Associations between sexual satisfaction and function and the severity of lower urinary tract symptoms among men in a rural sub-Saharan African community

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Abstract

Introduction: The recognized association between erectile dysfunction (ED) and lower urinary tract symptoms (LUTS) from high-income countries is unreported from Africa. Authentic figures on prevalence of ED and LUTS from Africa are scarce in the literature. This study was conducted to quantify sexual function and satisfaction among Ugandan men in relation to LUTS severity.

Methods: A convenience sample of men participating in a parallel, cross-sectional survey was used. The population, men >55 years living in Sheema district, Uganda, were recruited into two cohorts: those living in the community and those seeking clinic care due to bother from LUTS. This was to ensure inclusion of a full spectrum of LUTS. The instruments were the International Prostate Symptom Score (IPSS) to quantify LUTS and the Epstein Inventory (EI) to assess four measures of sexual functioning. Bivariate analysis compared community and clinic cohort participants, LUTS severity, and each sexual functioning item with two-sample t-tests for means and Chi-square tests of independence for categorical versions.

Results: Participants included 415 men (238 community and 177 clinic) at mean age of 67.5 years vs. 62.9 ($p<0.001$) with mean IPSS of 9.32 vs. 17.07 ($p\leq0.001$). Lower mean satisfaction with sexual activity and frequency of erections occurred in the clinic cohort ($p\leq0.001$). Overall, all four questions assessing dissatisfaction with sexual function were significantly correlated with worsening LUTS; sexual satisfaction and frequency of sexual drive were also influenced by age and low levels of education.

Conclusions: These are the first data describing the severity relationship between LUTS and ED in African men. Respondents reported dissatisfaction in the past year with the level of their sexual activity, frequency of sexual drive, ability to have erections, and sexual performance that related statistically to the severity of their LUTS.

Introduction

In high-resource countries, the association of erectile dysfunction (ED) and the presence of lower urinary tract symptoms (LUTS) is well-documented.[1-3] Individually, ED and LUTS are known to affect quality of life; both are common within individuals. This has led researchers to propose possible common metabolic pathways.[4] Risk factors identified for men to develop ED/LUTS include obesity, hypertension, diabetes, and metabolic syndrome, and clinical care pathways now include questionnaires to assess sexual function in men with LUTS.[3] However, in Africa, direct measures of the prevalence and correlates of ED with LUTS are unknown.

ED is a primary component of sexual dysfunction and a central marker in related research. Defined as the inability to maintain an erection sufficient for satisfying sexual activity, ED prevalence is said to be underestimated in developing countries,[5,6] and epidemiological data and studies of sexuality in old age are considered relatively scarce in Africa.[5,7] In 2007, Ojewole noted that although ED affects many African men, "authentic figures on the incidence and/or prevalence of the disease are not available in African countries;"[8] while this situation is now changing in sub-Saharan Africa the number of reports available is still small,[9-13] except from Nigeria.[5,6,14-18]

Generalizing prevalence data from high-resource countries to African regions is no longer appropriate, especially for ED and LUTS, because, while many factors associated with ED are likely similar worldwide, their distribution and prevalence do differ across countries.[4,14,19,20] It is likely that important risk factors and comorbidities vary in Africa, including physiology, diet, and metabolism. Also, that cultural practices and beliefs that cannot be divorced from sexuality are relevant.[7,16,17,21] In addition, food security is an important potential factor that, to date, has not been considered; regional diets differ markedly in Africa compared

to North America, Europe, and Asia, and the incidence of metabolic syndrome and obesity are very different.[22-24]

The World Health Organization (WHO) and African practitioners have called for more direct measures of the incidence and burden of disease due to ED and LUTS[5,19,25] in order to rationalize the advances in investigation, prevention, and treatment in Africa suggested by organizations such as the American Urological Association (AUA), European Association of Urology (EAU), and the International Continence Society (ICS).[20] In this context, a unique opportunity was offered to collect such data, by adding to a larger study evaluating associations between the severity of obstructive LUTS and care-seeking behavior in rural Africa, conducted as part of a Grand Challenges Canada (GCC) project.[26,27]

The objectives were to: 1) quantify the sexual function and satisfaction and severity of LUTS among men in a rural Ugandan setting; 2) examine how severity of LUTS is associated with sexual function and satisfaction; and 3) examine effects of demographic factors on sexual function and satisfaction in the context of LUTS.

Methods

Study design

This was a cross-sectional study with two cohorts of men aged 55 years or older that was based on another, parallel study. The collection of the data reported was part of a larger survey on the burden of bladder disease in rural Africa; this GCC project[26,27] provided a unique opportunity to evaluate, in parallel, the association of sexual function and the severity of LUTS.

Study population

The GCC study included data from two populations to ensure a broad cross-section of symptom severity. We hypothesized that a cohort living with their symptoms in the community would predominantly have mild or moderate symptoms, while a cohort presenting to a clinic would have more severe symptoms, as they were seeking treatment due to the extent of bother from LUTS. Because the design of the principal study required both community and clinic cohorts to capture a full spectrum of symptom severity, data on sexual health was obtained from the same two cohorts. This met our purpose of evaluating sexual symptoms in men with mild, moderate, and severe LUTS, and enabled us to test the hypothesis that, as in studies reported from industrialized countries, increasing LUTS severity is associated with a greater degree of sexual dysfunction in Ugandan men. Ethical approval was obtained from the University of British Columbia and Mbarara University of Science and Technology.

Recruitment

Recruitment took place in the rural district of Sheema in South Western Uganda in 2015. The method for the principal study has been reported previously and required recruitment of study participants as a stratified sample, with at least 50 men >55 years of age enrolled from each of five villages in the district into one of two cohorts, those living in the community and those seeking care at a community health clinic due to bother from LUTS.[27] Subjects volunteered in response to calls broadcast during local radio programs and posters displayed at the health clinic.

Tools

The International Prostate Symptom Score (IPSS) was used to quantify participants' LUTS as mild (0–7), moderate (8–19), or severe (20–35),[28] and the Epstein Inventory (EI) to assess their sexual functioning.[29] The EI was chosen because it included four elements of sexual function and no validated version of the International Index of Erectile Function (IIEF) existed in the local language, Banyankole. Additionally, local investigators felt that the wording of the questions in the EI were culturally appropriate and suited to translation by the interviewers into Banyankole. The four EI elements specific to sexual function address: 1) satisfaction with level of sexual activity or lack (scored from 0 [low] to 10 [high]); 2) frequency of sexual drive (scored from 1 [low] to 8 [high]); 3) frequency of erections when sexually stimulated (scored 1 [low] to 6 [high]); and 4) change in sexual performance over the past year (scored 1 [poor] to 7 [best]).[26]

Protocol

After providing informed consent, all recruits to both cohorts were interviewed individually and alone by trained health professionals, who asked the questions from the IPSS and from the EI. To ensure comprehension of the questions and optimal capture of an individual's responses, both the IPSS and EI were administered in the local dialect (Banyankole). For accuracy, forward translation was completed by faculty at Mbarara University, and to ensure the meaning and intention of the questions was maintained, expert back translation was done by the healthcare professionals who were to conduct the interviews, who were experienced in the application of comparable questionnaires,[30] and were fluent in both English and Banyankole. Translation and use of the interview format also allowed equitable participation in the study regardless of a participant's fluency in English and their ability to read or write.

Demographic data

We included each participant's age, marital status, number of children, total number in household, current employment status, sufficiency of food available to the household, and highest level of education completed.

Data analysis

This was a descriptive study, so a formal inference-based power calculation was not undertaken; however, the resulting sample size was sufficiently large (more than 175 subjects each in community and clinic cohorts) to give 80% power detecting small-to-moderate effects sizes ($p<0.05$). Bivariate analysis was done to compare the two cohorts with respect to demographic variables (Chi-square tests of independence for categorical variables, and two-sample t-tests for measurement variables). Each EI sexual functioning item was analyzed to correspond to the three categorical levels of the IPSS. Mean scores across IPSS categories with respect to each sexual function item were compared using one-way analysis of variance. The association between IPSS categories and the categorical versions of each item was assessed with a Chi-square test. For each item, means scores with respect to: cohort (community or clinic), availability of sufficient food, marital status, and education level attained were compared using two-sample t-tests and one-way analysis of variance. Pearson correlations examined the association of the measurement scale items with age and number of people in the household.

Statistical analysis was carried out with IBM (U.S.) SPSS, version 24.

Results

A total of 415 men participated; 238 men in the cohort who were living in the community and 177 in the cohort who had presented to the local clinic because of bothersome LUTS symptoms. One subject declined to answer questions 2–4 in the EI; calculations were done on the number of valid responses.

The demographics of the two cohorts are shown in Table 1. On average, clinic respondents were significantly older (67.5±12.9 vs. 62.9±12 years), had lower levels of education (91.5% vs. 81.5% primary or less), and had slightly smaller families (5.2±3.1 vs. 5.9±3.1). The cohorts were not significantly different with respect to marital status, number of children, salaried employment, or self-reported availability of sufficient food.

Clinic respondents had statistically significantly lower mean scores for satisfaction with the level of their sexual activity (4.94±1.93 vs. 6.11±3.27; $p<0.001$ score; range 0 [low] – 10 [high]) and frequency of erections (3.32 vs. 4.10; $p<0.001$ score range 1 [low] – 8 [high]) (Table 2A). Cohorts were marginally significantly different with respect to mean change in sexual performance ($p=0.048$) but not with respect to mean frequency of sexual drive.

Worse IPSS scores (using a three-level categorical version of the IPSS) accompanied worse mean scores on each

Table 1. Socio-demographic variables of community and clinic cohort respondents

	Community (n=238)	Clinic (n=177)	Total (n=415)	p*
Age, mean (SD)	62.9 (12.0)	67.5 (12.9)	64.9 (12.3)	0.001*
Marital status				
Married	217 (91.2%)	161 (91.0%)	378 (91.1%)	0.33*†
Divorced/separated	3 (1.3%)	3 (1.7%)	6 (1.4%)	
Widowed	14 (5.9%)	13 (7.3%)	27 (6.5%)	
Single	4 (1.7%)	0 (0.0%)	4 (1.0%)	
Number of children	7.3 (3.4)	7.8 (3.5)	7.5 (3.4)	0.13*
Total persons per household	5.9 (2.7)	5.2 (3.1)	5.6 (2.9)	0.016*
Salaried employment				
Yes	217 (91.2%)	165 (93.2%)	382 (92.0%)	0.45**
No	21 (8.8%)	12 (6.8%)	33 (8.0%)	
Household food sufficiency				
Yes	88 (37.0%)	78 (44.1%)	166 (40.0%)	0.15**
No	150 (63.0%)	99 (55.9%)	249 (60.0%	
Education				
Never attended	39 (16.4%)	59 (33.3%)	98 (23.6%)	<0.001**
Primary	155 (65.1%)	103 (58.2%)	258 (62.2%)	
Secondary	27 (11.3%)	11 (6.2%)	38 (9.2%)	
Post-secondary/tertiary	17 (7.1%)	4 (2.3%)	21 (5.1%)	

*Two-sample t-test. **Chi-square test. †Married vs. all others: p=0.94. SD: standard deviation.

sexual function item (Table 2B). Differences across the IPSS categories were strongly statistically significant (p<0.001). Those with mild LUTS (IPSS 0–7) had low mean scores for EI sexual function items 2–4. A companion analysis also showed strongly significant association (p<0.001) between the three-level categorical versions of the outcome measures and the IPSS categorical version; worse sexual function scores were seen for cases with worse IPSS scores.

The effect of demographic variables on mean sexual function scores was examined (Table 3). Level of education showed significant differences; higher education was associated with higher scores (less dysfunction) on each of the four EI items. Age was negatively correlated with scores on all four items, but the correlations were weak, with the highest negative correlation at -0.32 occurring for the item on frequency of erections. Similarly, with respect to marital status, frequency of sexual drive and change in function over time were significantly higher for married men. Whether the household had sufficient food was not a significant predictor of response for any of the sexual function items. And number of people in the household was not significantly correlated with any of the four items. The other quality of life dimensions measured by the EI and their association with LUTS have been reported previously; the clinic and community cohorts differed. Health-related quality of life (HRQL), bother from LUTS, interference with daily living, and worry were greater (p<0.001) in the clinic cohort.[27]

Discussion

The opportunity to collect these unique data came because of a larger study where two cohorts of men from a rural African community were evaluated for their LUTS. We now report that in the population of men in these cohorts — men 55 years or older in rural Uganda — declining sexual health co-exits with LUTS. It appears that sexual function is adversely affected in relation to the severity of their LUTS; however, this finding may be more suggestive of a significant prevalence of sexual dysfunction despite LUTS.

The inclusion of two cohorts was based on the hypothesis that this would provide a broad range of LUTS symptom severity — those living with their symptoms predominantly having mild or moderate disease and those presenting to the clinic having moderate or severe disease, as they were seeking treatment due to the extent of bother from LUTS. Our findings are consistent with our hypothesis.

The separate analysis of the cohort presenting at the clinic confirmed that sexual dysfunction increases with worsening LUTS and as men age; lower mean satisfaction with sexual activity and frequency of erection was reported in this cohort. The rationale of comparing men presenting to clinic to those in the community is also relevant in this geographic region, as clinics are difficult to reach due to distance and lack of transportation. These factors may act as barriers to patients seeking care for both ED and LUTS.

Importantly, men with mild LUTS also reported dissatisfaction with elements of their sexual drive, erection frequency, and/or performance; the clinical significance of this is that LUTS in and of itself negatively impacts sexual function in the majority of those affected. Men who reported concern about their LUTS also reported in negative terms about their sexual function; sexual function satisfaction and erection frequency were also negatively influenced by advancing age.

Table 2. questionnaire results

Q1: Activity satisfaction: How satisfied are you with the level of sexual activity or lack?
Q2: Drive frequency: How frequently have you felt sexual drive?
Q3: Erection frequency: How often are you able to have erections when sexually stimulated?
Q4: Performance change: Over the past year how has sexual performance changed?

2A. Comparison of sexual function item means by cohort

	Community (n=238)	Clinic (n=176)		
	Mean (SD)	Mean (SD)	p*	95% CI for difference
Q1: Activity satisfaction – Score range 0–10	6.11 (3.27)	4.94 (3.28)	<0.001	(0.53,1.81)
Q2: Drive frequency – Score range 1–8	4.26 (1.76)	4.41 (1.93)	0.41	(-0.52,0.21)
Q3: Erection frequency – Score range 1–6	4.10 (1.72)	3.32 (1.22)	<0.001	(0.48,1.08)
Q4: Performance change – Score range 1–7	2.93 (1.29)	3.23 (1.84)	0.048	(-0.61, -0.003)

2B. Comparison of sexual function item by International Prostate Symptom Score (IPSS)

	Mild (0–7) (n=164)	Moderate (8–19) (n=167)	Severe (20–35) (n=83)	Total (n=414)	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	p**
Q1: Activity satisfaction – Score range 0–10	7.34 (2.68)	4.72 (3.25)	4.02 (3.14)	5.62 (3.32)	<0.001
Q2: Drive frequency – Score range 1–8	4.88 (1.63)	4.05 (1.80)	3.80 (2.00)	4.33 (1.83)	<0.001
Q3: Erection frequency – Score 1–6	4.59 (1.44)	3.40 (1.44)	2.88 (1.31)	3.77 (1.57)	<0.001
Q4: Performance change – Score range 1–7	3.58 (1.21)	2.81 (1.54)	2.53 (1.86)	3.06 (1.55)	<0.001

*Two-sample t-test. **One-way ANOVA F-test. CI: confidence interval; SD: standard deviation.

Table 3. Comparison of sexual function item means by demographics

Does household have sufficient food?					
	Sufficient food (n=166)	**Insufficient food (n=248)**			
	Mean (SD)	**Mean (SD)**	**p***	**95% CI for difference**	
Q1: Activity satisfaction	5.51 (3.36)	5.69 (3.30)	0.58	(-0.84, 0.47)	
Q2: Drive frequency	4.22 (1.80)	4.40 (1.85)	0.34	(-0.54, 0.19)	
Q3: Erection frequency	3.66 (1.58)	3.85 (1.57)	0.23	(-0.50, 0.12)	
Q4: Performance change	3.02 (1.59)	3.09 (1.53)	0.67	(-0.37, 0.24)	
Marital status					
	Married (n=378)	**Unmarried (n=36)**			
	Mean (SD)	**Mean (SD)**	**p***	**95% CI for difference**	
Q1: Activity satisfaction	5.57 (3.30)	6.11 (3.56)	0.35	(-1.68,0.60)	
Q2: Drive frequency	4.39 (1.76)	3.72 (2.40)	0.037	(0.04,1.29)	
Q3: Erection frequency	3.78 (1.56)	3.71 (1.79)	0.83	(-0.49,0.61)	
Q4: Performance change	3.01 (1.54)	3.63 (1.65)	0.023	(-1.16, -0.09)	
Education level					
	None (n=98)	**Primary (n=258)**	**Secondary+ (n=58)**	**Total (n=414)**	
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**p****
Q1: Activity satisfaction	5.24 (3.49)	5.52 (3.33)	6.66 (2.81)	5.62 (3.32)	0.028
Q2: Drive frequency	3.95 (1.82)	4.34 (1.87)	4.90 (1.51)	4.33 (1.83)	0.007
Q3: Erection frequency	3.32 (1.54)	3.79 (1.57)	4.47 (1.42)	3.77 (1.57)	<0.001
Q4: Performance change	2.80 (1.60)	3.05 (1.56)	3.56 (1.35)	3.06 (1.55)	0.012

*Two-sample t-test. **One-way ANOVA F-test. CI: confidence interval; SD: standard deviation.

Higher education was associated with better scores (less dysfunction) on all four Epstein questions; scores for frequency of sexual drive and change in function over time were significantly higher for single respondents, but whether a household had sufficient food was not a significant predictor of response for any sexual function item.

We suggest the data we report are relevant because the association of sexual dysfunction and LUTS as comorbidities has not been reported previously in men living in sub-Saharan Africa. In addition, our data are direct measures of the prevalence and correlates of sexual dysfunction and LUTS for a cohort of Ugandan men, in contrast to most regional prevalence figures for African regions, which are estimates based on extrapolations of symptom burden measured in other populations.[14,30] Furthermore, the association between sexual dysfunction and LUTS we report corresponds to evidence from epidemiological studies in North America and Europe.[1-3]

The WHO has called for more quantitative data from low- and middle-income countries,[25] and the relevance of region-specific data in Africa is increasing as advanced healthcare is planned and delivered.[19,31] Such care in the context of sexual dysfunction and LUTS is being called for by practitioners in sub-Saharan Africa,[5,6,15] in addition to being advocated internationally by the AUA, EAU, and ICS.[20] Our study now contributes such region-specific quantitative data on sexual dysfunction and LUTS.

Although we did not find that whether or not a household had sufficient food was a predictor of sexual dysfunction, we suggest that this variable has relevance in prevalence studies, particularly in Africa. This is because poverty, malnutrition, and food insecurity are recognized to negatively impact social determinants of health, and adults who are food-insecure are at an increased risk of developing chronic diseases.[32,33] While no prior research has explored an association of food security and the availability of adequate food with either ED or LUTS, we suggest that the issue of food security should still be included in future studies to either confirm or refute our findings, and further explore the potential association with increased risk of chronic disease. Food security varies globally; in Canada, it is relevant that refugee populations and those living in poverty are particularly vulnerable.

Agunbiade et al explored sexuality and related practices and beliefs among older Yoruba people, where the impact of cultural practices and spiritual dimensions on sexual decline were emphasized.[17] van de Geest exlored the same in Ghana, where waning "strength" (equated by men with potency and penetration) was seen as central.[7] Shaeer et al reported on the prevalence of ED and its correlates among men attending primary care in Nigeria; age-standardized prevalence estimates for any degree of ED were similar in Nigeria (57%) to those in Egypt (64%) but substantially lower to those in Pakistan (8 1%).[14]

As in our study, age was a very strong correlate, as was marital status. While we found that single men reported higher levels of sexual dissatisfaction, Shaeer and colleagues

found that those separated, widowed, or divorced were three times more likely to have moderate to severe ED than married men.[14] As in the study we conducted, Claramonte et al studied a rural population in Uganda, but 204 of the 902 men enrolled were positive for HIV. The ED rate was 47.8% overall and 36.8% in those HIV-negative. The influence of LUTS and diet were not explored.[9] Mutagaywa et al reported the prevalence of ED and associated factors among diabetic men in Tanzania.[10] ED severity was significantly correlated with increased age and significantly predicted by the presence of peripheral vascular disease and peripheral neuropathy; those with ED were more likely to suffer in other sexual domains, but no lifestyle component was associated. Seid et al also reported data in diabetic men from Ethiopia,[12] and Olugenga-Bello et al noted an additional association with alcohol consumption and smoking in Nigeria.[18]

Prior research related to LUTS in Africa has used the IPSS or a visual version of components of the scale,[26] but data specific to sub-Saharan Africa remain limited. In 2012, Chokkalingam et al reported no prior population-based studies of benign prostatic hyperplasia (BPH) in Western Africa.[34] Bajunirwe et al estimated that the burden of LUTS in Uganda and sub-Saharan Africa as a whole is high,[35] and Oliapade-Olaopa et al reported that in Nigerian men LUTS severity is related to age.[36]

While the association between ED and LUTS is established by epidemiological evidence from North America and Europe,[1-3] when searching the literature linking the terms sexual dysfunction, ED, and LUTS with Africa, the items found predominantly relate to studies of men of African origin living abroad. Reported differences in prevalence and etiology in these data raise the possibility of racial disparity,[16,34] but future research is required to establish what factors, if any, may be involved.

Prior research on ED from sub-Saharan Africa[5-18] has predominantly relied on the IIEF-5.[37] There is a validated version of the five-item IIEF in Swahili[13] and forward translations into Tigregana[12] and Kiswahili (15-item IIEF)[10] are reported. However, no validated translation exists for Banayankole. The Erection Hardness Score and Aging Male Symptoms Scale[9,38] have also been used in African populations. Other authors have used a single ED assessment question. Shaeer et al reported validating the NIH Consensus Conference definition of ED, "the inability to attain and/or maintain penile erection sufficient for satisfactory sexual intercourse," in a study that included men from Nigeria.[14] While this is an important question to validate, the broader content of the EI provides more information.

With the association of ED with LUTS now identified in Africa, and the prevalence of LUTS projected to increase as Africa's population ages,[30] future studies on LUTS and associated ED are probable. We recognize that having validated translations of the commonly reported tools for evaluating sexual function is desirable and will enable comparison with existing studies in the literature. A challenge in this context is that the number of African dialects is so large (there are 65 in Uganda alone). The practical reason for use of the EI in this study was the preference of local investigators regarding culturally appropriate language and ease of translation. The EI does capture data on sexual function and LUTS, and uses terminology and definitions approved by international agencies beyond Canada, such as the AUA, EAU, and ICS.

We recognize limitations in what we report. The EI has no bona fide measure of ED, instead using surrogates, such as frequency of erection and ability to obtain and maintain an erection sufficient for sexual activity. No history, apart from the validated questionnaires or physical examination to assess respondents for underlying causes of sexual dysfunction or LUTS (such as diabetes or hypertension), were completed. Men in both the community and clinic cohorts came voluntarily for screening; hence, generalizability of our results may be limited. This was also a community where economic status, employment, and levels of educational attainment/literacy were low; however, this was likely a similar situation to that existing in many other parts of Africa. Because data collection came from interviews conducted using the local language, translation of the IPSS and EI questionnaires was required, followed by translation of the responses back into English, but the translated questions were checked by health professionals for accuracy and back-translated to confirm that meaning and intention were maintained; the interviewers were healthcare providers with experience administering the IPSS and comparable instruments.[26,27] One subject declined to answer questions 2–4 in the EI questionnaire; however, complete data sets were obtained from 414/415 subjects. In a statistical context, this one missing case does not contribute any bias.

As estimates for the future global increase in the prevalence of both sexual dysfunction and LUTS are predicted to particularly affect Africa[30,35,39] clinicians need to be aware that LUTS and sexual dysfunction coexist, so as to inquire and educate patients appropriately and use treatment options available for both conditions. Further basic science investigation and applied research is also warranted to establish what the causal links are, and how the burden of these two conditions can be reduced in Africa.

Conclusions

Ugandan men over 55 years of age reported dissatisfaction with their level of sexual activity, frequency of sexual drive, ability to have erections, and the change in their sexual performance over the past year that was statistically correlated with the severity of their LUTS. These data are the first from Africa to report similar findings to the evidence from North America and Europe that sexual dysfunction and LUTS are strongly linked.

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This paper has been peer-reviewed.

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