

Prevalence of Prostatitis-Like Symptoms in Singapore: A Population-Based Study

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ABSTRACT

Objective: To study the prevalence of prostatitis-like symptoms in a generally healthy population.

Subjects and methods: A population-based cross-sectional survey was conducted in Singapore to evaluate “prostatitis-like symptoms” (PS), lower urinary tract symptoms (LUTS), erectile dysfunction (ED), and quality of life (QoL). Respondents with pain or discomfort in the perineum, testicles, tip of penis or bladder/suprapubic region were identified as having prostatitis-like symptoms.

Results: Altogether, 1087 males aged 21 to 70 were evaluated. While at least 20% of them had some degree of LUTS, only 2.67% (29 out of 1087) had pain or discomfort suggestive of prostatitis. Six men had pain in the bladder or suprapubic region, two in the perineum, six at the tip of penis and 26 had pain during micturition (11 subjects had more than one location of pain). Only two men had severe pain while seven had moderate and the rest had mild pain. The mean age of subjects with PS was 43.14. In terms of racial distribution, 2.23% (18) of Chinese, 3.15% (4) of Malay, 4.49% (4) of Indians and 12.12% (3) of other ethnic origin had PS. Those who had PS had worse erectile function (International Index of Erectile Function (IIEF) 11.92 vs. 17.16, $p < 0.003$) and a worse QoL score (2.96 vs. 1.38, $p < 0.001$) than those without PS. Those with PS were more bothered and worried about their symptoms.

Conclusion: The prevalence of prostatitis-like symptoms in a largely Chinese population is 2.67%. Prostatitis-like symptoms have a negative impact on the quality of life and erectile function.

Keywords: prostatitis, prevalence, population-based study

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INTRODUCTION

Chronic prostatitis/chronic pelvic pain syndrome was poorly defined and poorly understood until recently.

Table I. NIH Prostatitis Classification System.

Category	Type
I	Acute bacterial prostatitis
II	Chronic bacterial prostatitis
III	Chronic prostatitis/chronic pelvic pain syndrome
IIIA	Inflammatory
IIIB	Noninflammatory
IV	Asymptomatic inflammatory prostatitis

In 1995, the National Institute of Health (NIH) Workshop on Chronic Prostatitis proposed a new Prostatitis Classification System⁽¹⁾ (Table I). The new definition recognises that pain is the main symptom in chronic prostatitis (with variable voiding and sexual dysfunction) and is the optimal criterion to differentiate patients with chronic prostatitis from control patients or patients experiencing other genitourinary problems such as benign prostatic hyperplasia (BPH). Since then a NIH Chronic Prostatitis Symptom Index (NIH-CPSI) has been developed and validated for both clinical practice and research protocol⁽²⁾.

Prior to the NIH-CPSI, there had been attempts to characterise the symptom complex using a variety of scoring system, indexes, and inventories⁽³⁻⁵⁾, some validated, some not. As there is no universally accepted properly validated chronic prostatitis symptom index, the magnitude of the problem of chronic prostatitis in any population cannot be ascertained for sure. The prevalence rate of prostatitis in the general population was estimated to be 5% to 14.2% depending on definition of prostatitis, study subjects and methodology. It is apparently a common disease in America and Europe accounting for at least 8% of urology visits⁽³⁾.

Ever since the new NIH-CPSI was validated for research and clinical studies, investigators have begun using it to study chronic prostatitis in clinical trials. Recently, Nickel conducted a community-based study using the NIH-CPSI, in Lennox & Addington County, Ontario, Canada and revealed a prevalence of 9.7% amongst males aged 21 to 70 having prostatitis-like symptoms⁽⁶⁾. The NIH-CPSI is a nine-question survey

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that explores the four important domains of chronic prostatitis: pain, voiding symptoms, impact, and quality of life⁽²⁾. The NIH-CPSI differentiates chronic prostatitis symptoms from subjects with no genitourinary symptoms and subjects with benign prostatic hyperplasia.

The design of our study was originally not meant to study chronic prostatitis *per se*. When our study was first designed, the NIH-CPSI was not available then. Our study was a population study of lower urinary tract symptoms (LUTS), 'bothersomeness' and quality of life (QoL), pain symptoms and erectile function. By sub-analysis of our original study population, focusing mainly on their pain symptoms, LUTS and QoL, we were able to define and identify subjects who have prostatitis-like symptoms.

We therefore report our questionnaire survey of a randomly chosen sample of men aged 21 to 70 years to describe the prevalence of prostatitis-like symptoms and its impact on quality of life.

METHODOLOGY

A population-based cross-sectional survey was conducted in Singapore in 1999 to evaluate lower urinary tract symptoms (LUTS), pain symptoms, erectile dysfunction (ED), anxiety, and irritable bowel symptoms. A two-stage random sample of 3,000 household units was selected from a sampling frame of households in Singapore. From each household, one individual aged 20 and above was selected randomly, using the random table. Interviewers, mainly undergraduate medical and non-medical students and part-time nurses were recruited and trained by the team of investigators to assist in conducting the door-to-door questionnaire survey. Administrative and logistic details such as handling non-responders and partial responders were covered during the training sessions. Medical terms were clearly defined and explained. The questionnaire was also translated into Chinese and locally validated. Random checks on interviewers were conducted by the principal investigators. When inconsistencies were detected, interviews were re-conducted and results rectified.

Altogether, 2,346 subjects out of 3,000 selected individuals responded to the questionnaire survey, giving a response rate of 78.2%. Fifty subjects were eliminated from the final data set when key data such as sex and/or age were missing. Twenty other subjects were deemed non-eligible because they were mistakenly interviewed despite being below the age of 20. The final data set consisted of 2,276 subjects (1,143 males and 1,133 females) aged 20 and above. For the purpose of studying prostatitis-like symptoms,

only 1,087 males aged 21 to 70 were finally analysed. Excluded from the prostatitis study were 51 men aged above 70 as we feel their symptoms if any would be more likely to come from BPH than prostatitis. A typical patient with type III chronic abacterial prostatitis is a man aged 20 to 45 years according to Meares⁽⁷⁾.

The whole questionnaire contained 115 questions categorised into the following domain: demographic data, medical and surgical history, lower urinary tract symptoms and bothersome score according to the International Prostate Symptoms Score and Madsen Iverson Index, pain symptom, QoL, erectile function according to the International Index of Erectile Function (IIEF-5)⁽⁸⁾ and bowel symptoms suggestive of Irritable Bowel Syndrome.

We defined and identified cases as having "prostatitis-like symptoms" if a respondent had pain or discomfort in the perineum, testicles, tip of penis or bladder/suprapubic region associated with micturition. Instead of defining pain on a 10-point severity scale as used in the NIH-CPSI, we have graded the severity into mild, moderate and severe. As the focus of this report is on "prostatitis-like symptoms", only a question each on the obstructive and irritative aspect of lower urinary tract symptom was used to evaluate the presence or absence of urinary symptom. Quality of life score was assessed by asking the patient one single question: "If you were to spend the rest of your life with your symptoms just the way they have been during the last week, how would you feel about that?". A response of either "mixed" (about equally satisfied and dissatisfied), "mostly dissatisfied", "unhappy", or "terrible" was taken as having impaired QoL. Erectile dysfunction was defined as IIEF-5 less than 21 (total of 25). Severity of erectile dysfunction was graded as mild (IIEF5 score of 16-20), moderate (11-15) and severe (10 or less). Data were collected, entered and analysed using SPSS version 9.05 for Windows.

RESULTS

Demographics

The demographic characteristics of the 1087 male responders aged 21 to 70 are presented in Table II. These were generally in line with those of the Singapore male population. The mean age of the respondents was 41.68 \pm 12.48.

Urinary Symptoms

In response to the two urinary questions, 20.0% (216/1082) had some degree of obstructive LUTS and 32.0% (346/1081) had some degree of irritative

LUTS (Table III). Our result showed that lower urinary tract symptoms were fairly common in Singapore males.

Pain symptoms according to location and severity

Only 2.67% (29 out of 1087) had pain or discomfort suggestive of prostatitis. In terms of location of pain symptoms, six had pain in the bladder or suprapubic region, two in the perineum, six at the tip of penis and 26 had pain during micturition, (11 subjects had more than one location of pain). In terms of severity, only two subjects had severe pain to the perineum, seven had moderate pain and the rest had only mild or vague pain.

Age and racial distribution of respondents with prostatitis-like symptoms

The mean age of respondents with prostatitis-like symptoms was 43.14 +/-13.92. This was not statistically different from the mean age of those without symptoms. Of the 29 symptomatic respondents, 2.23% (18/825) were Chinese, 3.15% (4/131) were Malays, 4.49% (4/93) were Indians and 12.12% (3/33) were of other ethnic origins.

Impact of symptoms and Quality of Life Score

Analysis of the quality of life score revealed that 15 out of 28 with PS (53.6%) had impaired QoL score: mixed (4), mostly dissatisfied (2), unhappy (8) and terrible (1). Only 160 out of 1004 subjects without PS (15.9%) had an impaired QoL. This difference is statistically significant. A detailed comparison with statistical analysis is shown in Table IV. In response to the question "Over the past month, how much of the time have your symptoms kept you from doing the kind of things you would usually do?", 15 out of the 29 (51.7%) with PS were affected to various degrees – a little (9), some (5) and most of the time (1). In response to the question "Over the past month, how much did you worry about your health because of your symptoms?", 15 out of the 29 (51.7%) with PS said they were worried to a varying degree: little (6), some (7) and a lot (2).

Erectile Dysfunction

Of the 859 responders with evaluable IIEF-5 score, 454 of them have some degree of erectile dysfunction (52.9%). Comparing the 21 responders with PS and those without PS, there was a statistically significant difference in the mean IIEF-5 score (Table IV). The PS group had a lower mean IIEF-5 score reflecting moderately severe erectile dysfunction while the non-PS group has a higher mean IIEF-5 score in the mild erectile dysfunction range.

Table II. Comparison of demographic characteristics of our sample population with those of Singaporean population.

	Sample population	Singapore population ⁽⁹⁾
Ethnicity		
Chinese	824 (75.8%)	76.9%
Malay	131 (12.1%)	14.0%
Indian	93 (8.6%)	7.7%
Others	37 (3.4%)	1.4%
Age group		
21-30	232 (21.3%)	22.4%
31-40	285 (26.2%)	28.5%
41-50	326 (30.0%)	26.2%
51-60	134 (12.3%)	14.5%
61-70	110 (10.1%)	8.4%

Table III. Obstructive and Irritative urinary symptoms.

	"How often have you had a sensation of not emptying your bladder completely after you finished urinating, over the last week?" (Obstructive)	"How often have you had to urinate again less than two hours after you have finished urinating, over the last week?" (Irritative)
Number of valid response	1082	1081
Not at all	866 (80.0%)	735 (68.0%)
Less than 1 time in 5	151 (14.0%)	225 (20.8%)
Less than half the time	41 (3.8%)	65 (6%)
About half the time	15 (1.9%)	27 (2.5%)
More than half the time	3 (0.3%)	14 (1.2%)
Almost always	6 (0.6%)	15 (1.43)

Table IV. Comparing PS and non-PS subjects

	Subjects with Prostatitis-like symptoms (29)	Non-PS Subjects (1058)	p value at 95% confidence interval
Mean Age	43.14+/-13.92	41.64+/-12.45	0.524 (T-test)
Mean QoL Score	2.96+/-1.80	1.38+/-1.60	<0.001 (Mann Whitney)
Mean IIEF-5	11.92+/-9.16	17.16+/-8.11	0.003 (Mann Whitney)
Percentage of respondents with some degree of worry	51.7% (15/29)	9.3% (96/1034)	<0.001 (Chi-square)
Respondents with some degree of bother	51.7% (15/29)	6.8% (70/1026)	<0.001 (Chi-square)
Percentage of respondents with impaired QoL	53.6% (15/28)	15.9% (160/1004)	<0.001 (Chi-square)

DISCUSSION

Whilst at least 20% of respondents have some degree of LUTS, the prevalence of prostatitis-like symptoms in a largely Chinese population of Singapore males aged 21 to 70 is only 2.67%. A breakdown of symptomatic respondents in terms of racial distribution showed that only 2.23% of Chinese have prostatitis-like symptoms. To our knowledge, this is the first reported population-based study attempting to estimate the prevalence of prostatitis-like symptoms in an Asian population.

Our prevalence figure of 2.67% is lower than those reported in the literature (mainly Caucasian population). The reported prevalence rate of prostatitis ranges from five to 14.2% depending on definition of prostatitis, study subjects and methodology. Moon et al estimated that approximately 5% of young men aged 20 to 50 years have a history of prostatitis⁽⁵⁾. The prevalence of prostatitis in 1832 Finnish men was recently reported as 14.2% by Mehik et al⁽¹⁰⁾. However the definition of prostatitis in that study was all-encompassing as the investigators did not differentiate the different forms of prostatitis and they relied on diagnosis made by general practitioners or hospital doctors/urologists. The prevalence of 14.2% refers to lifetime prevalence of prostatitis. The period prevalence (one year) of prostatitis was much lower: 2.3% for men aged 20-39 years, 4.0% for those aged 40-49 years and 5.5% for those aged 50-59 years.

The first truly population-based study of prostatitis-like symptoms reported by Nickel revealed a prevalence of 9.7% in a group of 868 men. Nickel whose study was based on the NIH-CPSI, concludes that chronic prostatitis-like symptoms is common. In comparison to Nickel's figure of 9.7%, our prevalence figure of 2.67% would appear low. Differences in methodology and the fact that our study was not originally intended to evaluate chronic prostatitis may account for the lower prevalence in our study.

Even though our study was not designed specifically to study chronic prostatitis-like symptoms, our evaluation of pain symptoms was similar to the NIH-CPSI. The pain domain in the NIH-CPSI scores pain with a 21-point score in terms of location (0-6), frequency (0-5), severity (0-10) and its association with urination, ejaculation and impact on quality of life. We studied pain symptoms in terms of location, severity and its association with urination and impact on quality of life. We identified all subjects with pain in the perineum, testicles, tip of urethra and during micturition as having "prostatitis-like symptoms". As the 10-point severity of pain scale in the NIH-CPSI was not available at the time of our study, we have instead graded the severity of pain into mild, moderate and severe. The questions on urinary symptoms, impact of symptoms

and the quality of life used in our questionnaire were exactly the same as the NIH-CPSI. However we did not elucidate the frequency of pain symptoms. In retrospect, we should have included a question on the frequency of pain as it gives an idea to the severity and clinical significance of the pain. This limitation of our study may have under-estimated our prevalence.

On the other hand, Nickel may have over-estimated his prevalence rate, which he alluded to in his discussion. In our study, the response rate was 78.2% and the majority of our respondents were below 50 years of age. The age distribution conformed to the general population of Singapore. In comparison, the response rate of Nickel's study was only 29%. The majority of his respondents were 50-70 years of age. In his paper, Nickel discussed the possibility of over-estimation due to the response bias. Other than an under-representation of younger respondents, it is possible that those with lower urinary tract symptoms could be more likely to respond to a postal survey than those with no symptoms.

Other reasons for the lower prevalence rate in our study are less certain. The lower prevalence rate may be related to a less sexually promiscuous society or it may be related to a lack of awareness of the prostate and its diseases⁽¹¹⁾. It may also be related to racial, genetic and environmental factors alike the much lower incidence of prostate cancer in Singapore. In fact the prevalence of PS in the 'Others' ethnic group of our respondents was 12.12% (3/33). But the small number precludes any definite conclusion to be drawn.

Chronic prostatitis pain symptoms have a negative impact on the lifestyle and mental well being of the sufferer⁽¹²⁾. It has been hypothesised that an initiating event (ie. infection, trauma, or sexually transmitted disease) starts an inter-related multifactorial cascade of events which may include physical, chemical, immunologic or neurogenic components that culminates with chronic perineal/pelvic neuropathy. The pain can be very crippling in some sufferers and can impair one's quality of life. It is difficult to evaluate and study the severity of pain as it is such a subjective feeling. In our study, most of the patients with prostatitis-like symptoms have mild to moderate pain only. Only two respondents indicated severe pain.

Despite the fact that the prevalence of prostatitis-like symptom is low and most are mild to moderate in severity, our study revealed that a significant proportion of them were bothered by these symptoms. They were kept from doing the kind of things they would usually do or they were worried about their symptoms. Our study also showed that the QoL score of symptomatic subjects was significantly higher (worse or impaired) compared to the asymptomatic

group implying the clinical importance of the disease despite the low prevalence rate.

Chronic prostatitis has also been associated with erectile dysfunction⁽¹¹⁾. Our results revealed that those with PS tend to have a lower IIEF5 score ie poorer erectile function than those who had no prostatitis-like symptoms. This difference is unlikely to be due to age differences as the mean age of the two groups were very similar. There is also no difference in the prevalence of diabetes mellitus in both PS and non-PS subjects.

CONCLUSION

The prevalence of prostatitis-like symptoms in our largely Chinese population is 2.67%. Prostatitis-like symptoms have a significant negative impact on the quality of life and erectile function.

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