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QUESTIONNAIRE ANALYSIS ON SEX DIFFERENCE  
IN LOWER URINARY TRACT SYMPTOMS

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Runninghead: Questionnaire study on lower urinary tract symptoms in men and  
women

Key Words: lower urinary tract symptoms; symptom score; questionnaire; aging,

## ABSTRACT

**Objectives.** To examine the sex difference in the prevalence and severity of lower urinary tract symptoms in Japanese men and women.

**Methods.** Of 970 individuals who attended the public lectures by urologists and a famous veterinarian that were organized as a public service of the 88<sup>th</sup> annual meeting of the Japanese Urological Association (June 2000, Sapporo, Japan), 677 (70%) completed the self-administered International Prostate Symptom Score (I-PSS). Scores answered from 653 attendees aged thirties to seventies (446 men, mean 67.5 years; 207 women, mean 60.7 years) were the basis of this study.

**Results.** Significant age-related increase in I-PSS and QOL score was observed in both men and women. The ratio of moderate (I-PSS 8 to 19) to severe (I-PSS 20 or greater) symptoms in the 50s, 60s, and 70s was 52%, 72%, and 80% in men and 27%, 36%, and 55% in women, respectively. Additional analysis in each decade showed that at the age 50 years and older the total score and voiding symptom score of I-PSS, as well as the quality-of-life score, were significantly greater in men than in women.

**Conclusions.** The total I-PSS and quality-of-life score correlated highly with age in both sexes. At the age 50 years and older, men had severer voiding symptoms than did women. Although age-related changes in bladder function predispose both men and women equally to lower urinary tract symptoms, the higher incidence of bladder outlet obstruction in men having a prostate may have a significant influence on the higher voiding symptom score in men.

## INTRODUCTION

Aging is associated with structural and physiological changes of the lower urinary tract. Benign prostatic hyperplasia (BPH) is a common age-related pathological condition that affects men worldwide.<sup>1</sup> Symptomatic BPH or lower urinary tract symptoms are highly prevalent in men. However, the development of increased lower urinary tract symptoms is not gender specific. Women also develop lower urinary tract symptoms with increasing age. A recent population-based study has indicated that lower urinary tract symptoms are highly prevalent in women.<sup>2</sup>

International Consultations on BPH adopted the American Urological Association symptom index as a validated questionnaire and termed it International Prostate Symptom Score (I-PSS).<sup>3</sup> I-PSS has been used for an initial quantitative symptom assessment of BPH and for assessing treatment response and disease progression. However, it is well known that I-PSS is non-specific for BPH. Previous studies have shown comparable scores in men with lower urinary tract symptoms of varying etiology.<sup>4,5</sup> Regarding the gender difference, the severity of lower urinary tract symptoms defined by I-PSS was not different in both sexes,<sup>6</sup> while in other studies I-PSS total score was significantly higher among men than among women.<sup>7,8</sup> The fact that I-PSS does not include the item of urinary incontinence may have influenced the results of these studies, since the prevalence of urinary incontinence in women is about twice as high as in men.<sup>9</sup>

To assess lower urinary tract symptoms including urinary incontinence in women, there are several validated questionnaires such as the Bristol Female Lower Urinary Tract Symptoms questionnaire<sup>10</sup> and the Urogenital Distress Inventory (UDI) or its short form UDI-6.<sup>11,12</sup> So far,

there is no universally accepted questionnaire that can be used for both men and women for assessing lower urinary tract symptoms including incontinence. Under these circumstances, we used I-PSS to attempt to estimate the age-related changes in the prevalence and severity of lower urinary tract symptoms in Japanese men and women.

## MATERIALS AND METHODS

Of 970 individuals who attended the pre-congress public lectures that were combined with the 88<sup>th</sup> annual meeting of the Japanese Urological Association (June 2000, Sapporo, Japan), 677 (response rate 70%) completed the self-administered I-PSS. Scores answered from 653 attendees aged thirties to seventies (446 men, mean 67.5 years; 207 women, mean 60.7 years) were the basis of this study. Topics of public lectures by urologists were erectile dysfunction, BPH, prostate cancer and female urinary incontinence. These lectures were followed by a special lecture entitled “Between the human and animal” by a famous Japanese veterinarian. The attendees were classified into 5 age groups, 30 to 39, 40 to 49, 50 to 59, 60 to 69 and 70 to 79. Age distribution of the subjects was shown in Fig. 1. I-PSS included 4 items of voiding symptoms (straining, stopping and starting during urination, weak urinary stream and incomplete emptying of the bladder) and 3 items of storage symptoms (daytime frequency, urgency and nocturia). The severity of symptoms was defined by I-PSS total score as mild (0 to 7), moderate (8 to 19) and severe (20 to 35). Correlations between age and I-PSS total score and QOL score were analyzed with Spearman’s rank correlation. Sex differences in I-PSS total score, voiding symptom score and storage symptom score as well as QOL score were analyzed statistically with Mann-Whitney U test.  $P < 0.05$  was considered statistically significant.

## RESULTS

I-PSS total score in men ( $11.6 \pm 0.3$ , mean  $\pm$  SE) was significantly higher than in women ( $6.4 \pm 0.4$ ) ( $p < 0.0010$ ). There was a significant correlation between the age and I-PSS total score in both men ( $r_s = 0.208$ ,  $p < 0.001$ ) and women ( $r_s = 0.364$ ,  $p < 0.0001$ ). Within each age group, I-PSS total score and voiding symptom score were significantly higher among men aged 50s, 60s and 70s than among women of the same age group, but did not differ significantly among men and women in the younger age groups (Fig. 2, Fig. 3). Symptom score of each of 4 voiding items was significantly higher among men aged 50s, 60s and 70s than among women of the same age group. Regarding I-PSS storage symptom score, men and women did not differ significantly within each age group except the 60s ( $4.8 \pm 0.2$  in men and  $4.0 \pm 0.3$  in women,  $p = 0.0091$ ) (Fig. 3). Symptom score of each of 3 storage items was not significantly different between men and women except daytime frequency ( $1.9 \pm 0.1$  in men and  $1.6 \pm 0.2$  in women,  $p = 0.0397$ ) and nocturia ( $1.6 \pm 0.1$  in men and  $1.2 \pm 0.1$  in women,  $p = 0.0032$ ) at the 60s. The percentage of 3 categories of the severity of symptoms in each age group showed a significant age-related trend in both men and women (Fig. 4). The ratio of moderate to severe symptoms at the ages of 30s, 40s, 50s, 60s and 70s was 13%, 17%, 27%, 36% and 55% in women, and 17%, 12%, 52%, 72% and 80% in men, respectively.

QOL score in men ( $3.2 \pm 0.1$ ) was significantly higher than that in women ( $1.9 \pm 0.1$ ) ( $p < 0.0001$ ). There was a significant correlation between the age and QOL score in both men ( $r_s = 0.250$ ,  $p < 0.0001$ ) and women ( $r_s = 0.259$ ,  $p = 0.0007$ ). Within each age group, QOL score was significantly higher among men aged 50s, 60s, and 70s than among women of the same age group (Fig. 5).

## COMMENT

Using I-PSS the present study confirmed the age-related increase in lower urinary tract symptoms in both men and women. Interestingly, I-PSS total score and voiding symptom score were significantly higher among men aged 50s, 60s and 70s than among women of the same age group, whereas storage symptom score was not significantly different between men and women of the same age group except the 60s. Thus, men tend to have more voiding symptoms than women. It is known that the development of increased lower urinary tract symptoms is age-related but not gender-specific.<sup>1</sup> Lower urinary tract symptoms in men and women may share, at least partly, common underlying etiologies that remain to be fully elucidated.<sup>13</sup> Age-related morphological changes in bladder wall (decreased ratio of the area density of smooth muscle to connective tissue) were demonstrated in both men and women,<sup>14</sup> and detrusor contractility was shown to decrease age-dependently in both men and women with a stronger correlation in women.<sup>15</sup> Thus, age-related structural as well as functional changes in the bladder predispose men and women equally to the development of lower urinary tract symptoms. However, age related changes in the lower urinary tract function are still not identical between men and women. It is likely that the presence of the prostate in the male urethra is associated with a higher incidence of bladder outlet obstruction in elderly men than in women of the same age group. It has been shown that maximum flow rate is significantly greater and postvoid residual volume is significantly smaller in women than in men despite the fact of age-related decrease in maximum flow rate and increase in postvoid residual volume in both sexes.<sup>16</sup> Thus, the higher incidence of bladder outlet obstruction in elderly men might have had a significant effect on the higher voiding symptom score in men aged 50s and over in the present study.



A previous study has shown that men reported more voiding symptoms than women on the ICS-BPH symptom questionnaire.<sup>17</sup> There have been only a few other studies that compared the prevalence and severity of lower urinary tract symptoms in men and women.<sup>6-8</sup> These studies, like the present study, used I-PSS to evaluate symptoms for both men and women. Population-based studies have shown that voiding symptom score, especially score for weak stream and straining, was higher in men than in women,<sup>7,8</sup> while there was no sex-related difference in voiding symptom score in a non population-based study.<sup>6</sup> The difference in the subject selection might have contributed to the difference in the results of those studies. The present study was not a population-based study and enrolled subjects were similar in nature to those in the latter study which included a total of 197 male and female attendees to a general health fair.<sup>6</sup> Because the parts of public lectures that the subjects in the present study attended covered both male (erectile dysfunction, BPH and prostate cancer) and female (female urinary incontinence) urological diseases, it was the opinion of the authors that there was no sampling bias at least in gender. However, the subjects in the present study may not be representative of the general population. They might have been more interested in or might have had more concern of lower urinary tract symptoms than the general population. This may be the reason why the mean of I-PSS total score in men (11.6) and women (6.4) in the present study was higher than that (7.1 in men and 5.8 in women) in a study for general population conducted in the USA.<sup>7</sup> According to a community-based study which was conducted for Japanese men, the ratio of moderate to severe symptoms on I-PSS was 44%, 52% and 63% for each age decade from ages 50 to 79 years,<sup>18</sup> which was lower than the present study (52%, 72% and 80% at 50s, 60s and 70s, respectively). Thus, the present study may not reflect the general prevalence of lower urinary tract symptoms in Japanese community. However, such limitations of the present study still

permit comparisons between men and women of the same age group.

It has been shown that men and women with urinary incontinence are likely to report a higher score of I-PSS than continent men and women.<sup>8</sup> The prevalence of urinary incontinence in women is about twice as high as in men.<sup>9</sup> This difference in the prevalence of urinary incontinence between men and women may contribute to the lower score of I-PSS in women in the previous and present studies,<sup>7,8</sup> since I-PSS does not include the item of urinary incontinence. I-PSS has been used to evaluate lower urinary tract symptoms in men with BPH.<sup>3</sup> However, it is well known that I-PSS lacks diagnostic specificity in predicting the presence or absence of BPH.<sup>4,6,7,19</sup> Some investigators have suggested that it may have potential for assessment of lower urinary tract symptoms severity among women.<sup>8,19</sup> However its psychometric property among women requires investigation before its general use.

## **CONCLUSIONS**

The present study conducted for Japanese men and women has shown that I-PSS total score and QOL score increased age-dependently in both men and women. At the age of fifty years and over, men had severer voiding symptoms than women. Although age-related changes in bladder function predispose both men and women equally to lower urinary tract symptoms, the higher incidence of bladder outlet obstruction in men having prostate may have a significant influence on the higher voiding symptom score in men.

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## LEGENDS FOR FIGURES

Fig. 1 Age distribution of the subjects in each age group.

Fig. 2 I-PSS total score in each age group.

\*  $p=0.001$  , \*\*  $p=0.0008$  , \*\*\*  $p<0.0001$  versus female of the same age group

Fig. 3 A: I-PSS voiding symptom score in each age group.

B: I-PSS storage symptom score in each age group.

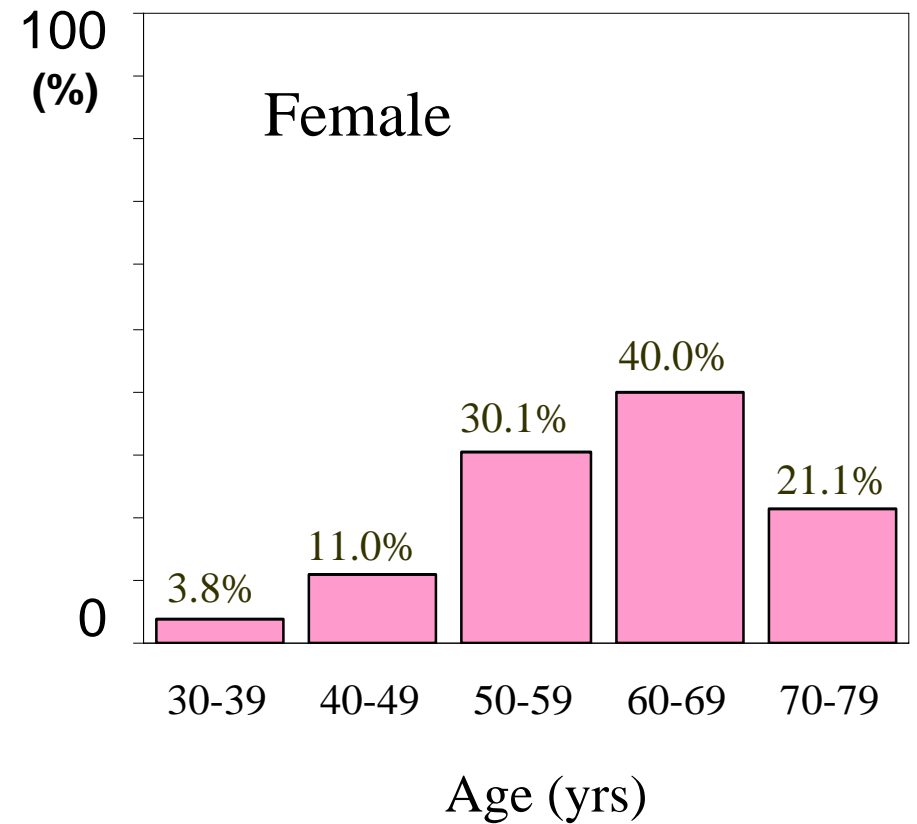
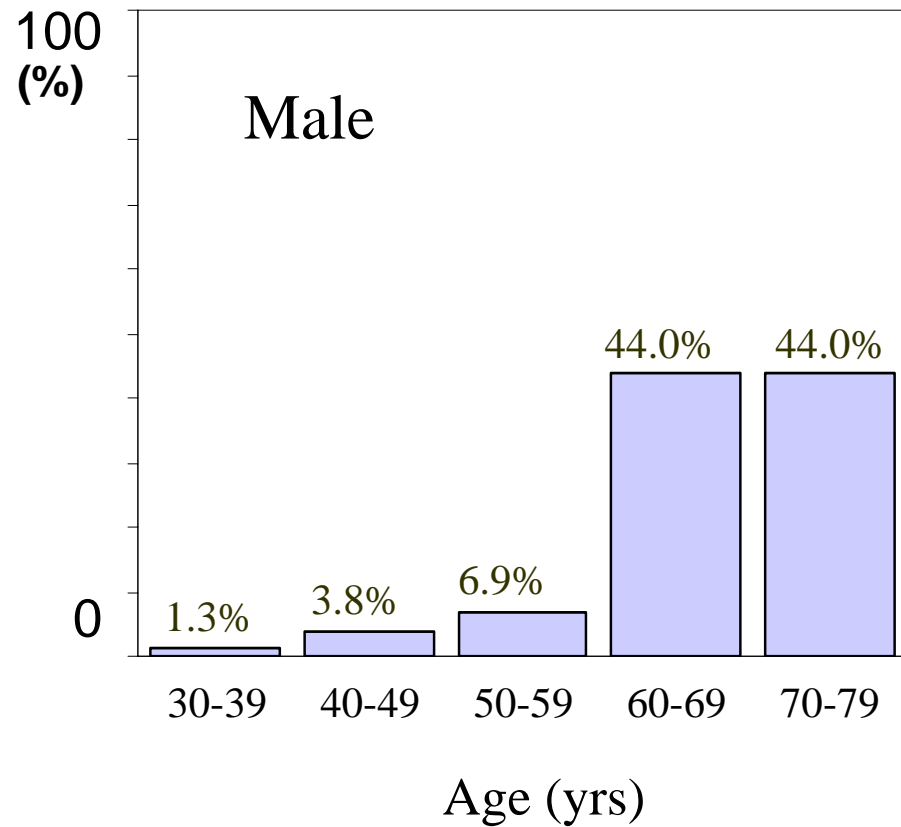
\*  $p=0.0091$ , \*\*  $p<0.0001$  versus female of the same age group

Fig. 4 Percent distribution of 3 categories of the severity of symptoms in each age group.

Fig. 5 QOL score in each age group.

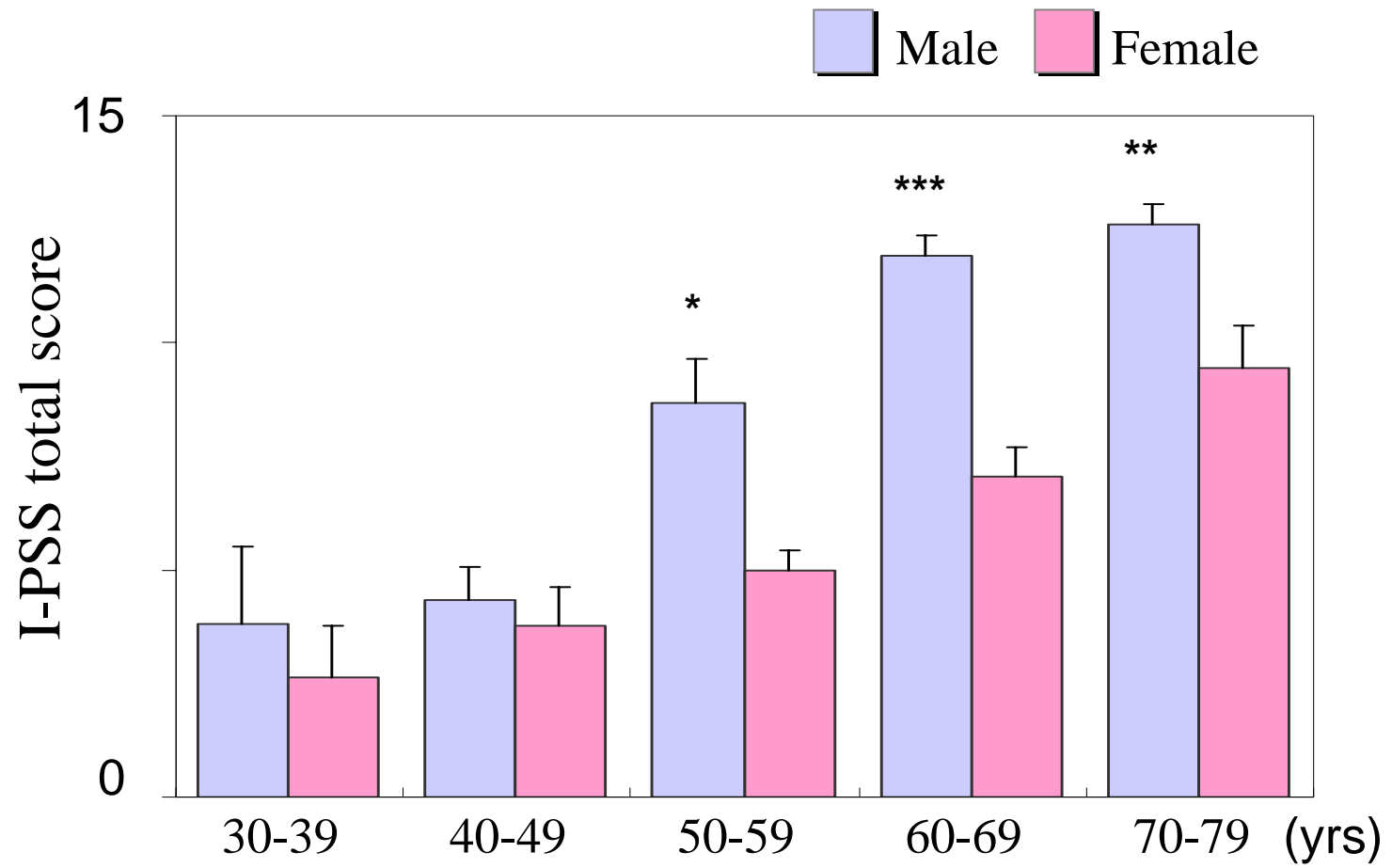
\*  $p=0.0387$ , \*\*  $p=0.0024$ , \*\*\*  $p<0.0001$  versus female of the same age group

# Figure 1

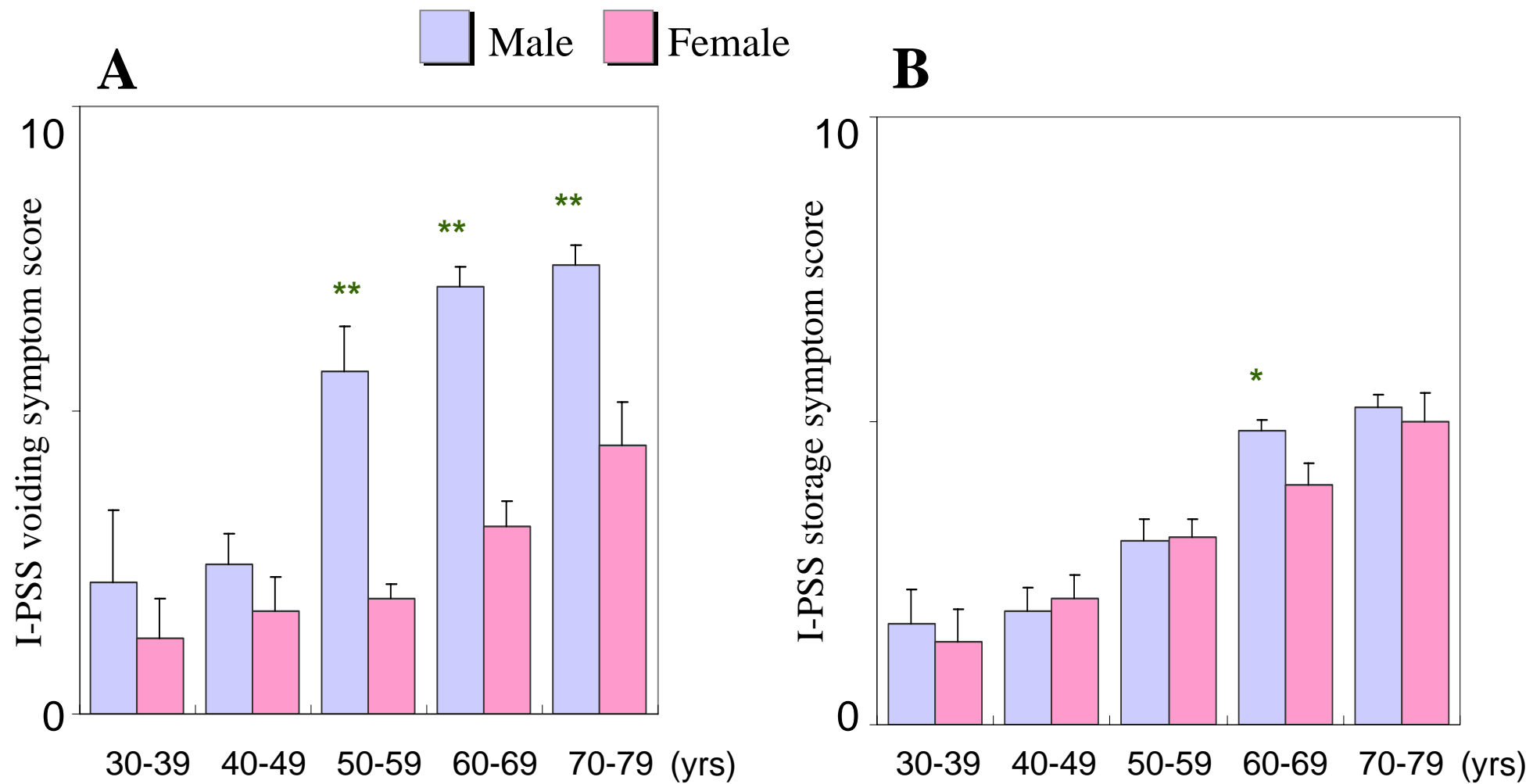




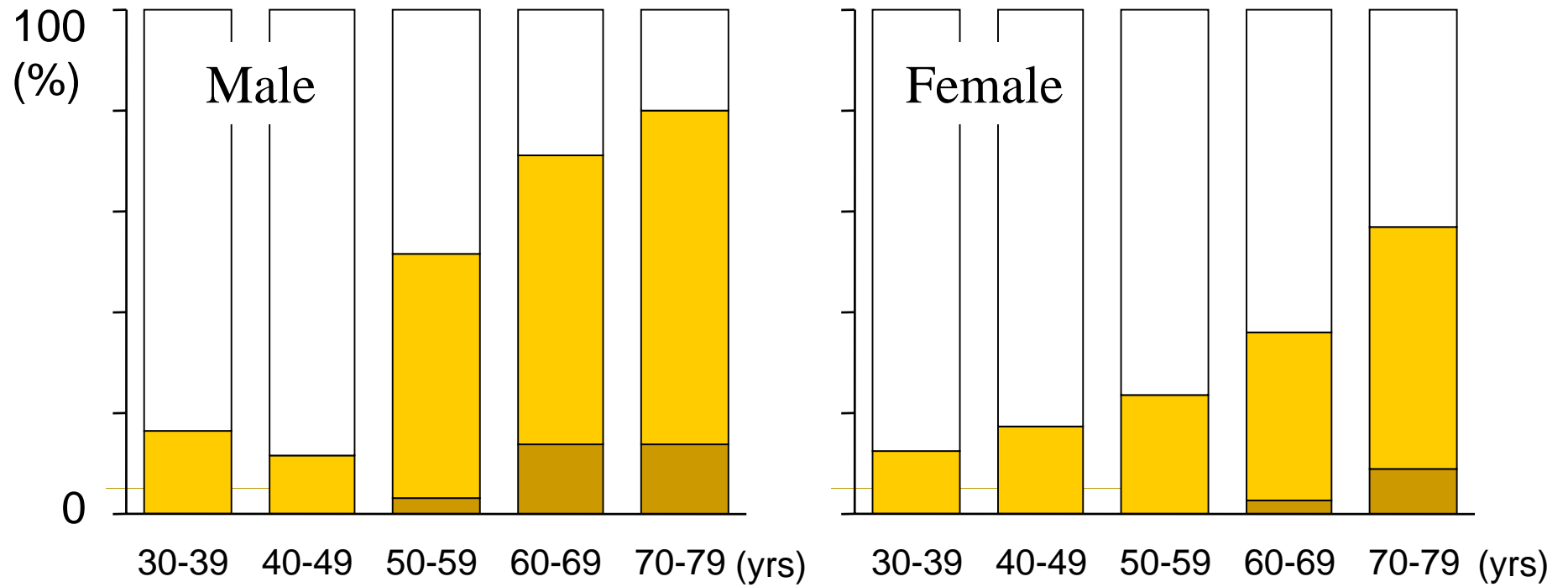
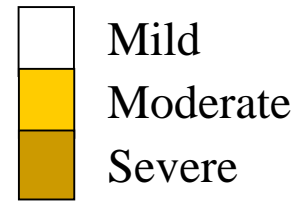
**Figure 2**



# Figure 3



# Figure 4



**Figure 5**

