present that day had agreed to complete the questions anonymously. All surveys were completed individually in the classroom setting. Participants were instructed to prompt researchers if they experienced any difficulty in understanding the questions asked on the survey. Survey completion was approximately 15-20 minutes.

Measures

Ages, location of school and grade level were collected. The National Institutes of Health Chronic Prostatitis Symptom Index (NIH-CPSI) is used to measure prostatitis-like symptoms and their impact on daily life using four questions regarding pain, two regarding urinary symptoms, and three regarding quality of life based on these symptoms. The symptoms in each endorsed domain are assigned points from 0-43 (pain, 21; urinary symptoms, 10; and quality of life/impact, 12). The NIH-CPSI provides a valid outcome measure for chronic prostatitis and is psychometrically robust and easily self-administered.[9] CP-like case identification was based on NIH-Chronic Prostatitis Symptom Index definition (NIH-CPSI; pain in perineum and/or with ejaculation and NIH-CPSI total pain score of ≥ 4 [mild] and ≥ 8 [moderate-severe]). This case definition has been empirically reported in community[6] and population[5] studies of symptom prevalence. It is important to note that all the prevalence statistics presented in the results of this paper are for participants identified with CP-like pain symptoms, which are not confirmed by independent clinical evaluation. However, the CPSI has been commonly used across international studies examining CP/CPPS facilitating initial cross-cultural symptom comparison.

Patient health questionnaire (PHQ)

The PHQ[21] is a questionnaire designed for use in primary care to diagnose mood. This questionnaire includes questions regarding depressive symptoms which is calculated by assigning scores of 0, 1, 2, and 3,

to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively. The total score for the depressive items ranges from 0-27. Spitzer et al report that it is both a reliable and valid measure of depressive symptoms.[21]

Analyses plan

Before analyses were conducted, accuracy of data entry and missing values were performed. There were missing data for only five cases of the 166 participants. The data missing across the cases was dispersed randomly amongst the scales. For no scale did the missing data equate to more than 15% of the scale items to be computed.[22] Therefore, missing values were substituted with the mean intra-item value of that scale.[22] Prior to analyses, all variables were examined for normality and transformations used if appropriate. Prevalence rates of CP-like symptoms were produced with frequency analyses of the NIH-CPSI. Previously validated case identification was calculated using case-identification indicators from the NIH-CPSI.

Results

One hundred sixty-six Kenyan males between the ages of 16-19 years were sampled from three schools within three different school districts in Migori and Nairobi provinces of Kenya. The age breakdown was 34.3% (n = 57) 16-year-olds, 39.2% (n = 65) 17-year-olds, 21.1% (n = 35) 18-year-olds, and 5.4% (n = 9) 19-year-olds. Participants were recruited from Rapogi Boys Secondary in Migori (n = 69; 41.6%), St. Aloysius Mixed Secondary in Kibera (n = 56; 33.7%) and Kahawa Mixed Secondary in Kahawa (n = 41; 24.7%). Participants ranged in grade level from "Form 1" to "Form 4" an equivalent to Grade 9-12 in Canada. English is one of the official languages of Kenya and the primary language of school instruction, thus all participants were able to read and write in English at an appropriate level to complete the study measures.

The distribution of each item in the NIH-CPSI among participants is shown in Table 1. Although a slight majority of participants reported not experiencing pain or discomfort (items 1 and 2), almost 40% of this sample reported pain in one or more location(s) of the pelvic region. There were a variety of pain locations endorsed with pain in one, two and almost 10% reporting 3 or more painful locations. The majority of the sample did not report pain over the past week, but approximately 20% reported infrequent pain in the pelvic region and some reported pain as "often" or "usually". For pain severity (rating severity of pain on a scale from 0-10; 0 = "no pain" and 10 = "pain as bad as you can imagine"), the majority indicated no pain with approximately 5% reporting more than midline pain (i.e., score ≥ 5). The majority of participants did not report problems with their ability to completely empty their bladder after urination. Approximately 20% of the sample did report having the sensation of not emptying their bladder completely after they had finished urinating less than 1 times in 5. A noticeable number of participants

TABLE 1. **The distribution of each item in the NIH Chronic Prostatitis Symptom Index (n = 166)***

Score	Pain locations Items 1,2	Pain frequency Item 3	Pain severity Item 4	Incomplete emptying Item 5	Frequency of urination Item 6	Symptom impact Items 7,8	Overall quality of life Item 9
0	100 (60.2)	94 (56.6)	102 (61.4)	101 (60.8)	88 (53.0)	76 (45.8)	34 (20.5)
1	32 (19.3)	34 (20.5)	23 (13.9)	32 (19.3)	29 (17.5)	28 (16.9)	6 (3.6)
2	21 (12.7)	33 (19.9)	17 (10.2)	18 (10.8)	17 (10.2)	16 (9.6)	8 (4.8)
3	8 (4.8)	3 (1.8)	11 (6.6)	5 (3.0)	16 (9.6)	25 (15.1)	16 (9.6)
4	3 (1.8)	2 (1.2)	3 (1.8)	2 (1.2)	9 (5.4)	9 (5.4)	32 (19.3)
5	1 (0.6)	0 (0.0)	4 (2.4)	8 (4.8)	7 (4.2)	6 (3.6)	22 (13.3)
6	1 (0.6)		3 (1.8)			6 (3.6)	48 (28.9)
7			1 (0.6)				
8			0 (0.0)				
9			0 (0.0)				
10			2 (1.2)				

*values are numbers with (%) of the participants

indicated they could not fully empty their bladder about half or more than half of the time when urinating (i.e., 9%). Comparably, few participants report this sensation "almost all the time". Just over half of the sample reported no problems with frequency of urination, with almost 20% of participants reporting they had to urinate less than 2 hours after having finished urinating less than 1 times in 5. Almost 1/3 of participants reported urgency to urinate again within 2 hours from less than half the time to almost always. Almost half of the sample reported no interference in daily activities and psychological distress (items 7 and 8), with 7.2% describing this inference as occurring 'a lot'. In regard to the participants opinion on how they would feel if they had to live the rest of their lives with the symptoms they have been experiencing (i.e., QoL impact), the majority of responders (61.5%) reported they would be "dissatisfied", describe that situation as making them "unhappy" or leaving them feeling "terrible".

Distribution of the NIH-CPSI pain domain scores are shown in Figure 1. Overall, 39/166 (23.5%) males reported an index pain score ≥ 4. There were 22/166 (13.1%) of the sample that complained of perineal and/or ejaculatory pain or discomfort and an indexed pain score ≥ 4 with chronic prostatitis-like symptoms.[6,13] The participants that met the cut score for CP-like symptoms in the last week had an average pain severity score (CPSI question 4) of 3.3/10 with only one severity score reported as 0 and all others as a 2/10 or greater. Average index pain score for this group with CP-like symptoms was 7.9 (SD = .68) and average index urinary score was 3.5 (SD = .59). A total of 12/166 (7.2%) males reported an

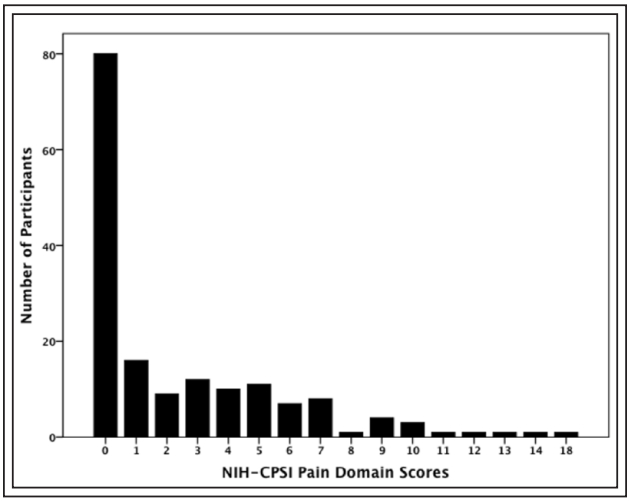

Figure 1. Frequency distribution of NIH-CPSI pain domain scores (n = 166).

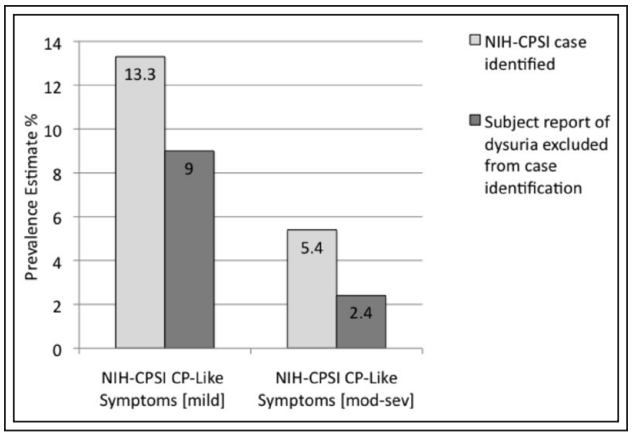

Figure 2. Prevalence of at least mild CP-like symptoms (pain cut-score ≥ 4) and moderate to severe CP-like symptoms (pain cut-score ≥ 8)(n = 166).

indexed pain score ≥ 8 and 9/166 (5.4%) had perineal and/or ejaculatory pain or discomfort and a score ≥ 8, indicating moderate to severe CP-like symptoms. Average index pain score for this CP-symptom group was 10.8 (SD = 1.02) and average index urinary score was 3.0 (SD = 1.01). In order to be conservative in the prevalence estimate, NIH-CPSI item 2a (i.e., pain or burning during urination) was removed from the analysis on the speculation of sexually transmitted infection (STI) symptom overlap in the survey as previously conducted.[13] Using the case identification criteria, 13.3% of the adolescents reported CP-like symptoms, Figure 2, which declined to 9% when the NIH-CPSI dysuria item (2a) is removed (cut-score for pain domain of ≥ 4). Participants reporting moderate to severe symptoms with a pain domain cut-score ≥ 8 reported a prevalence of 5.4%, which declined to 2.4% when item 2a was removed.

Prior to predicting QoL scores, the overall and domain scores of the NIH-CPSI, PHQ depressive symptoms total score distributions, and the assumptions of multivariate analysis were conducted, Table 2, with the pain and urinary domain scores undergoing successful square root transformations to normalize their distributions.[22] No other variables warranted transformation. School district was examined for differential effects of the school districts on the dependent variable of QoL. Analyses revealed that Rapogi participants (rural school) reported significantly better QoL than did the participants at Kahawa and Kibera (urban schools) (p = .001) and that they endorsed lower overall CPSI scores (p = .000). Thus, school district was entered into the regression to account for theses differences as per statistical procedure.[22]

TABLE 2. **The overall and domain scores of the NIH-CPSI, PHQ depressive symptoms and age score distributions (n = 166)**

	NIH pain domain	NIH urinary domain	NIH quality of life impact	NIH CPSI total score	PHQ depressive symptoms	Age (years)
Mean	2.43	1.88	5.01	9.34	6.84	16.97
Std. deviation	3.38	2.37	3.17	7.03	4.78	0.88
Minimum	0.00	0.00	0.00	0.00	0.00	16.00
Maximum	18.00	10.00	12.00	34.00	23.00	19.00

NIH-CPSI = National Institutes of Health -Chronic Prostatitis Symptom Index; PHQ = patient health questionnaire
*values are numbers with (%) of the participants

As shown in Table 3, correlations of the study variables showed moderate to strong association amongst the dependent variable (QoL) and independent variables (pain, urinary scores, depressive symptoms, and school region). The pain domain showed the strongest correlation with adolescent QoL indicating that as pain report increased, QoL decreased. Urinary scores and depressive symptoms also show significant association with QoL, indicating that as these variables increase QoL decreases accordingly. The association between the school district and QoL confirms that rural schools are reporting better self-assessed QoL compared to urban participants.

As shown in Table 4, the QoL regression model was significant (r^2 = .34; F (20.97); p = .000) and pain was the strongest predictor of diminished adolescent QoL

TABLE 3. **Correlations between NIH domains, depressive symptoms and school district (n = 166)**

	NIH-CPSI pain domain*	NIH-CPSI urinary domain*	Depressive symptoms	NIH-CPSI QoL domain
NIH-CPSI urinary domain	.43**			
Depressive symptoms	.29**	.23**		
NIH-CPSI QoL domain	.51**	.33**	.33**	
School district	.25**	.14	.12	.33**

NIH-CPSI = National Institutes of Health-Chronic Prostatitis Symptom Inventory; QoL = quality of life; depressive symptoms = PHQ depressive symptoms scores;*square-root transformed;**correlation is significant at the 0.01 level (2-tailed)

TABLE 4. **Multivariable regression model predicting NIH-CPSI QoL (n = 166)**

	B	Std. Error	Beta	T	Sig.
School district	1.26	.426	0.20	2.97	.003
Depressive symptoms	0.19	.045	0.18	2.63	.009
NIH-CPSI pain domain*	1.00	.206	0.36	4.85	.000
NIH-CPSI urinary domain*	0.35	.234	0.11	1.49	.138

B = regression coefficient; beta = standardized regression coefficient; depressive symptoms = PHQ depressive symptoms scale; NIH-CPSI = National Institutes of Health-Chronic Prostatitis Symptom Inventory;* = square root transformed; T = t value

(β = 0.36; p = .001). This finding is evidenced over and above the variance accounted for by school district (β = 0.20; p = .003) or depressive symptoms (β = 0.18; p = .009). Urinary scores were not significant in the model predicting diminished QoL (β = 0.01; p = .138).

Discussion

This study is the first to examine and suggest an initial point prevalence estimate of CP-like symptoms (i.e., 13.3% and 5.4% for mild and moderate symptoms respectively) and a regression based-model of CP symptom associated in diminished QoL for African adolescent males. Unlike benign prostatic hyperplasia (BPH) or prostatic cancer, diseases primarily in older males, CP-like symptoms appear to be affecting a much wider age group of the male population.[6,10,13,14,17] The present study suggests a prevalence rate of 13.3% among an African sample of youth aged 16-19, which is comparable to existing data (9.7%)[6] and provides initial evidence that CP-like symptoms are ethnically diverse in adolescent samples.[13]

Item 2a of the NIH-CPSI queries pain or burning during urination, which is a common symptom of several sexually transmitted infections (STI) (e.g., gonorrhea, chlamydia, trichonomiasis). Removal of item 2a resulted in a more conservative CP-like prevalence of 9% and 2.4% for mild to moderate symptom severity respectively, but this estimate is comparable to symptoms as well as negative impact reported on QoL similar to that of older men and North American adolescents suffering from CP-like symptoms.[7,13,23]

Concordant with reports that pain was the most prominent urogenital symptom of chronic prostatitis,[10,17] pain scores in this study proved to be the strongest predictor in diminished QoL. The association between pain and poorer QoL was considerable even when the significant impact of urban or rural status and depressive symptoms were controlled. However, in contrast to some published data,[10] urinary scores were not a significant predictor of diminished QoL for these adolescents.

Olapade-Olaopa, Oluwabunmi and Onawola[20] suggest that many African countries provide little information available to the public on healthcare status and delivery. Further, communication about common urological diseases and risk factors are simply unavailable. Little information is available about health matters (apart from HIV/AIDS and to a lesser extent breast cancer and immunization) in most Sub-Saharan Africa countries. Sub-Saharan African knowledge about common diseases and cancers, their risk factors, and methods of prevention, early detection and treatment is especially low.[20] This region has the highest morbidity and mortality associated with most infectious, chronic and malignant diseases in the world. Thus, one could speculate that the prevalence rate of adolescent CP in this study is accurate and may show multiple comorbidities if they were screened for in this study but directed future research examining the potential impact of STI rates and impact in regard to CP-like symptoms may be an important issue to address.

The present data may prompt future urologic research in international adolescent samples and acts to support the suggestion that CP-like symptoms may manifest earlier than traditionally considered. The impact on QoL on these males is appears to be a function of pain in the pelvic region and is correlated with depressive symptoms and rural or urban setting. If these symptoms are left untreated/unrecognized, social, interpersonal and developmental outcomes are likely to be affected and manifest in poor adjustment. With a clear worldwide prevalence of these symptoms, and the contributions of the present study, there is little doubt this is an important area for further international research into causes and treatments of this problematic syndrome.

There are limitations in this study. As in other community survey data,[6,13] physiological testing of participants was not conducted and the prevalence rate was determined solely on the answers given on the NIH-CPSI surveys. Although physical examination and analyses of prostate fluid and/or urine specimens may aid in definitive diagnoses, this is not always appropriate or viable as was the case of our overseas community survey. Further, future research documenting the clinical existence of CP/CPPS is suggested and there is no definitive category for CP-like symptoms, but case identification,[6,11,13] which includes pain cut-scores, remains an empirically accepted method for prevalence estimate comparison. Potential concerns exist in concurrent urological infection that were not recorded; STI (i.e., n. gonorrhea and chlamydia) may have a high prevalence and infections such as schistosomiasis may be endemic which may reduce the present point prevalence estimates in these communities. However, the present study did remove an item of the CPSI that may mark such infection occurrence revealing prevalence estimates of 9% (mild) and 2.4% (moderate) of CP-like symptoms.

Generalizability of these findings to the population of Kenyan adolescents is cautioned. Although this study was not designed as a randomized stratified epidemiological survey and the sample size is adequate but not representative of the population as a whole, the African adolescent CP-like prevalence rates are very similar to the Canadian figures with item 2a removed. These similarities, found across two very different social and cultural environments, suggest that CP-like

symptoms may be a universal condition in adolescents as in older males that is not restricted to Western societies.

A critique may also be levied at the method of survey. It is possible that peer pressure in the classroom setting could sway the responses of some students. Researchers must also consider the possibility of recall bias existing in this study as the data was collected using surveys. However, as suggested above the present findings strike a similar impact and occurrence of CP-like symptoms in both Canadian and African adolescents.

Finally, the primary analysis in this study was regression, which is based on correlational associations, and one cannot assume causality within the correlational or regression-based relationships described in this paper. Although correlations do not equate to causation, the consistent finding of poorer QoL and symptoms like pain and depressive symptoms[13,14,17] is suggestive of the need for future research into potential mechanisms underlying such associations in adolescent CP/CPPS. Future research should expand the types and numbers of variables examined in this population to include a broader sense of demographic (e.g., family income), health (e.g., comorbid disease states), and interpersonal variables (e.g., general life stress) yet to be examined in this particular adolescent population.

Conclusion

This study shows that Kenyan youth report perineal and/or ejaculatory pain and a mild to moderate pain domain score (CP-like symptoms) at a similar prevalence rate as Western adolescents. Analysis showed that pain was the strongest predictor of QoL, supporting and extending the results of previous work suggesting that CP pain is a cardinal symptom in poor outcomes regardless of age. These data set the stage for future research in North American and other international adolescent samples. □

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