## Diabetes and Depression in Denmark 1996-2010: National data stratified by occupational status and annual income

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Novelty Statements

\* Using a Danish national database, we have shown that people with diabetes are 65% more likely to fill a prescription for antidepressants than those without diabetes.

\* The increased risk for an antidepressant prescription is more marked in men with diabetes than women with diabetes

\* The increased risk for an antidepressant prescription seen in people with diabetes is more marked in people with lower income

\* Interventions to prevent depression following a diagnosis of diabetes may need to be targeted more toward low income jobs and men in particular.

Abstract

Aims: Diabetes and depression affect labour market performance and outcomes. It is important to determine the socioeconomic distribution of comorbid diabetes and depression. We used national registry data to focus on the socioeconomic distribution of comorbid depression and diabetes among the Danish workforce.

Methods: Using national registers, all eligible Danish adults aged 18-59 years on 1 January 1996 were followed until 31 December 2010. Diabetes status was obtained from the Danish National Diabetes Register and purchase of prescription antidepressants from the Register of Medicinal Product Statistics. Data were also obtained on participants’ occupational status and gross annual income. Participants were stratified according to their highest occupational group during the study period. Annual incomes were adjusted to 2013 levels and, using the distribution of the study population’s incomes, we stratified participants into income quintiles.

Results: 3,434,420 individuals met inclusion criteria at baseline, with 98,006 developing diabetes during follow-up. There were 603,498 new prescriptions of antidepressants during follow-up; 19,849 (20.3%) among people with diabetes and 583,649 (17.5%) among those without. People with diabetes in all income quintiles (Risk Ratio 1.65; CI 95% 1.62 – 1.67) and all occupational groups (Risk Ratio 1.70; CI 95% 1.68 -1.73) had significantly elevated risk compared to the general population. Risk ratios were significantly higher among the lowest occupational groups and income quintiles.

Conclusion: Our results provide robust data underlining the associations between diabetes, depression and socioeconomic status. They support and encourage further attention to the issue of comorbid diabetes and depression, particularly among the most disadvantaged.

**Introduction**

Workforce wellness has been identified by the International Diabetes Federation (2011) as one of the main themes in the on-going struggle to reduce the impact of diabetes (1). Wellbeing has different attributes, but mental wellbeing, or the absence thereof, is one of the main drivers of work disability (2). As such, it is important to consider the potential impact of co-morbid diabetes and depression and to determine whether this comorbidity is prevalent within the workforce and how it affects employment opportunity. Moreover, given that diabetes and depression disproportionately affects people of lower socioeconomic status (3), it is also important to determine the distribution of comorbid diabetes and depression within the working-age population. In this article, we use national registry data to focus on the socioeconomic distribution of comorbid depression and diabetes among the Danish workforce.

Denmark has an extensive system for the registration of population data, where data from a variety of different registries can be linked together at an individual level (4). This facilitates access to a very large dataset which, in light of what is already known about the consequences of comorbid diabetes and depression, can be used to provide robust evidence of the extent and social distribution of comorbid diabetes and depression.

The aim of this study was twofold; 1) to assess the risk ratio for being prescribed antidepressants among people with diabetes compared to those without diabetes and; 2) to examine whether, and to what extent, there is a social or employment gradient in filled prescriptions of antidepressant medication among people with and without diabetes.

### Research Design and Methods

### Participants

Using population registers we included all Danish adults aged between 18 and 59 years on 1 January 1996. These individuals were followed for fifteen years, until 31 December 2010. We obtained data about diabetes diagnoses from the Danish National Diabetes Register (5) (DNDR) and filled drug prescriptions from the Register of Medicinal Product Statistics (RMPS) (6).

We excluded individuals who were diagnosed with diabetes before entry into the dataset (e.g. prevalent cases diagnosed prior to 1 January 1996 or anyone diagnosed before their 18th birthday), or who had migrated in and/or out of Denmark between 1995 and 2010. The remaining individuals were followed until 31 December 2010 or until they turned 60 years, died, or retired, whichever occurred first.

### Measures

### Antidepressant Prescription

We used filled antidepressant prescriptions as a proxy for a diagnosis of depression, using the RMPS to identify the first date at which the individual purchased prescribed antidepressants. The status of participants in our analysis was determined exclusively on the basis of their first filled prescription of antidepressants and we did not seek to investigate frequency or duration of antidepressant consumption. We defined antidepressants in accordance with the Anatomical Therapeutic Chemical Classification System (ATC), and included any medication registered with the code NO6A.

### Occupational Status

We used each individual’s highest occupational status in the study period as a proxy for socio-economic status. We obtained this information from the Register-based Labour Force Statistics. We stratified job status categories in accordance with the International Labour Organisation and made the following ordered categorization of job status to identify participants’ highest level of employment: 1) High-skilled employment, 2) Executive Management, 3) Medium-skilled employment, 4) Basic-skilled employment, 5) Self-employed, 6) Unskilled employment, and 7) Unemployed. For instance, an individual who had been self-employed, in medium-skilled employment, and unemployed at some point during our study period would be classified as in medium-skilled employment in our dataset.

### Income

We obtained the participants’ gross annual income in each year from the Danish tax registers. We adjusted their incomes in each year to 2013 price levels and identified their maximum annual income in the study period to create one income observation per individual. We used the maximum income as a further proxy of their socioeconomic status.

### Statistical Analysis

We used Poisson regression models to estimate the risk ratios for depression among individuals with and without diabetes. We controlled for age, time in the dataset with and without diabetes respectively and, when calculating risk ratios for the population as a whole, sex. For the purposes of determining differences between the sub-groups of men and women and people with and without diabetes we used formal interaction tests.

### Results

A total of 3,434,420 individuals were included into the analysis. Of the 98,006 individuals developed diabetes during the study period, of whom 19,849 (20.3%) subsequently filled a prescription for antidepressants. In addition, 583,649 (17.5%) of the 3,336,414 individuals who remained free of diabetes filled antidepressant prescriptions at least once during the study period (Table 1). Men accounted for 57.8% of cases of incident diabetes in the study period. Among the population free of diabetes, men only accounted for 39.8% cases of filled antidepressant prescriptions. In the population that developed diabetes, however, men accounted for 48.4% cases of filled antidepressant prescriptions. It was also apparent from this data that the mean age of people with diabetes is notably higher than the mean age of the population without diabetes. This was expected in view of the close relationship between age and prevalence of diabetes in the population. The relationship between age and prevalence of diabetes was also apparent in the unadjusted distribution of diabetes cases in the higher income groups, a finding that can be explained by the fact that age and income are also closely related. As will be seen in the age-adjusted analyses, however, the risk ratios remained significantly higher in the lower socioeconomic categories.

### Data stratified by income quintiles

The adjusted risk ratio for a filled antidepressant prescription among those with diabetes compared with those without was highest in the lowest income group, as shown in table 2. Although income level moderated the risk ratios for both men and women, the effect was less marked in men. The risk ratio was significantly lower for men in the highest income group compared with lower income groups but the risk ratios did not differ between the other income groups. The effect of income was more marked among women with diabetes; the risk ratio for a filled antidepressant prescription for a woman with diabetes was 1.89 and 1.26 in the lowest and highest income groups respectively compared with 1.89 and 1.64 in the lowest and highest male income groups. Formal interaction tests of men and women confirmed the sex effect, and with the exception of the lowest income group, men had significantly higher risk of a filled antidepressant prescription (p < 0.001) in all income groups than their female counterparts.

### Data stratified by Occupational Status

Overall individuals in basic-skilled employment and unskilled-employment had significantly higher risk ratios than other occupations (Table 3). This pattern is reflected for women, though in the case of men it is only individuals in basic-skilled employment who were significantly worse than the other categories. Men had a significantly higher risk ratio than women in all occupational categories except unskilled employment. For the three largest occupational groups – basic-skilled employment, medium-skilled employment and high-skilled employment – the differences between men and women were highly significant (P ≤0.001).

**The social gradient**

Although the risk ratio for a filled antidepressant prescription was generally higher in the lower socioeconomic categories, these findings did not address the social gradient in incidence of filled antidepressant prescriptions among people with and without diabetes respectively. In order to assess this we performed a risk ratio analysis using the highest ranked categories (Highest income quintile and High-skilled employment) as reference (Table 4).

Compared with highest income quintile, we observed significantly elevated risk for filled prescriptions of antidepressants among all other quintiles in both people with and without diabetes. The effect of the social gradient, however, was attenuated in people with diabetes within certain income and occupational groups. As highlighted in Table 4, this is particularly apparent for men in all occupational categories aside from Executive management and for women in Basic and Unskilled employment.

**Discussion**

This study clearly indicates that comorbid diabetes and depression has a distinct social and economic differential. This is not unexpected and confirms findings from previous research, where both diabetes (7) and depression (8-10) have been significantly associated with low socioeconomic status. Recognising this, it is important to acknowledge that, irrespective of socioeconomic status, all people with diabetes filled antidepressant prescriptions to a greater extent than their socioeconomic counterparts without diabetes. So while the likelihood of people with diabetes filling antidepressant prescriptions is greater among the lower socioeconomic groups, *the overall levels of risk for filling antidepressant prescriptions among people with diabetes are high across all socioeconomic strata*.

The risk ratios for filling antidepressant prescriptions are more pronounced in the analysis stratified by income rather than job status. As different socioeconomic markers may impact differently at different times during an individual’s life course (11), this finding is in accord with previous work, where income has tended to overshadow other markers of socioeconomic status (8). Nonetheless, the results stratified by occupational status are consistent with the results of the income analysis. When compared to their socioeconomic counterparts without diabetes, men with diabetes are much more likely to have filled antidepressant prescriptions than women. However, more women in the general population have filled antidepressant prescriptions than men and it is against this background that the results of this study should be interpreted.

As with diabetes and depression, the relationship between depression and low income is considered to be bi-directional, with low income being both a cause and an outcome of depression (9, 10). People with low socioeconomic status are more likely to suffer depression related work disability and such periods of work inactivity will be of longer duration and more recurrent than among people with higher socioeconomic standing (12, 13). However, diabetes and depression interact in such a way that their independent negative impacts may be compounded when in combination. Comorbid diabetes and depression is associated with increased all-cause mortality (14), functional disability (15), impaired diabetes self-care (16), poor medical adherence (17) and lower quality of life (18). A recent study has also highlighted that return to work after depression related absence was prolonged by the presence of comorbid health conditions such as diabetes (19).

Our study does not address the question of the causal relationship between diabetes and depression. However, the levels of risk in our study are close to those identified in a study that reported antidepressant use before and after diagnosis of type 2 diabetes (20). Furthermore, one of the most comprehensive meta-analyses in this area has shown that people with undiagnosed diabetes had lower rates of depression than those with diagnosed diabetes, suggesting that knowledge of the diagnosis of diabetes affects the risk of depression (21).

In terms of endogeneity, there is more to consider than the question of causality between diabetes and depression. Work and work environment have, for example, recently received attention as a potential risk factor for the development of type 2 diabetes (22). At the same time, work environment is also a well-established risk factor for depression (23). Likewise, associations between diabetes, depression and socioeconomic status are also vulnerable to the problem of endogeneity, since the factors that determine whether a person achieves high occupational status or a high income may well be similar to aetiological factors for diabetes (24) and depression (10).

One limitation of our study is that we were unable to distinguish between type 1 and type 2 diabetes. Elsewhere, it has been proposed that since the physiological and psychological processes involved in the two conditions are different, analyses looking at diabetes and depression should focus exclusively on one type or the other (25). Although this is a potential weakness, Anderson et al (26) found that there was no significant difference between type of diabetes and the prevalence of comorbid depression. However, they noted that overall prevalence varied considerably in both types of diabetes in accordance with the means by which depression is being measured.

Using filled prescriptions of antidepressant medication as a proxy measure for depression has both advantages and disadvantages when compared to other measures. Arguably the greatest advantage it provides is the sample size of this study. However, while there is a clear difference between diagnoses of clinical depression and filling antidepressant prescriptions, using the latter as a marker for depression at least captures something of the psychopharmalogical treatment which people diagnosed with diabetes are receiving. As such, it provides a valid measure that serves to cut through debates about the distinction between depression and diabetes related distress (27). A further limitation is that we were unable to identify people who have not sought treatment and so we do not know the extent to which people with diabetes may be receiving non-pharmacological treatment for depression. Together with the potential influence of healthcare utilisation bias, this may lead to underestimates of the actual levels of depression (12), particularly among the socioeconomic groups less inclined to seek help proactively. Conversely, because antidepressants are used to treat more than clinical depression, our data will also contain a number of false positive cases of depression.

Any distinction between depression and distress is less important for our present purposes as the focus on antidepressants provides us with insight into the way people with diabetes are treated. Our data are exclusively from a Danish context, but we believe that, at least with respect to high-income countries, the issues arising from comorbid diabetes and depression can be extrapolated to other settings. As the data may be context specific, one might anticipate different rates of antidepressant use in different cultures (28) and different economies (29). However, our findings are broadly in line with previous research. In fact, given that Denmark is an affluent country with strong welfare provision, the levels of social inequality manifest in our findings could possibly be even greater in countries where welfare provision was less extensive.

**Conclusion**

Given the damaging consequences of comorbid diabetes and depression, not least in terms of labour market outcomes, identifying vulnerable groups is an important task. Our results, however, indicate that, relatively speaking, people with diabetes within all socioeconomic classes are vulnerable to depression, or depressive symptoms. Yet while the risk for filling antidepressant prescriptions is greater among women in the general population, the impact of diabetes in this regard is significantly more pronounced among men. Likewise, both men and women of lower socioeconomic status with diabetes have higher risk ratios for filling antidepressant prescriptions than their counterparts in the general population. This highlights the particular vulnerability of these groups since the risk of filling antidepressant prescriptions is already highest among the lower socioeconomic groups within the general population.

We believe that any attempt to address the potential challenges presented by comorbid diabetes and depression in the working population must adopt an integrative, or collaborative approach (30) to the two conditions, recognising that the management of distress and depression is as important as the management of blood glucose (27).

In light of the economic costs associated with comorbid diabetes and depression and the notable proportion of these costs among the working age population in relation to increased work absence and reduced productivity, there is reason to suppose that proactive investment to support people in this situation would provide both economic and human returns.

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Table 1 Descriptive Statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Total** | **No Diabetes** | **Developed Diabetes** | **No Diabetes** | **Developed Diabetes** |
|  |  |  |  | No Antidepressants | Filled Antidepressant prescription | No Antidepressants | Filled Antidepressant prescription |
| Number | 3,434,420 | 3,336,414 | 98,006 | 2,752,765 | 583,649 | 78,157 | 19,849 |
| Men (%) | 51.1% | 50.9%  | 57.8% | 53.2% | 39.8% | 60.2% | 48.4% |
| Women (%) | 48.9%  | 49.1% | 42.2% | 46.8% | 60.2% | 39.8% | 51.6% |
| Mean Age (Yrs) | 44.6 | 44.4 | 52.5 | 44.2 | 45.4 | 52.8 | 51.2 |
| **Occupational Status (%)** |  |  |  |  |  |  |  |
| High-skilled employment | 22.9% | 23.1% | 16.9% | 23.7% | 20.0% | 17.4% | 14.9% |
| Executive management | 3.8% | 3.8% | 4.5% | 4.0% | 2.8% | 4.9% | 3.2% |
| Medium-skilled employment | 15.3% | 15.3% | 14.8% | 15.2% | 16.0% | 14.9% | 14.4% |
| Basic-skilled employment | 42.8% | 42.7% | 44.8% | 42.2% | 45.0% | 44.4% | 46.3% |
| Self-employed | 4.2% | 4.1% | 6.6.% | 4.1% | 3.8% | 6.8% | 6.1% |
| Unskilled employment | 9.9% | 9.9% | 10.6% | 9.7% | 10.8% | 10.1% | 12.3% |
| Unemployed | 1.2% | 1.1% | 1.8% | 1.0% | 1.6% | 1.6% | 2.6% |

### Table 2: Risk ratios for purchasing prescribed antidepressants among people with diabetes relative to people without diabetes stratified by income quintiles

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|   | ***N*** | ***N* developing diabetes** | ***N* developing depression** | ***N* developing diabetes and depression** | **Risk Ratios** | CI - 95% | P Values - Formal interaction test: Men/Women |
| (a) Both men and women |   |   |   |   |  |  |  |  |   |
| All | 3,434,420 | 98,006 | 603,498 | 19,849 | **1.65** | **1.62** | **-** | **1.67** |   |
| 1: Lowest income quintile | 686,884 | 11,789 | 117,520 | 3,236 | **1.92** | **1.85** | **-** | **1.99** |   |
| 2: 2nd income quintile | 686,884 | 20,567 | 151,838 | 4,963 | **1.63** | **1.58** | **-** | **1.68** |   |
| 3: 3rd income quintile | 686,884 | 21,257 | 128,150 | 4,275 | **1.59** | **1.54** | **-** | **1.65** |   |
| 4: 4th income quintile | 686,885 | 21,787 | 112,603 | 3,928 | **1.56** | **1.51** | **-** | **1.62** |   |
| 5: Highest income quintile | 686,883 | 22,606 | 93,387 | 3,447 | **1.53** | **1.47** | **-** | **1.59** |   |
|   |   |   |   |   |  |  |  |  |   |
| (b) Men |   |   |   |   |  |  |  |  |   |
| All | 1,753,905 | 56,635 | 241,852 | 9,599 | **1.76** | **1.72** | **-** | **1.80** | **<0.001** |
| 1: Lowest income quintile | 286,574 | 3,934 | 34,504 | 855 | **1.89** | **1.76** | **-** | **2.02** | **1.00** |
| 2: 2nd income quintile | 208,084 | 6,843 | 36,401 | 1,415 | **1.81** | **1.71** | **-** | **1.92** | **<0.001** |
| 3: 3rd income quintile | 322,461 | 11,791 | 49,577 | 2,101 | **1.85** | **1.76** | **-** | **1.94** | **<0.001** |
| 4: 4th income quintile | 413,664 | 15,119 | 58,060 | 2,499 | **1.79** | **1.71** | **-** | **1.87** | **<0.001** |
| 5: Highest income quintile | 523,122 | 18,948 | 63,310 | 2,729 | **1.64** | **1.57** | **-** | **1.71** | **<0.001** |
|   |   |   |   |   |  |  |  |  |   |
| (c) Women |   |   |   |   |  |  |  |  |   |
| All | 1,680,515 | 41,371 | 361,646 | 10,250 | **1.57** | **1.54** | **-** | **1.60** |   |
| 1: Lowest income quintile | 400,310 | 7,855 | 83,016 | 2,381 | **1.89** | **1.81** | **-** | **1.97** |   |
| 2: 2nd income quintile | 478,800 | 13,724 | 115,437 | 3,548 | **1.52** | **1.47** | **-** | **1.58** |   |
| 3: 3rd income quintile | 364,423 | 9,466 | 78,573 | 2,174 | **1.40** | **1.34** | **-** | **1.47** |   |
| 4: 4th income quintile | 273,221 | 6,668 | 54,543 | 1,429 | **1.32** | **1.25** | **-** | **1.40** |   |
| 5: Highest income quintile | 163,761 | 3,658 | 30,077 | 718 | **1.26** | **1.17** | **-** | **1.37** |   |
|  |  |  |  |  |  |  |  |  |  |
| **Notes** |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| *N*: Number of unique individualsThe population without diabetes are the reference group*p*-values when comparing risk ratios: Two-sided *t*-tests of log-risk ratiosCalculation of risk ratios was adjusted for age, time in the dataset with and without diabetes and, when calculating for the whole population, sex. |  |  |  |  |  |  |

### Table 3: Risk ratios for purchasing prescribed antidepressants among people with diabetes relative to people without diabetes stratified by occupational group

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|   | ***N*** | ***N* developing diabetes** | ***N* developing depression** | ***N* developing diabetes and depression** | **Risk Ratios** |  **CI - 95%** | **P Values - Formal interaction test: Men/Women** |
| **(a) Men & Women** |  |  |  |  |  |  |  |  |   |  |
| All | 3,434,420 | 98,006 | 603,498 | 19,849 | **1.70** | **1.68** | - | **1.73** |   |  |
| 1: High-skilled employment  | 786,295 | 16,601 | 119,973 | 2,965 | **1.55** | **1.49** | - | **1.61** |   |  |
| 2: Executive management | 131,429 | 4,459 | 17,277 | 644 | **1.58** | **1.45** | - | **1.72** |   |  |
| 3: Medium-skilled employment  | 525,706 | 14,491 | 96,308 | 2,864 | **1.54** | **1.48** | - | **1.60** |   |  |
| 4: Basic-skilled employment  | 1,468,691 | 43,879 | 271,607 | 9,199 | **1.78** | **1.75** | - | **1.82** |   |  |
| 5: Self-employed | 142,623 | 6,500 | 23,179 | 1,216 | **1.58** | **1.49** | - | **1.68** |   |  |
| 6: Unskilled employment | 339,689 | 10,324 | 65,213 | 2,443 | **1.77** | **1.70** | - | **1.85** |   |  |
| 7: Unemployed | 39,987 | 1,752 | 9,941 | 518 | **1.49** | **1.36** | - | **1.63** |   |  |
|   |   |   |   |   |  |  |   |   |   |  |
| **(b) Men** |   |   |   |   |  |  |   |   |  |  |
| All | 1,753,905 | 56,635 | 241,852 | 9,599 | **1.83** | **1.79** | - | **1.87** | **<0.001** |  |
| 1: High-skilled employment  | 367,069 | 9,209 | 44,143 | 1,475 | **1.73** | **1.63** | - | **1.83** | **<0.001** |  |
| 2: Executive management | 95,481 | 3,592 | 10,925 | 477 | **1.71** | **1.55** | - | **1.89** | **0.02** |  |
| 3: Medium-skilled employment  | 221,016 | 7,422 | 30,613 | 1,193 | **1.69** | **1.59** | - | **1.80** | **<0.001** |  |
| 4: Basic-skilled employment  | 793,386 | 25,931 | 114,424 | 4,534 | **1.95** | **1.89** | - | **2.02** | **<0.001** |  |
| 5: Self-employed | 99,752 | 5,040 | 14,278 | 876 | **1.67** | **1.55** | - | **1.80** | **0.01** |  |
| 6: Unskilled employment | 160,987 | 5,035 | 24,485 | 935 | **1.77** | **1.66** | - | **1.90** | **0.67** |  |
| 7: Unemployed | 16,214 | 406 | 2,984 | 109 | **1.89** | **1.55** | - | **2.29** | **0.01** |  |
|   |   |   |   |   |  |  |   |   |   |  |
| **(c) Women** |   |   |   |   |  |  |   |   |   |  |
| All | 1,680,515 | 41,371 | 361,646 | 10,250 | **1.60** | **1.57** | - | **1.64** |   |  |
| 1: High-skilled employment  | 419,226 | 7,392 | 75,830 | 1,490 | **1.42** | **1.34** | - | **1.50** |   |  |
| 2: Executive management | 35,948 | 867 | 6,352 | 167 | **1.35** | **1.14** | - | **1.59** |   |  |
| 3: Medium-skilled employment  | 304,690 | 7,069 | 65,695 | 1,671 | **1.45** | **1.38** | - | **1.53** |   |  |
| 4: Basic-skilled employment  | 675,305 | 17,948 | 157,183 | 4,665 | **1.65** | **1.61** | - | **1.71** |   |  |
| 5: Self-employed | 42,871 | 1,460 | 8,901 | 340 | **1.39** | **1.24** | - | **1.55** |   |  |
| 6: Unskilled employment | 178,702 | 5,289 | 40,728 | 1,508 | **1.74** | **1.65** | - | **1.83** |   |  |
| 7: Unemployed | 23,773 | 1,346 | 6,957 | 409 | **1.42** | **1.28** | - | **1.57** |   |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Notes** |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

*N*: Number of unique individuals

The population without diabetes are the reference group

*p*-values when comparing risk ratios: Two-sided *t*-tests of log-risk ratios

Calculation of risk ratios was adjusted for age, time in the dataset with and without diabetes and, when calculating for the whole population, sex.

Table 4: Occupational and income gradient of risk ratios for purchasing prescribed antidepressants among people with and without diabetes

|  |  |  |  |
| --- | --- | --- | --- |
|  | **People with Diabetes** | **People without diabetes** |  |
|   | *N* | Risk Ratios | CI - 95% | P Values - Men Women | N | Risk Ratios | CI - 95% |  P Values - Men Women | P Values - Diabetes No Diabetes |
| ***(a) Both men and women*** |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1: Lowest income quintile | 10,218 | 1.58 | 1.50 | - | 1.66 |   | 686,516 | 1.96 | 1.94 | - | 1.98 |   | 0.18 |
| 2: 2nd income quintile  | 18,425 | 1.34 | 1.28 | - | 1.41 |   | 687,095 | 1.58 | 1.56 | - | 1.59 |   | <0,001 |
| 3: 3rd income quintile  | 19,245 | 1.20 | 1.14 | - | 1.25 |   | 686,963 | 1.30 | 1.29 | - | 1.31 |   | 0.02 |
| 4: 4th income quintile  | 19,820 | 1.13 | 1.08 | - | 1.18 |   | 686,921 | 1.15 | 1.14 | - | 1.16 |   | 0.12 |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| ***(b) Men*** |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1: Lowest income quintile | 3,410 | 1.53 | 1.41 | - | 1.65 | 0.99 | 286,456 | 2.21 | 2.17 | - | 2.24 | <0.001 | 0.95 |
| 2: 2nd income quintile  | 6,096 | 1.42 | 1.33 | - | 1.51 | 0.03 | 208,140 | 1.89 | 1.87 | - | 1.92 | <0.001 | 0.03 |
| 3: 3rd income quintile  | 10,732 | 1.22 | 1.15 | - | 1.29 | 0.15 | 322,477 | 1.40 | 1.39 | - | 1.42 | <0.001 | <0.001 |
| 4: 4th income quintile  | 13,846 | 1.14 | 1.08 | - | 1.20 | 0.38 | 413,682 | 1.20 | 1.18 | - | 1.21 | <0.001 | 0.08 |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| ***(c) Women*** |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1: Lowest income quintile | 6,808 | 1.53 | 1.40 | - | 1.66 |   | 400,060 | 1.77 | 1.74 | - | 1.79 |   | <0.001 |
| 2: 2nd income quintile  | 12,329 | 1.27 | 1.17 | - | 1.37 |   | 478,955 | 1.42 | 1.40 | - | 1.43 |   | 0.01 |
| 3: 3rd income quintile  | 8,513 | 1.13 | 1.04 | - | 1.23 |   | 364,486 | 1.19 | 1.18 | - | 1.21 |   | 0.25 |
| 4: 4th income quintile  | 5,974 | 1.09 | 0.99 | - | 1.19 |   | 273,239 | 1.09 | 1.08 | - | 1.11 |   | 0.92 |
| ***(a) Both men and women*** |  |  |  |  |  |   |   |   |   |   |   |   |   |
| 2: Executive management | 4,097 | 0.93 | 0.85 | - | 1.01 |   | 131,429 | 0.98 | 0.97 | - | 1.00 |   | 0.18 |
| 3: Medium-skilled employment | 13,129 | 1.11 | 1.06 | - | 1.17 |   | 525,706 | 1.22 | 1.21 | - | 1.23 |   | <0.001 |
| 4: Basic-skilled employment | 39,655 | 1.21 | 1.16 | - | 1.26 |   | 1,468,691 | 1.42 | 1.41 | - | 1.43 |   | <0.001 |
| 5: Self-employed | 5,753 | 1.22 | 1.14 | - | 1.30 |   | 142,623 | 1.37 | 1.35 | - | 1.39 |   | <0.001 |
| 6: Unskilled Employment | 8,996 | 1.38 | 1.31 | - | 1.45 |   | 339,689 | 1.83 | 1.81 | - | 1.85 |   | <0.001 |
| 7: Unemployed | 1,510 | 1.60 | 1.45 | - | 1.75 |   | 39,987 | 2.45 | 2.40 | - | 2.50 |   | <0.001 |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| ***(b) Men*** |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2: Executive management | 3,301 | 0.86 | 0.77 | - | 0.95 | 0.03 | 95,481 | 0.95 | 0.93 | - | 0.97 | 0.03 | 0.06 |
| 3: Medium-skilled employment  | 6,745 | 1.01 | 0.94 | - | 1.09 | <0.001 | 221,016 | 1.19 | 1.18 | - | 1.21 | <0,001 | <0.001 |
| 4: Basic-skilled employment  | 23,635 | 1.09 | 1.03 | - | 1.16 | <0.001 | 793,386 | 1.35 | 1.34 | **-** | 1.37 | <0,001 | <0.001 |
| 5: Self-employed | 4,489 | 1.14 | 1.05 | - | 1.24 | 0.14 | 99,752 | 1.32 | 1.29 | - | 1.34 | <0,001 | <0.001 |
| 6: Unskilled employment | 4,443 | 1.22 | 1.12 | - | 1.32 | <0.001 | 160,987 | 1.90 | 1.87 | - | 1.93 | <0,001 | <0.001 |
| 7: Unemployed | 353 | 1.76 | 1.45 | - | 2.14 | 0.53 | 16,214 | 2.58 | 2.48 | - | 2.68 | 0.01 | <0.001 |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| ***(c) Women*** |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2: Executive management | 796 | 0.99 | 0.84 | - | 1.16 |   | 35,948 | 0.98 | 0.96 | - | 1.01 |   | 0.98 |
| 3: Medium-skilled employment  | 6,384 | 1.21 | 1.13 | - | 1.30 |   | 304,690 | 1.24 | 1.22 | - | 1.25 |   | 0.52 |
| 4: Basic-skilled employment  | 16,020 | 1.32 | 1.25 | - | 1.40 |   | 675,305 | 1.47 | 1.46 | - | 1.48 |   | <0.001 |
| 5: Self-employed | 1,264 | 1.27 | 1.13 | - | 1.43 |   | 42,871 | 1.39 | 1.36 | - | 1.42 |   | 0.14 |
| 6: Unskilled employment | 4,553 | 1.52 | 1.42 | - | 1.64 |   | 178,702 | 1.81 | 1.79 | - | 1.84 |   | <0.001 |
| 7: Unemployed | 1,157 | 1.64 | 1.47 | - | 1.83 |   | 23,773 | 2.43 | 2.37 | - | 2.49 |   | <0.001 |
| **Notes** |  |
| Using the **highest income quintile** and **high-skilled employment** as reference we calculated the social gradient in filled antidepressant prescriptions among people with and without diabetes respectively.N: Number of unique individualsP-values when comparing risk ratios: Two-sided t-tests of log-risk ratios |

 Calculation of risk ratios was adjusted for age, time in the dataset with and without diabetes and, when calculating for the whole population, sex