

# Differential Prevalence Rate of Venlafaxine Treatment by Age and Gender in a Community Based Cohort

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## ABSTRACT

**Background:** Major depressive disorder (MDD) is the tenth leading cause of death in the United States as well as the third leading cause of disability worldwide. While the overall lifetime risk of developing MDD stands at approximately thirty percent; females are consistently two times more likely to be prescribed treatment for MDD than men and perimenopausal women are especially more likely to be prescribed antidepressants. Recall, that women endorse different symptoms of MDD than men. Also, there is often overlap in the signs and symptoms of MDD and perimenopause as well as an increased risk of MDD while going through perimenopause.

**Methods:** We performed a retrospective observational study on 11,087 long-term patients of Mayo Clinic to gain a greater understanding of diagnosis and prescribing practices surrounding antidepressant use in Olmstead County, Minnesota. Of the 11,087 subjects in our study, 6,682 were female and 4,405 were male. Logistic regression was used to determine any statistically significant differences in prescribing practices between males, females and perimenopausal women. 1-year prevalence rate was captured for the 12-month period prior to entry to the Mayo Clinic Biobank study and DNA collection.

**Results:** Our results showed consistently by both individual drug and by drug class that females were more than twice as likely to be prescribed antidepressants. The results also showed that females in the standard perimenopausal age range were more than three times as likely to be prescribed venlafaxine. Recall, venlafaxine is also used to manage the symptoms of perimenopause.

**Conclusions:** In the United States more than two-thirds of mental health care is provided in the primary care setting as opposed to in the psychiatric specialty environment. Women are more than two times as likely to be prescribed antidepressants over the course of 1-year. Females are also more likely to be prescribed multiple unique antidepressants than males over the course of 1-year. Perimenopausal women are approximately three times more likely to be prescribed venlafaxine than men.

## METHODS

Age, demographics, and antidepressant prescription data was collected from the Rochester Epidemiology Project (REP). The REP population-based cohort addresses limitations observed in clinical series minimizing referral bias and incomplete case ascertainment often encountered. The sample size for this investigation included 11,087 participants (female n = 6,682, male n = 4,405) who had previously provided a stored biological sample (i.e. DNA) for sequencing of 77 pharmacokinetic/dynamic genes as part of the Right 10K study, a Mayo Clinic Baylor College of Medicine collaboration. Long-term Mayo adult patients embedded in primary care, English speaking, who were able to provide informed consent were included. Prevalence rate of antidepressant exposure (drug class, individual drug) was quantified as 1-year, defined as time of study entry where DNA was collected. Sex differences were analyzed by Firth regression and age adjusted by logistic regression. Menopausal status was defined as age ≥55 years. For venlafaxine specifically, we use standard logistic regression and model effects of age and sample collection year using restricted cubic splines to flexibly allow for nonlinearity.

## RESULTS

Overall, antidepressants were the second most prescribed drug in our study. The most prescribed drug class was SSRIs (see Table 1) 1514/11087 (13.7%) with the most prescribed drug being citalopram 637/11087 (5.7%).

Our results showed consistently by both individual drug and by drug class that females were more than twice as likely to be prescribed antidepressants (see Table 2).

A total of 42/4405 males (0.95%) had a venlafaxine prescription (Table 3) in the previous year, compared to 217/6682 (3.25%) females (age-adjusted p< 0.001). We identified a significant quadratic effect for age for odds of prescription in a female-specific model (p<0.001, see Figure), indicating a peak in prescription near the perimenopausal range.

**TABLE 1 : 1 YEAR PRIOR TO THE SAMPLE COLLECTION DATE**

FDA Medication	RIGHT '10K'	
	N=11087	
<b>SSRI</b>	<b>1514</b>	<b>13.7%</b>
Citalopram	637	5.7%
Escitalopram	110	1.0%
Fluoxetine	285	2.6%
Paroxetine	142	1.3%
Sertraline	409	3.7%
<b>SNRI</b>	<b>414</b>	<b>3.7%</b>
Duloxetine	156	1.4%
Venlafaxine	259	2.3%
<b>NDRI</b>	<b>446</b>	<b>4.0%</b>
Bupropion	446	4.0%
<b>TCA</b>	<b>399</b>	<b>3.6%</b>
Amitriptyline	198	1.8%
Doxepin	34	0.3%
Nortriptyline	161	1.5%

**TABLE 2: 1 YEAR PRIOR TO THE SAMPLE COLLECTION DATE**

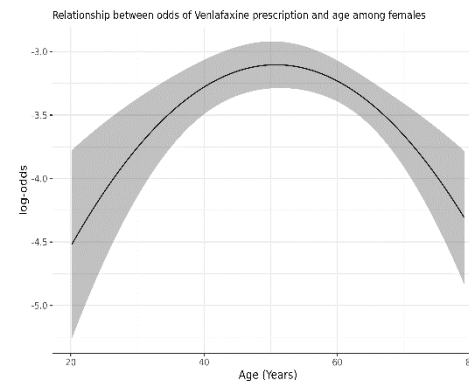
Drug Type	Total	M	F	Percentage	Firth Regression: Age adjusted logistic analysis of sex differences in prevalence of prescriptions by drug class
NDRI	446	114	332	M:114/4405 (2.5 %); F: 332/6682 (4.9%)	p< 0.00001
SNRI	414	76	338	M: 76/4405 (1.73%); F: 338/6682 (5.06%)	p< 0.00001
SSRI	1512	375	1137	M: 375/4405 (8.51%); F:1137/6682 (17.02%)	p< 0.00001
TCA	399	95	304	M: 95/4405 (2.16%); F:304/6682 (4.55%)	p< 0.00001

\*\* Due to low event rates, the total number (of prescriptions) to qualify for the Firth logistic regression is 23; and the statistically significant P-value was calculated to be < 0.0022.

**TABLE 3: 1 YEAR PRIOR TO THE SAMPLE COLLECTION DATE**

Drug	Total	M	F	Percentage	P-value
Bupropion	446	114	332	M: 114/4405 (2.6%); F: 332/6682 (4.97%)	< 0.00001
Venlafaxine	259	42	217	M: 42/4405 (0.95%); F: 217/6682 (3.25%)	< 0.00001
Citalopram	637	177	460	M: 177/4405 (4.02%); F: 460/6682 (6.88%)	< 0.00001
Escitalopram	110	39	71	M: 39/4405 (0.9%); F: 71/6682 (1.06%)	0.99875
Fluoxetine	284	59	225	M: 59/4405 (1.3%); F: 225/6682 (3.37%)	< 0.00001
Paroxetine	141	38	103	M: 38/4405 (0.9%); F: 103/6682 (1.54%)	0.00050
Sertraline	409	86	323	M: 86/4405 (2.0%); F: 323/6682 (4.82%)	< 0.00001
Amitriptyline	198	42	156	M: 42/4405 (0.95%); F: 156/6682 (2.33%)	< 0.00001
Doxepin	34	8	26	M: 8/4405 (0.2%); F: 26/6682 (0.39%)	0.01032
Nortriptyline	161	43	118	M: 43/4405 (1.0%); F: 118/6682 (1.77%)	0.00109

## FIGURE



## CONCLUSIONS

Females were more than three times as likely to be prescribed venlafaxine and exhibited highest prescription rates in the perimenopausal range.

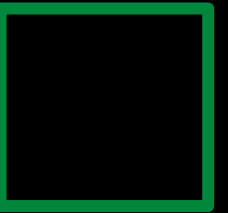
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