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# Human service work, gender and antidepressant use: A nationwide register-based 19-year follow-up of 752 683 women and men

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## Abstract

**Objectives:** To examine antidepressant use among male and female human service professionals.

**Methods:** A random sample of individuals between 25 and 54 years old (N=752 683; 49.2% women; mean age: 39.5 years). Information about each individual's filled antidepressant prescriptions from 1995 to 2014 was provided by the Social Insurance Institution. First, antidepressant use in five broad human service categories was compared to that in all other occupations grouped together, separately for men and women. Then, each of the 15 human service professions were compared to all other occupations from the same skill/educational level (excluding other human services professions). Cox models were applied and the results are presented as hazards ratios (HR) for antidepressant use with 95% confidence intervals (CIs).

**Results:** The hazard of antidepressant use was higher among men working in human service versus all other occupations with the same skill/occupational level (1.22, 95% CI 1.18 to 1.27), but this was not the case for women (0.99, 95% CI 0.98 to 1.01). The risks differed between professions: male health and social care professionals (including medical doctors, nurses, practical nurses, and home care assistants), social workers, child care workers, teachers and psychologists had a higher risk of antidepressant use than men in non-human service occupations, whereas customer clerks had a lower risk.

**Conclusions:** Male human service professionals had a higher risk of antidepressant use than men working in non-human service occupations. Gendered socio-cultural norms and values related to specific occupations as well as occupational selection may be behind the elevated risk.

**What is already known about this subject?**

- Human service professionals have high emotional demands at work and they are at a higher risk of antidepressant use.

**What are the new findings?**

- Hazard of antidepressant use was higher among men working in human service versus men in non-human service occupations in the same skill/occupational level.
- When looking at all human service professionals together, even if the overall prevalence of antidepressant use was higher among women than men, the corresponding risk for these women was not significantly different from the female population working in non-human service occupations.

**How might this impact on policy or clinical practice in the foreseeable future?**

- The nature of face-to-face interaction, and the emotional labour associated with it, seems to influence mental health outcomes through gender-specific pathways.

## INTRODUCTION

Human service professions are characterised by face-to-face interaction in which the employee provides customers with health, educational, social, or commercial services [1]. Because people in these occupations (including medical doctors, nurses, practical nurses, teachers, and police officers) often work with particularly vulnerable populations, their performance is linked to experienced emotions [2]. As such, these professionals engage frequently in emotional labour. They have to suppress their own feelings to “sustain the outward countenance that produces the proper state of mind in others” [3]. This can easily create unbalanced relationships which can result in the depletion of one’s emotional resources and increase the risk of depressive symptoms [4]; [5]. Indeed, high emotional demands associated with direct client interaction have been linked to affective and stress related disorders [6]; [7]. However, epidemiological studies on the relationship between emotionally demanding work and the leading mental disorder, depression, have mainly relied on cross-sectional data and self-reported measurements [8]; [9], which are subject to response bias and the risk of reverse causality.

Emotional demands associated with each occupation have been shown to be gendered [10]. Related to gendered social roles and labour market structures, women are more often employed in the emotionally demanding human service professions. Tasks involving professional caring and empathising are often typical for female-dominated occupations and less typical for male occupations [11], and women are generally more engaged in emotional labour [3]; [12]; [13]. Therefore, it can be expected that men working in emotionally demanding human service professions may have somewhat different social position and behavioural tendency when compared with their female counterparts. For instance, male nurses have been found to emphasise task-oriented behaviours, instead of people-oriented behaviours, to shape their work role to be more masculine [14]. The burden of the emotionally taxing occupation may also have adverse gender-specific impacts on mental well-being. In fact, sparse survey results on male nurses point to rather poor job satisfaction [15], and a tendency to view their job as a “dead end job” [16].

To overcome the limitations associated with cross-sectional designs and self-reported measurements, recent studies have used register-based data to investigate mental health in human services professionals [1]; [17]; [18]; [19]. Yet, from the perspective of gendered

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3 working life and occupational hazards these studies also have limitations. Their findings are  
4 either restricted to specific occupational groups [19], limited to one gender [17], or the  
5 studies have used short follow-ups [1]; [18]. To fill these gaps, our long-term study uses  
6 register data for antidepressant prescriptions for a large representative sample of the Finnish  
7 working-age women and men with an exceptionally long follow-up period (1995-2014), and  
8 with a comprehensive set of occupational groups. Our hypothesis is that human service  
9 professionals have a higher risk of antidepressant use than those working in other occupations  
10 with the same skill/educational level due to the emotional demands associated with their  
11 professions. These impacts might be more pronounced among male than female human  
12 service professionals.  
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## 20 **METHODS**

### 21 **Study population**

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27 We obtained a randomly selected 33% sample of the 18-64 years old permanent residents of  
28 Finland in 1994 from the Population Register maintained by Statistics Finland. For this study,  
29 we included individuals between 25 and 54 years old (N=752 683; 49.2% women; mean age:  
30 39.5). This age group was used as the younger professionals would just have entered the  
31 profession, whereas those older than 54 years old would retire at some point during the  
32 follow-up thereby reducing their exposure time to emotional demands related to their work.  
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### 38 **Exposure**

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42 The Finnish Population Register maintained by the Statistics Finland includes occupational  
43 class for each individual in our data at the end of 1994. The occupations are classified  
44 according to the 2001 International Standard Classification of Occupations codes (ISCO). If  
45 the person was not employed at this time, he/she did not have occupation and became  
46 excluded. To define emotionally demanding work, we identified 21 occupational groups  
47 related to human service. The criteria for emotional labour was that the job tasks involved  
48 face-to-face interaction in which the employee provides customers with health, educational,  
49 social, or commercial services [1]. Professions with small numbers of individuals were  
50 grouped together with broader occupational categories based on similar job tasks. For  
51 instance, “Midwives” was grouped together with the category “Nurses”. Occupations with  
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low numbers that could not be grouped in any larger occupational categories were excluded (prison guards, firefighters, foreign exchange traders, and auditors). The resulting 15 occupational groups were further grouped into five larger human service categories following Wieclaw et al. [1] classification: health professionals; educational professionals; social workers; customer services workers; and miscellaneous (including police officers and psychologists).

### **Outcome**

Information about each individual's filled antidepressant prescriptions (i.e. antidepressant use) (Anatomical Therapeutic Chemical (ATC) code N06A[20]) from 1995 to 2014 was provided by the Social Insurance Institution (SII) that maintains the Finnish Prescription Register. This register includes dates of all drug purchases reimbursed to Finnish residents in non-institutional settings. Mean follow-up time until the first antidepressant use was 15.2 (minimum 0.1 – maximum 19.0) years.

### **Covariates**

Information about possible confounders was obtained from the Population Register. For each individual we included sex, age, marital status (married, single, divorced, and widowed), income (higher or lower than 17 691 euros/year), level of education (a university degree vs. not), place of residence (Uusimaa vs. other counties), and unemployment status (being unemployed for more than one month at baseline or not).

### **Statistical analysis**

Cox proportional hazards regression models were used for data analysis (PHREG procedure, SAS version 9.4, SAS institute Inc, Cary, NC, USA). Results are presented as hazard ratios (HR) for antidepressant use with 95% confidence intervals (CIs). Individuals were followed-up from the 1st Jan 1995 until the first purchase of antidepressants, death, or 31st Dec 2014, whichever occurred first.

Antidepressant use in the five broad human service categories was first compared to that in all other occupations grouped together. Then each of the 15 human service occupations were

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3 compared to all other occupations from the same skill/educational level (excluding other  
4 human service professions from the reference group). The similarity of skills was determined  
5 by the first character of the 4-digit ISCO code, which defines broader occupational classes.  
6 For instance, the ISCO code for medical doctors is 2221, the first character '2' refers to  
7 'specialists', which includes professions like architects, engineers, business specialists,  
8 among others. All non-human professions whose first character was "2", representing the  
9 same skill-level, served as the reference group for medical doctors. The code for practical  
10 nurses is 5132, other human service professions that also have '5' as the first character  
11 (referring to 'service, sales, and nursing staff') are sellers and retailers, protection and  
12 security employees, among others. All non-human professions whose first character was "5"  
13 served as the reference group for these professions. This procedure was used to reduce the  
14 influence of other work stress factors related to different occupational status groups. The  
15 models were adjusted for age, marital status, income, educational level, place of residence  
16 and baseline unemployment.  
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## 26 27 RESULTS

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30 The distribution of human service professionals and the proportions of those with at least one  
31 antidepressant purchase during the follow-up by gender are shown in Table 1. Around 11%  
32 of the entire sample (N=752 683) were employed in human service professions (n=85 849).  
33 Among human service professionals, health professionals, educational professionals, and  
34 customer services were the largest groups. Women were more predominantly featured in  
35 these professions than men; 85% of all human service professionals were women. Women  
36 had used antidepressants more often than men: in human service professionals, 34% of  
37 women had at least one antidepressant medication purchase during the follow-up compared to  
38 27% of men. About 19% of the study participants who had purchased antidepressants had  
39 only one purchase during the follow-up while the majority had two or more anti-depressant  
40 purchases.  
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50 **Table 1.** Distribution of human service professionals among male and female employees and the  
51 proportions of those with at least one antidepressant purchase during the follow-up (n=752 683)

<i>Men</i>	<i>At least 1 antidepressant</i>	<i>Women</i>	<i>At least 1 antidepressant</i>



	<i>N</i>	<i>purchase</i> <i>N (%)</i>	<i>N</i>	<i>purchase</i> <i>N (%)</i>
<b>All employees</b>	382 315	93 211 (24)	370 368	127 054 (34)
<b>All human service</b>	12 497	3343 (27)	73 352	24 581 (34)
Health professionals	4175	1277 (31)	31 677	10 937 (35)
Education professionals	4106	982 (24)	22 942	7226 (32)
Social workers	933	333 (36)	4547	1741 (38)
Customer services	1551	337 (22)	12 927	4244 (32)
Miscellaneous	1732	414 (24)	1259	433 (34)
<b>Others</b>	369 818	89 868 (24)	297 016	102 473 (34)

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3 Table 2 presents the socio-demographic characteristics of the human service professionals  
4 and the hazards of antidepressant use by those characteristics. A higher proportion of women  
5 had a high education compared to men (52% and 38%, respectively). However, men had  
6 higher incomes: 85% of the male population earned more than 17 691 euros per year,  
7 whereas the corresponding figure was only 60% for women. Men in the human service  
8 occupations were on average 39.5 (SD=8.3) years old, while the mean age among all  
9 employed men in our data was 39.5 (SD=8.3) years. The proportion of men with university  
10 degree among the human service professionals was 62% and among all employed men 47%.  
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17 As Table 2 further shows, being divorced and being widowed were associated with an  
18 increased hazard of antidepressant use among human service professionals (HR 1.39, 95% CI  
19 1.36 to 1.41 for divorced men; and HR 1.46, 95% CI 1.43 to 1.49 for divorced women).  
20 Having high income and being unemployed at baseline were associated with an increased use  
21 of antidepressants in both genders, whereas living outside of Uusimaa and having a university  
22 degree were associated with a slightly decreased hazard. The results of each category were  
23 adjusted for the other sociodemographic characteristics.  
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**Table 2.** Socio-demographic characteristics and antidepressant use in human service professionals by gender (n=85 849)

	<i>Men N</i>	<i>At least 1 antidepressant purchase N</i>	<i>HR (95% CI)* for antidepressant purchase</i>	<i>Women</i>	<i>At least 1 antidepressant purchase N (%)</i>	<i>HR (95% CI)* for antidepressant purchase</i>
<b>Marital status</b>						
Single	2935	753	1.00	15051	4866	1.00
Married	8599	2232	0.97 (0.96 to 0.98)	49320	15911	0.99 (0.97 to 1.00)
Divorced	918	346	1.39 (1.36 to 1.41)	7850	3399	1.47 (1.44 to 1.49)
Widow/widower	45	12	1.24 (1.12 to 1.37)	1131	405	1.21 (1.16 to 1.26)
<b>Educational level</b>						
No university degree	7700	2035	1.00	35382	11650	1.00
University degree	4797	1308	0.98 (0.96 to 0.99)	37970	12931	0.97 (0.96 to 0.98)
<b>County</b>						
Uusimaa	3513	952	1.00	21513	7672	1.00
Other counties	8984	2391	0.92 (0.90 to 0.93)	51839	16909	0.89 (0.88 to 0.90)
<b>Income (€)†</b>						
<17691	10565	2786	1.00	43648	14409	1.00
≥17691	1932	557	1.22 (1.20 to 1.24)	29704	10172	1.08 (1.07 to 1.10)
<b>Unemployment at baseline</b>						
<1 month	293620	66868	1.00	292631	97357	1.00

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≥ 1 month	88695	23343	1.23 (1.21 to 1.25)	77737	29697	1.15 (1.14 to 1.17)
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\*Adjusted for the other sociodemographic characteristics; † income at baseline

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Table 3 presents the hazards of antidepressant use in the five broad categories of human service professions compared to all other occupations from the same skill/educational level. The adjusted HR for antidepressant use in all human service professionals together was 1.22 for men (95% CI 1.18 to 1.27), and 1.00 for women (95% CI 0.98 to 1.01) when compared to non-human service employees. In both women and men, social workers had an increased risk (HR 1.62; 95% CI 1.46 to 1.81 for men and HR 1.19; 95% CI 1.13 to 1.24 for women). In education professionals, men had a slightly higher hazard for antidepressant use (HR 1.09; 95% CI 1.03 to 1.16) when compared to non-human service employees, while the opposite was observed for women (HR 0.92; 95% CI 0.90 to 0.95).

**Table 3.** Hazard ratios (HR, 95% confidence intervals) for antidepressant use in the five broad human service profession categories, by gender.

	<i>Men</i>		<i>Women</i>	
	<i>HR (95% CI)*</i>	<i>HR (95% CI)**</i>	<i>HR (95% CI)*</i>	<i>HR (95% CI)**</i>
<b>Non-human service†</b>	1.00	1.00	1.00	1.00
<b>All human service</b>	1.09 (1.05 to 1.13)	1.22 (1.18 to 1.26)	0.95 (0.94 to 0.96)	1.00 (0.98 to 1.01)
Health professionals	1.28 (1.21 to 1.35)	1.41 (1.34 to 1.49)	0.99 (0.97 to 1.01)	1.04 (1.02 to 1.06)
Education professionals	0.96 (0.90 to 1.02)	1.09 (1.03 to 1.16)	0.88 (0.86 to 0.90)	0.92 (0.90 to 0.95)
Social workers	1.56 (1.40 to 1.74)	1.62 (1.46 to 1.81)	1.13 (1.08 to 1.19)	1.19 (1.13 to 1.24)
Customer services	0.87 (0.78 to 0.97)	0.95 (0.85 to 1.06)	0.93 (0.90 to 0.96)	0.97 (0.94 to 1.00)
Miscellaneous	0.95 (0.86 to 1.05)	1.12 (1.02 to 1.23)	0.99 (0.90 to 1.09)	1.04 (0.95 to 1.15)

\* Unadjusted

\*\* Adjusted for marital status, educational level, county, income, and unemployment

† All other occupations from the same skill/educational level

Gender differences could be seen when we look at the 15 specific human service professions separately (see Supplemental Table 1 for the unadjusted results, and Table 4 for the adjusted

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3 results). Elevated hazards for antidepressant use for both men and women were found for the  
4 following professions: medical doctors, practical nurses, home care assistants, child care  
5 workers, social workers, social care workers and special education teachers. In general,  
6 however, the associations were stronger in men and the strongest association was found for  
7 male social workers (HR 2.10; 95% CI 1.80 to 2.46). Among primary school teachers, the HR  
8 for antidepressant use was 1.11 (95% CI 1.01 to 1.24) in men, and 0.91 (95% CI 0.85 to 0.97)  
9 in women. The risk for antidepressant use was also increased among male nurses (HR 1.55;  
10 95% CI 1.32 to 1.81), but not in female nurses, and in male (HR 1.36; 95% CI 1.08 to 1.73)  
11 but not female psychologists. In addition, women police officers had an increased risk of  
12 antidepressant use. On the other hand, male service clerks and women in travel services had a  
13 lower hazard of antidepressant use (0.85; 95% CI 0.74 to 0.97 and 0.82; 95% CI 0.69 to 0.98,  
14 respectively). We also performed sensitivity analyses and modelled the risk of having more  
15 than one purchase (a proxy for repeated antidepressant use). All main results remained highly  
16 similar, the hazard ratio became statistically non-significant only among men working as  
17 special education teachers (HR 1.20, 95% CI 0.94-1.53) and psychologists (HR 1.27, 95% CI  
18 0.97-1.66).  
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**Table 4.** Adjusted hazard ratios (HR, 95% confidence intervals) of antidepressant use in human service professions when compared to non-human service employees at the same skill/educational level, by gender.

		Men			Women		
<i>Code</i>	<i>Job title</i>	<i>N/Events</i>	<i>HR*</i>	<i>95% CI</i>	<i>N/Events</i>	<i>HR*</i>	<i>95% CI</i>
<b>Health professionals</b>							
2221	Medical doctors <sup>†</sup>	2033/587	1.43	1.31 to 1.56	1967/691	1.13	1.04 to 1.22
323	Nurses <sup>^‡</sup>	509/158	1.55	1.32 to 1.82	12225/3998	1.03	0.99 to 1.07
5132	Practical nurses <sup>¶</sup>	1358/449	1.57	1.42 to 1.75	11881/4148	1.17	1.13 to 1.22
5133	Home care assistants <sup>¶</sup>	275/83	1.49	1.20 to 1.86	5604/2100	1.30	1.24 to 1.36
<b>Education professionals</b>							
2321	Sec. school teachers <sup>†</sup>	1955/446	1.08	0.98 to 1.19	4810/1468	0.93	0.88 to 0.99
2331	Prim. school teachers <sup>†</sup>	1601/382	1.15	1.03 to 1.27	3544/1037	0.91	0.85 to 0.97
2332	Pre-school teachers	125/31	1.20	0.84 to 1.71	2866/884	0.98	0.91 to 1.05
2340	Special education teachers <sup>†</sup>	322/83	1.23	0.99 to 1.52	836/305	1.14	1.02 to 1.28
5131	Child-care workers <sup>¶</sup>	103/40	1.72	1.25 to 2.36	10886/3532	1.07	1.03 to 1.12
<b>Social workers</b>							
2446	Social workers <sup>†</sup>	396/161	2.11	1.80 to 2.47	2393/929	1.27	1.18 to 1.36
3460	Social care workers <sup>^^‡</sup>	537/172	1.57	1.35 to 1.83	2154/812	1.23	1.14 to 1.32
<b>Customer services</b>							
42	Service clerks <sup>§</sup>	1128/241	0.85	0.75 to 0.98	12246/4104	0.99	0.95 to 1.03
511	Travel services <sup>¶</sup>	423/96	1.06	0.86 to 1.31	481/140	0.83	0.70 to 0.98
<b>Miscellaneous</b>							
2445	Psychologists <sup>^^^†</sup>	246/69	1.36	1.08 to 1.73	1131/381	1.04	0.94 to 1.15
5162	Police officers <sup>¶</sup>	1486/345	1.05	0.93 to 1.19	128/52	1.40	1.06 to 1.84

<sup>^</sup>Includes both '3231: Nurses' and '3232: Midwives'

<sup>^^</sup>Includes both '3443: Social benefit administrators' and '3460: Social care workers'

<sup>^^^</sup>Includes both '2412: Counsellors' and '2445: Psychologists'

\* Adjusted for marital status, educational level, county, income, and unemployment

† Medical doctors, secondary school teachers, primary school teachers, pre-school teachers, special education teachers, social workers, and psychologists were compared to all non-human services

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3 occupations whose ISCO code starts with 2 (e.g. business, legal, and engineering professionals)

4 ‡ Nurses and Social care workers were compared to all non-human services occupations whose ISCO  
5 code starts with 3 (e.g. finance and sales technicians)

6 § Service clerks were compared to all non-human services occupations whose ISCO code starts with 4  
7 (e.g. secretaries and insurance clerks)

8 ¶ Practical nurses, Home care assistants, Child-care workers, Travel services, and Police officers were  
9 compared to all non-human services occupations whose ISCO code starts with 5 (e.g. sales persons and  
10 demonstrators)  
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## DISCUSSION

In this large register-based study, we found that particularly male human service professionals were at a higher risk of antidepressant use than their counterparts within the same occupational grade but working in non-human service occupations. Male health professionals and social workers had the most increased risks. However, it is important to note that the prevalence of psychological distress and depression in the overall population is generally higher among women than men [21]; [22]. Thus, although the prevalence of antidepressant use among female nurses, and education professionals was higher than that of their male counterparts, the corresponding risk for these employees was not significantly different from the overall female population with a similar skill/educational background.

It has been argued that occupations in which one of the genders is in minority are associated with a higher risk of poor mental health [23]; [24]; however, this distinction does not account for all the differences found. For instance, although male customer service employees were also a gender minority, they were found to have a lower risk of antidepressant use than their counterparts with similar skill/educational background. One reason for this can be that male customer services employees might have been subjected to work stress factors that are also common to non-human service occupations. What essentially differentiates these occupational groups where gender minorities are common is that health and social care professionals, education professionals and social workers are more likely to be exposed to compassion fatigue, that is, the emphatic exhaustion associated with the care of clients [25]. Accordingly, the emphatic engagement of health and social care professionals with their patients and clients may make these employees more prone to develop vicarious traumatisation, burnout syndrome, secondary traumatic stress, compassion fatigue, and traumatic counter transference [26]; [27]; [28]. Thus, our findings suggest the higher risk of antidepressant use in human service professionals is specifically related to the nature of face-to-face interaction and the emotional demands associated with it.

Because personality traits are important determinants of occupational choices [29] as well susceptibility to depression [30], a competing explanation is that men selected into human services are more prone to develop mental illness to begin with [1], regardless of the emotional demands associated with their tasks. However, to the best of our knowledge, no

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3 previous studies have addressed the relationship between personality traits, occupational  
4 choices, and susceptibility to depression. Neither had different studies addressing only one of  
5 these characteristics observed results that could suggest a converging point. For instance,  
6 high levels of openness/intellect are associated with counter gender-stereotypical  
7 occupational choices [29], whereas high neuroticism, low extraversion, and conscientiousness  
8 are linked to depression [30]. Although occupational selection may affect our results, it is not  
9 possible to evaluate its magnitude from register-based data.  
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15 It is well-known that externalising disorders, defined by antisocial behaviour and substance  
16 abuse are considerably at a higher level among men than women [30]. Especially in the  
17 masculine occupational cultures (e.g., metal industry) behavioural patterns are more inclined  
18 towards non-psychological coping strategies [30]. This may also lead to the underuse of  
19 antidepressants among men working in non-human service occupations. Female professional  
20 cultures may also explain our findings (2); (15); (16); (17). Male doctors, nurses, teachers,  
21 and social workers are subjected to a female type of occupational culture, which entail certain  
22 behavioural standards and social norms. Among male employees who work in the female  
23 dominated sector this may lead to the development of occupation/organization-specific  
24 coping methods (i.e. the use of antidepressants) closer to the average of the female rather than  
25 the average male population. Men who work in the female dominated professions of caring  
26 and empathy may therefore treat themselves in a more feminine way. This may partly explain  
27 the high risk of antidepressant use among men working in some human service occupations  
28 when compared with other men working in non-human service occupations. However, there  
29 may also be occupational selection effects.  
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### 41 **Strengths and limitations**

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44 The main strengths of our study include the use of nationally representative register data for  
45 antidepressant prescriptions with an exceptionally long follow-up period (1995-2014), and a  
46 comprehensive set of occupational groups. The use of self-administered questionnaires is  
47 subject to misclassification bias [8], but the use of register data reduces this risk since  
48 purchase of antidepressant medication is only possible with a clinical diagnosis. Having a  
49 comprehensive set of occupational groups allowed us to assess the risk of antidepressant use  
50 in different human service professions compared to all other non-human service occupations  
51 with same skill/educational level together. This is an important addition to the literature as it  
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3 allowed us to discuss how the emotional demands of different occupations are associated  
4 with antidepressant use. In addition, by including only occupations from the same  
5 skill/educational level in the reference group we reduced the influence of work stress factors  
6 that are not directly associated with emotional demands.  
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10 Despite these strengths, our study also had some limitations. First, we used antidepressant use  
11 as a proxy for depression, however, even if the main indication of antidepressant use is  
12 depression, they are increasingly prescribed to treat other conditions such as anxiety,  
13 insomnia, and chronic pain [15]. Second, we cannot infer from the purchase of antidepressant  
14 that individuals are effectively adhering to the medication. Whereas our dependent variable  
15 was at least one antidepressant purchase during the follow-up, it has been found that up to  
16 50% of the patients may discontinue the treatment prematurely [31] [32]. Third, the  
17 occupation of each individual was determined at the start of the follow-up period and possible  
18 changes could not be traced.  
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## 26 27 **CONCLUSIONS**

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30 In this large-scale register study, we found that people working in occupations that contain  
31 human service are at increased risk of antidepressant use. The risks, however, differed  
32 between occupations and between women and men, the relative risks being the highest  
33 among male social workers when compared to the overall male population with same  
34 skill/educational level that do not work in human service. Although the incidence of  
35 antidepressant use was higher among women in human services professions, it was not  
36 significantly different from the overall female population. The nature of face-to-face  
37 interaction, and the emotional labour associated with it, seems to influence mental health  
38 outcomes through gender-specific pathways. For instance, while male social workers and  
39 health professionals had higher risks of antidepressant use, customer service employees had  
40 lower risks. In addition, being in a gender minority might also be associated with the  
41 observed higher risk of antidepressant use. Finally, the role of gender-specific occupational  
42 culture on antidepressant use provides an additional interpretation for our results.  
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## 52 53 **A COMPETING INTEREST DECLARATION**

All authors have completed the Unified Competing Interest form at [www.icmje.org/doi\\_disclosure.pdf](http://www.icmje.org/doi_disclosure.pdf) (available on request from the corresponding author) and declare that (1) AV has support from the Academy of Finland and AKou has support from the Economic and Social Research Council (ESRC) and the Medical Research Council (MRC); (2) AV has no relationships with the Academy of Finland and AKou has no relationships with the ESRC or MRC that might have an interest in the submitted work in the previous 3 years; (3) their spouses, partners, or children have no financial relationships that may be relevant to the submitted work; and (4) AB, AKou, LK, JIH, AKos and AV have no non-financial interests that may be relevant to the submitted work.

### **DETAILS OF CONTRIBUTORS**

AB, AKou, LK, JIH, AKos and AV conceived and designed the experiments, AB and AKos analysed the data, AKos and AV contributed to data collection. AV is the guarantor of the study. All authors were involved in writing the paper and approved the submitted and published versions.

### **ETHICS APPROVAL**

The study was approved by the ethics committee of the Finnish Institute of Occupational Health.

### **FUNDING**

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### **A TRANSPARENCY DECLARATION**

The corresponding author (AKou) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

## DATA SHARING

Because of legal reasons, we are unable to deposit the register data used in the present study with an open data repository. Interested researchers need to obtain these register data directly from the relevant data custodians: the Social Insurance Institution (SII) of Finland and Statistics Finland.

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## APPENDIX

Supplemental Table S1. Crude hazard ratios (HR) of antidepressant use in human service professions

Code	Job title	N/Events	Men			Women		
			HR*	95% CI	N/Events	HR*	95% CI	
<b>Health Professionals</b>								
2221	Medical doctors	2033/587	1.39	1.27 to 1.51	1967/691	1.09	1.01 to 1.18	
3231^	Nurses	509/158	1.49	1.27 to 1.74	12225/3998	1.01	0.97 to 1.04	
5132	Practical nurses	1358/449	1.59	1.44 to 1.76	11881/4148	1.17	1.13 to 1.21	
5133	Home care assistants	275/83	1.55	1.25 to 1.93	5604/2100	1.29	1.24 to 1.36	
<b>Education professionals</b>								
2321	Sec. school teachers	1955/446	1.07	0.97 to 1.18	4810/1468	0.93	0.88 to 0.98	
2331	Prim. school teachers	1601/382	1.11	1.00 to 1.24	3544/1037	0.88	0.82 to 0.94	
2332	Preschool teachers	125/31	1.15	0.81 to 1.64	2866/884	0.92	0.85 to 0.98	
2340	Special education teachers	322/83	1.26	1.01 to 1.56	836/305	1.15	1.02 to 1.29	
5131	Child-care workers	103/40	1.84	1.35 to 2.52	10886/3532	1.07	1.03 to 1.11	
<b>Social workers</b>								
2446	Social workers	396/161	2.18	1.86 to 2.55	2393/929	1.24	1.16 to 1.33	
3460	Social care workers^^	537/172	1.56	1.34 to 1.82	2154/812	1.22	1.14 to 1.31	
<b>Customer services</b>								
42	Service clerks	1128/241	0.82	0.72 to 0.93	12246/4104	0.95	0.92 to 0.99	

511	Travel services	423/96	1.07	0.87 to 1.31	481/140	0.89	0.75 to 1.05
<b>Miscellaneous</b>							
2445	Psychologists <sup>^^</sup>	246/69	1.36	1.08 to 1.73	1131/381	1.06	0.95 to 1.17
5162	Police officers	1486/345	1.04	0.93 to 1.16	128/52	1.36	1.04 to 1.79

<sup>^</sup>Includes both '3231: Nurses' and '3232: Midwives'

<sup>^^</sup>Includes both '3443: Social benefit administrators' and '3460: Social care workers'

<sup>^^^</sup>Includes both '2412: Counsellors' and '2445: Psychologists'

\* No adjustments

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## APPENDIX

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<i>Code</i>	<i>Job title</i>	<i>N/Events</i>	<b>Men</b>			<b>Women</b>		
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\* No adjustments

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