

## AFFECT OF DIABETES ON THE PREVALENCE OF LOWER URINARY TRACT SYMPTOMS (LUTS) IN WOMEN

### Hypothesis / aims of study

Prior studies have shown an increased prevalence of urinary incontinence among women with pre-diabetes and diabetes[1-3]; however, no population-based studies have examined whether these women also have an increased prevalence of LUTS. This study examines the overall prevalence of LUTS in an ethnically diverse population of women based on diabetes status.

### Study design, materials and methods

Diabetes RRISK is a population-based cross-sectional study of 2270 female Kaiser Permanente Northern California members with diabetes (N=452), pre-diabetes (N=427), or normal glucose (N=1391). We used the 2008 American Diabetes Association criteria to define pre-diabetes and diabetes. Participants self-reported demographic information and reproductive history and underwent an interviewer-administered questionnaire on LUTS. LUTS criteria included Nocturia: nighttime urination greater than 2 episodes; Increased Daytime Frequency: daytime urination greater than 9 episodes; Severe Urgency: severity of "urge or pressure to urinate" greater than 6 (on a 0 to 9 scale); Frequent Urgency: daily or more frequent "overwhelming urge to urinate". The LUTS criteria were chosen based on the 75<sup>th</sup> percentile of participants that were at least moderately bothered by these symptoms, as this was considered clinically significant. Responses were also analyzed by weekly or greater urgency incontinence. "Overactive Bladder (OAB) dry" was defined as one or more LUTS criteria without urgency incontinence, and "OAB wet" was defined as one or more LUTS criteria with urgency incontinence.

### Results

Diabetes RRISK includes an ethnically diverse population with 20% African-American, 18% Asian, 17% Latina, and 44% White participants and a mean age of 55.5 years (range 40-78 years). The overall prevalence of at least one LUTS was 37.0%. When analyzed by diabetes status, women with diabetes or pre-diabetes had more prevalent LUTS at 40.5% and 39.3% respectively compared to women with normal glucose at 35.2% (P=0.04 and P=0.15, respectively). In addition, women with diabetes and pre-diabetes had more severe individual LUTS with the exception of increased daytime frequency (Table 1). The prevalence of nocturia was 18.6% in women with diabetes and 16.4% in women with pre-diabetes compared to 13.4% in women with normal glucose (P=0.007 and P=0.13, respectively). The prevalence of severe urgency was 15.5% in women with diabetes and 13.3% in women with pre-diabetes compared to 11.1% in women with normal glucose (P=0.01 and P=0.21, respectively), and the prevalence of frequent urgency was 15.0% in women with diabetes and 14.3% in women with pre-diabetes compared to 10.9% in women with normal glucose (P=0.02 and P=0.06, respectively). Finally, women with diabetes or pre-diabetes had a higher prevalence of OAB wet at 6.9% and 7.5% respectively compared to 5.0% in women with normal glucose (P=0.08 and P=0.09, respectively). Given the overall similarities in LUTS prevalence between women with diabetes and pre-diabetes, we performed a separate analysis combining the two groups together (Table 2). The overall prevalence of LUTS was 39.9% in women with diabetes or pre-diabetes compared to 35.2% in women with normal glucose (P=0.02). The prevalence of nocturia was 17.5% in women with diabetes or pre-diabetes compared to 13.4% in women with normal glucose (P=0.008). The prevalence of severe urgency was 14.4% in women with diabetes or pre-diabetes compared to 11.1% in women with normal glucose (P=0.02), and the prevalence of frequent urgency was 14.7% in women with diabetes or pre-diabetes compared to 10.9% in women with normal glucose (P=0.008). Finally, the rate of OAB wet was 7.2% in women with diabetes or pre-diabetes compared to 5.0% in women with normal glucose (P=0.03).

### Interpretation of results

We found a strikingly similar and very common prevalence of LUTS as well as OAB wet among women with pre-diabetes and diabetes that were significantly higher than women with normal glucose. This finding suggests that LUTS may be an early consequence of hyperglycemia. Physicians should be alert for LUTS and OAB wet, which are often unrecognized and therefore under-treated among women with pre-diabetes and diabetes. Future research should identify specific risk factors that influence LUTS in order to potentially modify these risk factors and slow the progression of disease.

### Concluding message

There is a significantly increased prevalence of lower urinary tract symptoms in women with diabetes and pre-diabetes compared to women with normal glucose levels.

Table 1: Prevalence of individual lower urinary tract symptoms in women with diabetes, pre-diabetes, and normal glucose (statistically significant findings shown in bold)

Lower Urinary Tract Symptoms	Normal Glucose N=1391	Pre-Diabetes N=427 (p value)	Diabetes N=452 (p value)
Nocturia	13.4%	16.4% (0.13)	<b>18.6% (0.007)</b>
Increased Daytime Frequency	19.4%	18.5% (0.67)	<b>25.4% (0.05)</b>
Severe Urgency	11.1%	13.3% (0.21)	<b>15.5% (0.01)</b>
Frequent Urgency	10.9%	14.3% (0.06)	<b>15.0% (0.02)</b>
OAB Wet	5.0%	7.5% (0.09)	6.9% (0.08)

Table 2: Prevalence of individual lower urinary tract symptoms in women with normal and abnormal glucose levels (statistically significant findings shown in bold)

Lower Urinary Tract Symptoms	Normal Glucose N=1391	Abnormal Glucose N=879

		(p value)
Nocturia	13.4%	<b>17.5% (0.008)</b>
Increased Daytime Frequency	19.4%	16.9% (0.12)
Severe Urgency	11.1%	<b>14.4% (0.02)</b>
Frequent Urgency	10.9%	<b>14.7% (0.008)</b>
OAB Wet	5.0%	<b>7.2% (0.03)</b>

#### References

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<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	Yes
<i>Specify Name of Ethics Committee</i>	The Committee on Human Research at University of California, San Francisco and the Kaiser Permanente Northern California Institutional Review Board
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes