

Prevalence and Predisposing Factors for Self-reported Recurrent Vaginitis in Type 2 Diabetes Mellitus

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ABSTRACT

Background: Women with diabetes are likely to develop vaginitis due to predisposing factors, including hyperglycemia-related impairment of immune response.

Objectives: To estimate the prevalence and determine predisposing factors for self-reported recurrent vaginitis in women with type 2 diabetes mellitus (T2DM).

Methods: In the US Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) 2008 survey, respondents reported how many times in the past 12 months they had a genital infection. Respondents with T2DM reporting 3 or more infections were classified as recurrent and were compared with T2DM respondents reporting 1–2 infections (non-recurrent) and those without infections using chi-square and *t*-tests and logistic regression models.

Results: Among T2DM women (n=1,535), 5.4% reported recurrent vaginitis, 12.6% reported non-recurrent vaginitis, and 82% reported no vaginitis. Among women with vaginitis, 30% reported recurrent vaginitis. Fewer women with recurrent vaginitis had health insurance compared with non-recurrent vaginitis and no vaginitis groups. More women reporting recurrent vaginitis had higher body mass index (BMI), circulatory problems, stroke, and atherosclerosis than women with non-recurrent vaginitis. With multivariate analysis, lower education (OR=2.0), receiving oral anti-diabetes drugs (OADs) + insulin (OR=4.3), and atherosclerosis (OR=3.8) predicted recurrent vaginitis compared with non-recurrent vaginitis. Women reporting recurrent vaginitis were younger, had lower income, higher BMI, overactive bladder, kidney problems and more used insulin than women without vaginitis. In multivariate analysis, younger age (OR=0.93), receiving OADs + insulin (OR=6.1), circulatory problems (OR=2.2), overactive bladder (OR=3.3), and atherosclerosis (OR=4.5) were significantly associated with recurrent vaginitis compared with no vaginitis.

Conclusions: Among T2DM women reporting vaginitis, approximately one-third reported recurrent vaginitis, and select demographic and clinical characteristics may assist in identifying those likely to have self-reported recurrent vaginitis.

CONFLICT OF INTEREST STATEMENT:

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BACKGROUND

- Among women, vaginitis is the most common gynecological condition encountered in clinical practice¹
- Approximately 5%-7% of women will have recurrent *Candida* vaginitis, defined by Eckert in his study as 4 or more microbiologically documented episodes in a year²
- Diabetes has been associated with an increased risk of vaginitis among women³
- Yet, there is limited information on the prevalence of recurrent vaginitis in diabetes and what factors may predispose to recurrent vaginitis among women with T2DM

OBJECTIVES

- To estimate the prevalence of self-reported recurrent vaginitis among women with T2DM
- To determine the predisposing factors for recurrent vaginitis among women with T2DM

METHODS

Study Design

- Cross-sectional analysis of data collected in 2008 among SHIELD respondents with T2DM
- Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) is a 5-year population-based survey conducted to better understand the risk for the development of diabetes, as well as disease burden
 - Based upon a screening questionnaire mailed to 200,000 nationally representative households (TNS NFO Household Panel), responses for 211,097 adults from 127,420 households were obtained (64% response rate)
 - A baseline survey was sent in 2004 to 22,001 selected individuals derived from the screening respondents. Since 2005, annual SHIELD surveys have captured self-reported information on health status, attitudes and behaviors, quality of life, and anthropometry from this representative sample of the US population
 - The 2008 survey collected information from 14,921 individuals (71% response rate) and 2,671 respondents had T2DM (18%)

Study Population

- Respondents were 18 years of age or older and female
- Self-reported diagnosis of T2DM was based on being "told by a doctor, nurse or other healthcare professional that you have type 2 diabetes"

Study Measures

- Respondents were asked how many times in the past 12 months they had a fungal/yeast infection of the genital area
- Women with T2DM were classified as having recurrent, non-recurrent, or no vaginitis in the past 12 months
 - Recurrent vaginitis = reported 3 or more genital infections
 - Non-recurrent vaginitis = reported 1 or 2 genital infections
 - No infection = reported 0 genital infections
- Comorbid conditions were self-reported based on survey questions of being told by a healthcare professional that they had the condition

METHODS (Continued)

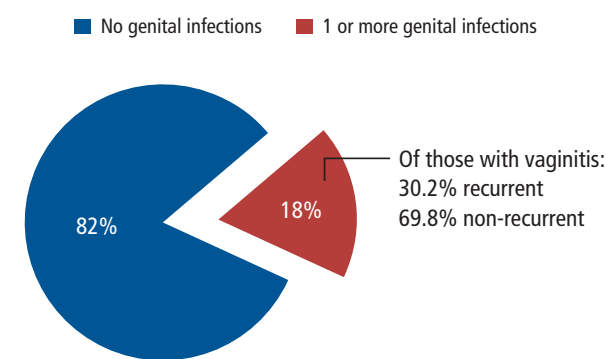
Statistical Analyses

- T2DM respondents reporting recurrent vaginitis were compared with T2DM respondents who reported non-recurrent vaginitis or no genital infections
- Comparisons between T2DM women with and without reported recurrent vaginitis were conducted using chi-square test for categorical variables and *t*-tests for continuous variables
- Logistic regression was used to determine predisposing factors for recurrent vaginitis
- Statistical significance was set *a priori* as $p < 0.05$

RESULTS

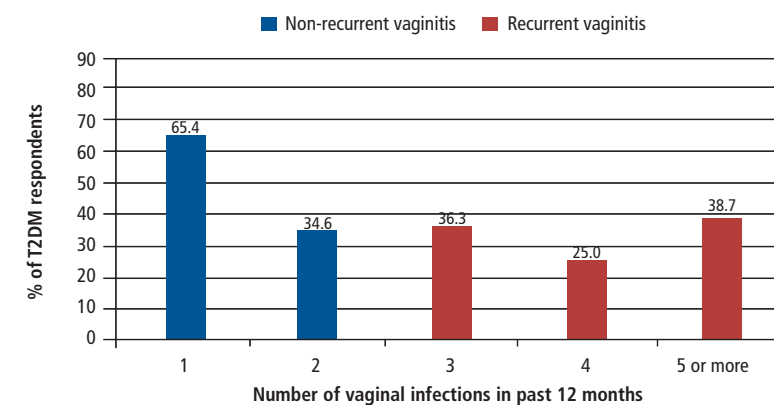
Prevalence of Recurrent Vaginitis

Figure 1. Proportion of T2DM women with and without reported vaginitis, n = 1,535



- Among 1,535 women with T2DM, 80 (5.4%) reported recurrent vaginitis (at least 3 infections in the past 12 months), 185 (12.6%) reported non-recurrent vaginitis and 1,270 (82.0%) reported no genital infections (Figure 1)
- Among women with vaginitis (n = 265), 30.2% reported recurrent vaginitis

Figure 2. Number of vaginal infections in the past 12 months among T2DM respondents with and without reported recurrent vaginitis



- Majority (65%) of T2DM women reporting non-recurrent vaginitis had only 1 infection in the past 12 months (Figure 2)
- Approximately 61% of T2DM women with recurrent vaginitis reported 3–4 infections and 39% had 5 or more vaginal infections in the past 12 months

RESULTS (Continued)

Table 1. Characteristics of SHIELD T2DM women with and without recurrent vaginitis (n = 1,535)

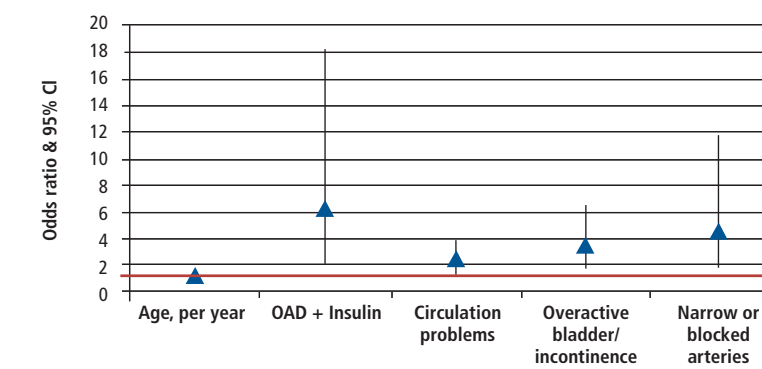
Characteristics	Recurrent vaginitis (n = 80)	Non-recurrent vaginitis (n = 185)	No vaginitis (n=1,270)
Age, years, mean (SD)	54.9 (10.9) ^{ab}	56.4 (11.4) ^c	62.9 (11.5)
White, %	72.5	71.4	70.9
Education, high school degree or less, %	47.5	34.3	37.9
Household income <\$30,000, %	55.0 ^{ab}	49.7	40.9
Body mass index, mean (SD)	38.4 (10.1) ^{ab}	35.7 (7.6)	35.2 (8.8)
Diabetes duration, years, mean (SD)	11.8 (8.4)	11.6 (8.5)	11.4 (8.5)
Health insurance, %	76.3 ^{ab}	89.7	91.9
Current diabetes treatment	^b	^c	
None, %	10.4	16.9	17.9
OADs alone, %	50.6	53.4	62.9
Insulin alone, %	11.7	11.2	8.7
OAD + insulin	27.3	18.5	10.5
Narrow or blocked arteries, %	17.5 ^{ab}	5.4	7.0
Cholesterol problem, %	80.0	74.1	72.7
Heart disease, %	22.5	15.1	20.6
Hypertension, %	77.5	72.4	74.2
Circulation problems, %	35.0 ^{ab}	23.2	18.3
Arthritis, %	55.0	54.1	56.2
Kidney problems, %	18.8 ^{ab}	10.3	7.5
Overactive bladder/incontinence, %	23.8 ^{ab}	20.5 ^c	12.7
COPD, %	12.5	8.1	7.6

^ap <0.05 across the 3 groups; ^a = significant difference between recurrent and non-recurrent, ^b = significant difference between recurrent and no vaginitis, ^c = significant difference between non-recurrent and no vaginitis

- Among T2DM respondents, recurrent vaginitis group had significantly higher BMI, greater proportion with narrow or blocked arteries and circulation problems, and lower proportion with health insurance compared with the non-recurrent vaginitis group (Table 1)
- Recurrent vaginitis T2DM group was younger, had lower income, higher BMI, circulation problems, narrow or blocked arteries, overactive bladder, kidney problems, fewer had health insurance, and more used insulin than T2DM women with no vaginitis

Predisposing Factors for Recurrent Vaginitis

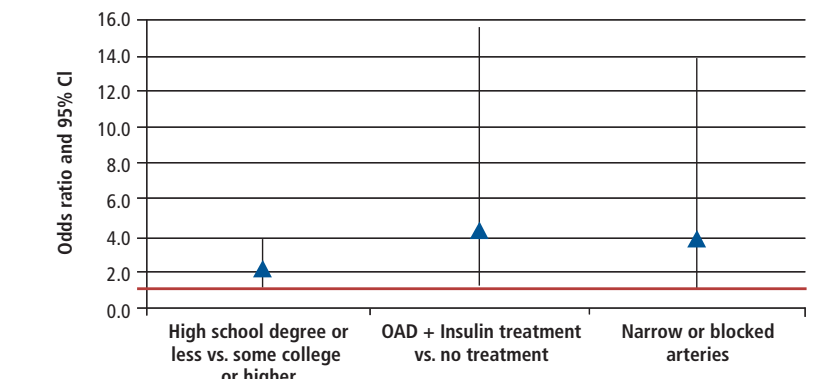
Figure 3. Logistic regression model for predictors of recurrent vaginitis in the past 12 months compared with no vaginitis



- Odds of having recurrent vaginitis compared with no vaginitis was 6.1 times higher if T2DM women received OAD + insulin compared with T2DM women who were not treated, 2.2 times higher if respondents had circulation problems, 3.3 times higher if respondents had an overactive bladder/incontinence, and 4.5 times higher if respondents had narrow or blocked arteries (Figure 3)

- Women of younger ages had significantly higher odds of recurrent vaginitis compared with no vaginitis
- Race, BMI, duration of diabetes, household income, education, health insurance, and other comorbid conditions did not significantly predict the likelihood of recurrent vaginitis among the T2DM women

Figure 4. Logistic regression model for predictors of recurrent vaginitis in the past 12 months compared with non-recurrent vaginitis



- Odds of having recurrent vaginitis compared with non-recurrent vaginitis were significantly higher if women had less education, received OAD + insulin, or cardiac revascularization (e.g. angioplasty) (Figure 4)
- Age, race, BMI, duration of diabetes, household income, health insurance, and other comorbid conditions did not significantly predict the likelihood of recurrent vaginitis among the T2DM women

LIMITATIONS

- Diagnosis of diabetes, other comorbid conditions, and vaginitis were self-reported and could not be validated with medical record review or administrative claims data. However, this bias is similar between the groups compared in this study
- Household panels, like the TNS NFO panel, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals

CONCLUSIONS

- Among T2DM women reporting vaginitis, approximately 30% have self-reported recurrent vaginitis (3 or more infections in the past year)
- Younger age, treatment with OAD + insulin, circulation problems, overactive bladder/incontinence, and narrow or blocked arteries increased the odds of recurrent vaginitis versus no vaginitis
- T2DM women with less education, treatment with OAD + insulin, and narrow or blocked arteries were significantly more likely to have recurrent vaginitis compared with T2DM women with non-recurrent vaginitis
- These demographic and clinical characteristics available in routine clinical practice may assist in identifying those likely to have recurrent vaginitis

References

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- Eckert LO. *New Engl J Med* 2006;355:1244-1252
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Abbreviations

BMI	Body mass index
OAD	Oral anti-diabetes drug
SHIELD	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes
T2DM	Type 2 diabetes mellitus
TNS NFO	Taylor Nelson Sofres National Family Opinion

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