

ORIGINAL ARTICLE

Risk of affective and stress related disorders among employees in human service professions

J Wieclaw, E Agerbo, P B Mortensen, J P Bonde

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See end of article for authors' affiliations

Correspondence to:
Dr J Wieclaw, Department of Occupational Medicine, Aarhus University Hospital, Noerrebrogade 44, building 2C, DK-8000 Aarhus C, Denmark; jwiec@as.aaa.dk

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Objectives: To examine the risk of affective and stress related disorders among men and women employed in human service professions.

Methods: Population based case-control study using data from national registers. Cases (n = 28 971) were identified in the Danish Psychiatric Central Research Register among all hospitalised patients and outpatients aged 18–65 who received a first time ever diagnosis of affective (ICD-10, F30–39) or stress related (ICD-10, F40–48) disorder from 1 January 1995 to 31 December 1998. Each case was assigned five never admitted referents (n = 144 855) of the same gender and age, randomly drawn from a 5% sample of the Danish population obtained from Statistics Denmark's Integrated Database for Labour Market Research. Occupation held the year before matching was classified according to the Danish version of the International Classification of Occupation. Health care, education, social work, and customer services were defined as human service professions and constituted 21% of all employed in the study. Adjusted risks (hazard ratios) relative to all other occupations were calculated for 24 human service occupations.

Results: The relative risk of depression in human service professions was 1.35 (95% CI 1.24 to 1.47) for women and 1.49 (95% CI 1.29 to 1.73) for men. The risk of stress was 1.18 (95% CI 1.11 to 1.26) for women and 1.49 (95% CI 1.32 to 1.67) for men. Specific professions contributed differentially to the magnitude of risk, with education and social services displaying the highest risks. No increase in risks was found in customer service occupations. Gender was a significant modifying factor with the highest risk levels in men.

Conclusions: There was a consistent association between employment in human service occupations and the risk of affective and stress related disorders. Risks were highest for men working in these typically female professions. More work is needed to distinguish work hazards from effects attributable to selection mechanisms and personality characteristics.

Depression and stress related disorders account for about 40% of incident psychiatric cases referred for inpatient or outpatient treatment in Danish hospitals.¹ The risk for such disorders is associated with female gender, family history of mental health problems, and low socioeconomic status, and with certain kinds of employment or occupation.^{2–4} About one third of the European working population, including the Danish, is employed in occupations providing service, education, or healthcare for other people. Such human service encounters involve particular exposures and associated risks of mental health problems different from those known in industrial settings. Risks pertain, in particular, to emotional demands, exposure to threats and violence, high responsibility, and job complexity.^{5–7}

Many studies have reported increased distress, anxiety, depression, and burnout in human service professions, and a number of studies have also shown high levels of symptoms in non-human service professions.^{5–14} Most investigate a particular occupation or sector, are cross-sectional, and do not use a reference group, which impedes determination of the magnitude of risks and cross-occupational comparison. Earlier study of occupational risk of affective and stress related disorders in the Danish working population has shown the increased risks of affective and stress related disorders in social workers and female teachers, health professionals, and unskilled workers.¹⁵

Few studies have compared mental health problems in human service and non-human service professions.^{6–16} The Norwegian Hordaland Health study showed no differences in mental health between professionals performing personal

services and those performing other forms of work. However, another study identified an inverse relationship between occupational skill levels and anxiety and depression.^{17–18}

Human service employees are, with some exceptions (police, prison staff), predominantly female, but little is known about gender differences in the risk patterns and levels.

The present study aims to investigate whether there is a higher risk of affective and stress related disorders in human service occupations than in non-human service occupations, to compare risk levels between specific human service professions and to investigate if risk profiles differ by gender.

METHODS

Register study

The present population based nested case-control study was conducted on the basis of data from two national registers: the Danish Psychiatric Central Research Register and Statistics Denmark's Integrated Database for Labour Market Research IDA.^{19–20} The IDA contains sociodemographic information on the entire Danish population, each individual's attachment to the labour market, and workplaces. Data on a person's occupation are available through the DISCO 88, a Danish version of the International Standard Classification of Occupations (ISCO 88), which has been systematically used by the IDA since 1996. This information is derived from the employers' obligatory reports of the employees' occupations to the Salary Statistics with use of the DISCO codes. The DISCO codes are subsequently

validated against information from other registers, for example, the Tax Return Register, the Education Register, and the Central Personal Register (CPR).

The Danish Psychiatric Central Research Register was established in 1938. It contains electronic records of all admissions and discharges to psychiatric hospitals or psychiatric wards in general hospitals since 1969 and data on outpatient treatments since 1995.²¹ Since there are no private psychiatric hospitals in Denmark, all admissions are included in the register. Diagnoses rest on all available information from the patient and on clinical observations made during admission and outpatient treatment. The 8th edition of the WHO International Classification of Diseases has been used until 1994 when it was replaced by the 10th edition. All entries into the Psychiatric Register are validated against clinical descriptions. A more detailed description of both registers has been given in a previous article.¹⁵

Study population

Data from the IDA and the Danish Psychiatric Central Research Register were merged, using the unique person identifier (Central Person Register number, CPR) that is assigned to each individual residing in Denmark. This procedure makes it possible to identify individuals across different registers with very high reliability, as the CPR number can be logically checked for errors.

Among all persons aged 18–65 recorded in the Psychiatric Register, cases were identified as patients who received a first time ever, since 1969, diagnosis of affective disorders (ICD-10, F30–39) or stress related conditions (ICD-10, F40–48) during the period 1 January 1995 to 31 December 1998.

Using a stratified time matched nested case-control design,²² each case was assigned five never admitted referents of the same gender and age at the time of admission. A similar design has been used in other studies of psychiatric outcomes.²³ The resulting study cohort consisted of 28 971 cases and 144 855 controls.

The 1995–98 study period was chosen to obtain complete records based on the latest edition of the WHO International Classification of Disease (ICD-8 until 1994 and ICD-10 afterwards) and to include records on outpatient treatment.

Exposure measure

The main exposure measure was the occupation (DISCO code) held the year before the matching date. In the DISCO classification system, occupations are divided into groups on the basis of skills/education level required and the type of job function actually performed. Specific occupations are hierarchically categorised at four digit levels: the narrower the job categories, the more digit numbers in a DISCO code. For the purpose of the present study, we a priori selected 24 human service professions among 372 occupations at the 4-digit

classification level. We defined human service professions as occupations involving person-to-person interaction for the purpose of providing health or social care, education, or commercial/customer service. In our selection, we followed the procedure similar to the one used in the Hordaland Health Study, which applied the Norwegian version of the ISCO and categorised occupations into personal and non-personal services.^{17 18}

The selected occupations were compiled into five broad categories according to the job contents: health professionals, teaching professionals, social and elderly care workers, customer services (service clerks and travel services), and miscellaneous (including counsellors, psychologists, special education teachers, fireman, police, and prison guards). All other occupations were grouped together as “others employed” and served as a reference group.

For the same time period we extracted for all persons, data on employment status: (1 = currently employed (wage earner, self employment, owner, helping spouse); 2 = unemployed; 3 = without attachment to the labour market (under education, early or age retirement, disability pension, or living on social benefits)) and on the extent of total unemployment during working career and sociodemographic factors.

Outcome measures

Our outcome measure was the first ever diagnosis of affective disorders (ICD-10 F30–39) or neurotic, stress related, and somatoform conditions (ICD-10 F40–48) given at the end of an outpatient treatment or on discharge from a psychiatric ward. Both diagnostic categories can, according to the WHO ICD-10 classification, be divided into several sub-diagnoses: F30–39 mainly into several forms of depressive conditions and F40–48 into various anxiety disorders. We have chosen to retain broad diagnoses, as they are believed to be more reliable.²⁴

In this paper the term depression will be used as shorthand for affective disorders and stress for stress related disorders.

Statistical analysis

Data were analysed using the Cox proportional hazards regression model for nested case-control data (PhReg procedure, SAS version 8).²⁵ We calculated incidence rate ratios (hazard ratios, HR) and 95% confidence intervals (CI) for all human service occupations grouped together, for the five broad occupational categories (health, education, social care, customer services, and miscellaneous) as well as for each of 24 human service occupations, using all other occupations as a reference group. Persons with missing DISCO 4-digit codes and currently not employed were entered in the analyses as dummy variables. All analyses were stratified by gender. Risk estimates were controlled for the main effects of gender, age, and time by stratification.

Table 1 The distribution of human service professions among all employed

	Women		Men		Total n = 12521
	Controls n = 65330	Cases n = 10438	Controls n = 42648	Cases n = 6835	
All employed					
Human service prof. all	19050	3316	3338	709	26413
Health services	9195	1709	934	225	12063
Education	7136	1212	1528	315	10191
Social workers	899	172	146	51	1268
Customer services	1661	196	305	45	2207
Miscellaneous*	159	27	425	73	684
DISCO 4-digit missing	12929	2343	10443	1889	72604
Others employed	33351	4779	28867	4237	71234

*Miscellaneous group included counsellors, psychologists, special education teachers, firemen, policemen, and prison guards.

Table 2 Sociodemographic characteristics of human service professionals (n = 26 413)

	Women			Men		
	Controls	Cases	HR adj.*	Controls	Cases	HR adj.*
Marital status						
Cohabiting	14311 (75%)	2034 (61%)	1	2413 (72%)	429 (60%)	1
Single	4739 (25%)	1282 (39%)	2.0 (1.7–2.2)	925 (23%)	280 (40%)	2.5 (1.6–5.0)
No. of children						
1 or more	10190 (53%)	1666 (50%)	1	1502 (45%)	264 (37%)	1
No children	8860 (47%)	1650 (50%)	1.1 (0.9–1.2)	1836 (55%)	445 (63%)	0.7 (0.4–1.1)
Education†						
Higher	8486 (45%)	1440 (44%)	1	1871 (56%)	387 (55%)	1
Vocational	5009 (26%)	818 (25%)	0.8 (0.7–1.0)	782 (23%)	136 (19%)	0.8 (0.5–1.5)
Basic	5533 (29%)	1052 (32%)	0.9 (0.8–1.0)	683 (21%)	185 (26%)	1.0 (0.5–1.6)
Income						
>€27 000	8299 (44%)	1304 (39%)	1	2458 (74%)	485 (68%)	1
≤€27 000	10751 (56%)	2012 (61%)	1.3 (1.2–1.5)	880 (26%)	224 (32%)	1.2 (0.7–2.0)
Citizenship						
Danish	18715 (98%)	3225 (97%)	1	3269 (98%)	679 (96%)	1
Not Danish	335 (2%)	91 (3%)	1.2 (0.9–1.7)	69 (2%)	30 (4%)	2.5 (1.2–17.2)
Total unemployed						
Low <2 years	15563 (82%)	2503 (75%)	1	2932 (88%)	586 (83%)	1
High >2 years	3487 (18%)	813 (25%)	1.3 (1.2–1.5)	406 (12%)	123 (17%)	1.1 (0.6–2.0)

*Adjusted for remaining sociodemographic variables.

†There were 31 missing values.

Additionally, we adjusted for marital status (single/not single), having children living at home (yes/no), socio-economic status (level of education and annual income), total unemployment during the working career (less/more than 2 years), and citizenship (Danish/not Danish). Finally, place of residence (town/country and a geographical location) was included in order to control for availability of mental health services.

In our paper expression “relative risk” designates the statistical term “hazard ratio” (HR).

RESULTS

In the study population, 72% (125 251) were registered as currently employed whereas 28% (48 575) were not actually employed (unemployed or without attachment to the labour market). Human service professionals constituted 21% of the employed sample and included 4025 cases and 22 388 controls. Health service and education professionals were the largest groups among the human service occupations (see table 1).

Eighty five per cent of human service professionals were women and they were on average younger than the men. Among the cases, 61% were diagnosed with stress disorder (62% of female and 58% of male cases), while 39% had received affective disorder diagnoses.

The socioeconomic characteristics of the human service sample are presented in table 2.

A greater proportion of men than women had higher education and high income among human service professionals. Case status was related to being single and in women to low income and higher than 2 years total unemployment during working career.

The relative risk (HR) of depression for all human service professions grouped together compared with the reference group of all other occupations was 1.35 (95% CI 1.24 to 1.47) for women and 1.49 (95% CI 1.29 to 1.73) for men. The relative risk of stress was 1.18 (95% CI 1.11 to 1.26) among women and 1.49 (95% CI 1.32 to 1.67) among men. These associations were modified by several sociodemographic factors. Thus, the relative risk of developing stress related conditions was higher among male than among female employees in human service occupations (interaction variable HR 1.16, 95% CI 1.03 to 1.32), while the relative risk of depression was higher among women who were over 40 years

old than among women below this age (interaction variable HR 1.22, 95% CI 1.05 to 1.41). Being single was associated with a relative risk more than twice that of those who were cohabiting (interaction variable: women: depression HR, 1.75 (95% CI 1.55 to 2.00), stress HR, 1.89 (95% CI 1.71 to 2.09); men: depression HR, 1.57 (95% CI 1.19 to 2.09), stress HR, 1.23 (95% CI 0.99 to 1.54)).

The fitted model with specific job titles was significantly better than the general human service occupations model. The results of the likelihood test statistics were highly significant regarding hazard ratios of stress in women and men and hazard ratios of depression in women (data not shown), and it was borderline significant for depression in men ($\chi^2 = 29.4$ with 19 degrees of freedom, $p = 0.059948$).

Tables 3 and 4 present the hazard ratios of depressive and stress related disorders in human service occupations according to the job held one year before being diagnosed, compared with the reference group of all employed in other occupations. The results for specific jobs in the customer services and miscellaneous groups are grouped together because of small numbers.

The relative risk (HR) spans a range from 1.14 to 3.90 with some differences in risk profiles among women and men. Significantly elevated relative risks (HR) of both disorders can be seen in the occupational groups of health professionals, and education and social workers, and in the case of stress for men in the miscellaneous group. The last result, however, is due mainly to the high risk among the rather small group of prison guards ($n = 90$, HR 2.75, 95% CI 1.22 to 6.29; result not shown). Men's relative risk levels are higher than those of women.

Women are facing significantly elevated relative risks of both disorders in six of 24 specific occupations: primary school teachers, pre-school teachers, child day care personnel, social workers, and institution and home based nurse-aids (both employed mainly in care of the elderly). Women police show the highest level of stress risk, but the result is based on very small numbers ($n = 16$, HR 3.90, 95% CI 1.33 to 11.45; result not shown). Women working with customer services have a significantly decreased risk of depression relative to non-human service professionals.

Among men, five occupational groups are facing a significantly elevated risk of both disorders: primary school teachers, child day care professionals, institution based

Table 3 Hazard ratios (HR) of affective and stress related disorders in human service occupations by 4-digit DISCO code; women

Code	Job title	Affective disorders					Stress related disorders				
		Controls	Cases	HR crude	HR adj	95% CI	Controls	Cases	HR crude	HR adj	95% CI
Health professionals		3038	702	1.60	1.56	1.41–1.73	6112	1007	1.13	1.15	1.06–1.24
2221	Medical doctor	108	18	1.11	1.38	0.83–2.32	181	11	0.40	0.60	0.33–1.12
2230	Midwife/head nurse	174	45	1.79	2.08	1.47–2.96	323	30	0.61	0.88	0.60–1.28
3231	Nursing	783	161	1.45	1.62	1.34–1.98	1633	181	0.75	1.08	0.91–1.28
5132	Nurse-aid	1445	332	1.62	1.51	1.32–1.73	3033	600	1.36	1.20	1.09–1.32
5133	Home nurse-aid	573	146	1.82	1.58	1.30–1.92	942	185	1.35	1.23	1.04–1.45
Education professionals		2358	420	1.24	1.22	1.07–1.38	4778	792	1.12	1.26	1.15–1.37
2320	Sec. school teacher	168	29	1.17	1.35	0.89–2.04	310	28	0.60	0.81	0.54–1.20
2331	Prim. school teacher	800	136	1.18	1.36	1.11–1.68	1492	222	1.01	1.38	1.18–1.62
3310	Pre school teacher	114	34	2.05	2.05	1.38–3.06	204	44	1.45	1.65	1.18–2.31
3320	Child day care prof.	575	132	1.59	1.50	1.21–1.84	1276	288	1.51	1.68	1.46–1.94
3340	Teaching associate	63	10	1.14	1.14	0.58–2.25	168	24	0.96	1.06	0.68–1.64
5131	Child care at home	638	79	0.86	0.79	0.62–1.01	11328	186	0.95	0.88	0.75–1.03
Social workers		307	67	1.48	1.47	1.11–1.95	592	105	1.18	1.47	1.18–1.83
3330	Social care worker	172	42	1.65	1.75	1.23–2.48	323	63	1.29	1.77	1.33–2.35
3443	Social benefit adm.	82	22	1.83	1.84	1.13–3.00	205	32	1.04	1.30	0.88–1.91
3460	Social worker	53	3	0.39	0.41	0.13–1.31	64	10	1.03	1.02	0.52–2.01
Customer services*		570	48	0.59	0.66	0.49–0.89	1091	148	0.92	0.98	0.82–1.17
Miscellaneous†		64	11	1.18	1.34	0.69–2.58	95	16	1.13	1.31	0.76–2.25
Not employed		8970	2511	2.19	1.75	1.61–1.89	18317	5577	2.36	1.92	1.82–2.03
DISCO 4-digit missing		3939	731	1.34	1.24	1.13–1.37	8990	1612	1.29	1.21	1.13–1.30
Ref. others employed		10739	1516	1	1		22625	3263	1	1	

*Customer group includes service clerks (DISCO 42) and travel services (DISCO 5111–5113).

†Miscellaneous group consists of counsellors (DISCO 2412), psychologists (DISCO 2445), special education teachers (DISCO 2340), firemen (DISCO 5161), policemen (DISCO 5162), and prison guards (DISCO 5163).

HRs are adjusted for marital status (single yes/no), having children (yes/no), level of education (up to vocational/higher), income level (low/high), total level of unemployment (less than 2 years/over 2 years), residence (town/province), and nationality (Danish/not Danish).

Bold type indicates hazard ratios with 95% confidence limits not including unity are not related to a priori hypothesis.

elderly care professionals (nurse-aid), social care workers, and social benefit administrators. Male social workers have the highest relative risk level.

An elevated risk of depression only can be seen among medical doctors and nurses of both sexes as well as among female midwives and social benefit administrators and among male home based nurse-aids.

DISCUSSION

Our study confirms that human service professions overall carry a significant risk of affective and stress related disorders as compared with all other occupations. Our data also indicate that specific professions contribute differentially to the magnitude of that risk. Relative risks are particularly high for teachers and social care workers providing personal care

Table 4 Hazard ratios (HR) of affective and stress related disorders in human service occupations by 4-digit DISCO code; men

Code	Job title	Affective disorders					Stress related disorders				
		Controls	Cases	HR crude	HR adj	95% CI	Controls	Cases	HR crude	HR adj	95% CI
Health professionals		325	97	1.93	1.79	1.41–2.27	609	128	1.47	1.29	1.06–1.59
2221	Medical doctor	126	39	1.96	2.10	1.44–3.06	162	10	0.40	0.57	0.30–1.09
2230	Midwife/head nurse	7	0	0	0	0	3	1	2.35	3.80	0.38–37.6
3231	Nursing	11	6	3.36	3.46	1.25–9.58	38	6	1.09	1.35	0.56–3.24
5132	Nurse-aid	171	47	1.79	1.51	1.08–2.10	369	101	1.97	1.51	1.20–1.90
5133	Home nurse-aid	10	5	3.67	3.15	1.06–9.34	37	10	1.87	1.16	0.57–2.3
Education professionals		587	123	1.37	1.31	1.06–1.61	941	192	1.42	1.68	1.42–2.00
2320	Sec. school teacher	97	17	1.09	1.13	0.67–1.90	131	20	1.07	1.45	0.89–2.35
2331	Prim. school teacher	340	72	1.34	1.38	1.05–1.81	517	87	1.16	1.67	1.31–2.13
3310	Pre school teacher	19	2	0.65	0.62	0.14–2.69	17	4	1.82	1.83	0.61–5.65
3320	Child day care prof.	51	19	2.49	2.11	1.22–3.63	121	42	2.44	2.33	1.62–3.35
3340	Teaching associate	49	7	0.91	0.90	0.40–2.01	76	17	1.53	1.38	0.80–2.36
5131	Child care at home	31	6	1.33	1.00	0.41–2.45	79	22	2.01	1.35	0.83–2.20
Social workers		55	26	2.91	2.73	1.67–4.46	91	25	1.82	2.48	1.56–3.91
3330	Social care worker	37	18	3.01	2.78	1.54–5.02	65	17	1.71	2.53	1.46–4.39
3443	Social benefit adm.	12	6	3.04	2.77	1.00–7.58	21	8	2.48	3.03	1.32–7.00
3460	Social worker	6	2	2.11	2.72	0.54–13.8	5	0	0	0	0
Customer services*		98	13	0.87	0.93	0.52–1.68	207	32	1.07	1.05	0.72–1.53
Miscellaneous†		163	32	1.25	1.44	0.97–2.12	262	41	1.08	1.51	1.07–2.12
Not employed		3385	1194	2.55	1.64	1.47–1.83	6188	2415	3.09	1.90	1.75–2.05
DISCO 4-digit missing		3452	597	1.14	1.05	0.95–1.17	6991	1292	1.33	1.19	1.11–1.28
Ref. others employed		10215	1574	1	1		18656	2664	1	1	

*Customer group includes service clerks (DISCO 42) and travel services (DISCO 5111–5113).

†Miscellaneous group consists of counsellors (DISCO 2412), psychologists (DISCO 2445), special education teachers (DISCO 2340), firemen (DISCO 5161), policemen (DISCO 5162), and prison guards (DISCO 5163).

HRs are adjusted for marital status (single yes/no), having children (yes/no), level of education (up to vocational/higher), income level (low/high), total level of unemployment (less than 2 years/over 2 years), residence (town/province), and nationality (Danish/not Danish).

Bold type indicates hazard ratios with 95% confidence limits not including unity are not related to a priori hypothesis.

for the elderly and the mentally and physically disabled. Health professionals like medical doctors, midwives, and nurses carry an elevated relative risk of affective disorders. The results show a minor variation in risk profiles according to gender, but, interestingly, men working in these typically female professions have the highest relative risk levels.

Our study does not allow us to explain the specific associations, but several interpretations may be hypothesised. The occupations carrying elevated risks share several job characteristics such as irregular working hours, exposure to traumatic events such as accidents, sudden death, prolonged illness or crime, and exposure to violence, threats, and abuse. These working conditions have been suggested either to be direct causes of mental disorders, for example, exposure to violence causing post-traumatic stress disorder,^{11 26 27} or to be components of a complex causal pathway, for example, including a high level of emotional demands,^{28 29} irregular work hours, or work-home interface problems.^{30 31}

In several studies, two leading models of work conditions—the control-demand and effort-reward imbalance—have been shown to be associated with mental health outcomes (for reviews, see de Lange *et al*³² and Van der Doef and Maes³³).

It is possible that human service professionals have challenging jobs with a relative high degree of influence, but they may also suffer from high and often conflicting job demands. It is also possible that persons seeking employment in these types of occupation display a high degree of “over-commitment” or are prone to strive despite the odds and that they perceive job rewards (salary, career opportunities, status) as inadequate. In particular, teachers and social workers seem to be facing increasing demands but also several limitations in their jobs.³⁴ However, the models have not, to our knowledge, been tested in relation to predicting psychiatrically diagnosed disorders for which their application may be limited.

Interestingly, we found no increased risk in customer service occupations, which is contrary to other studies where professionals dealing with customers were found to suffer from psychological distress, supposedly due to the emotional labour associated with the demand for hiding emotions.²⁸ In our study, the customer services group consist mainly of bank employees and office clerks, for example in post offices, who have a relatively high job mobility and who are not necessarily required to hide their emotions to the same extent as stewardesses and the like, the group most extensively studied regarding the health effects of emotional labour.³⁵

Contrary to our previous study, where we mainly found increased occupational risk of affective and stress related disorders in women, this study suggests that men employed in human service professions are facing the highest relative risk levels.⁴ Selection processes may partly explain this result. It is possible that men with particular backgrounds, predispositions, and personalities and who are susceptible to mental health problems are particularly prone to seek employment in these professions. Although the self-selection mechanism applies also to women, we believe that the effects are more pronounced in men, as these professions are predominantly female.

Equally, men in human service occupations may be exposed to particular job hazards due to differential assignment of work tasks as well being affected by the particular job culture in a female dominated workplace.^{36 37}

Methodological issues

To our knowledge this is the first follow up study of the risk of psychiatrically diagnosed affective and stress related disorders in human service professions compared to all

employed in other types of occupation. However, there are some limitations.

We have chosen all other occupations as a reference group, which is a large and heterogeneous group. This invites the question whether the risks we are seeing are dependent on the choice of the reference group. In order to test this possibility, we performed additional data analyses using the group of office clerks as a reference group. Human service professions still had increased risks and the risk profiles were very similar to those we saw in our original analyses, although the risks for men were lower (data not shown).

Our data do not answer the question whether employment in human service occupations causes a risk of mental disorders or whether working in other types of job has a protective effect on mental health. However, it is unlikely that our very heterogeneous reference group (all other professions) would display any general characteristics that could have a protective effect on mental health. On the other hand, human service occupations share several job characteristics that are believed to constitute mental health risk factors.

It is likely that persons treated at a psychiatric hospital have for a long time suffered from depressive or stress related symptoms and have been treated by, for example, their general practitioner, or have remained untreated. These symptoms may have affected their life circumstances such as income, and marital and family status, and could cause them to change or abandon their jobs. Our estimates are based on a lag of one year between the job and the diagnosis, which was chosen to allow job related causal risk factors to come into play, even though there is no definite knowledge on the time duration needed for mental disorders to develop. However, many people could have been in the same job for many years or have changed jobs before the last one. We have re-analysed our data using jobs 3 and 5 years before the diagnosis. The relative risk levels change less than 10%, except for social workers, where the relative risk of depression in women according to the jobs 5 years before the diagnosis rose from 1.47 to 1.80. In male social workers the relative risk of depression fell from 2.73 to 1.98, while the relative risk of stress rose from 2.48 to 2.93. This indicates that job changes during the years before hospital referral, which could be caused by mental health problems, do not confound the risk estimates.

Certain personality traits may be linked to both the choice of occupation and to the susceptibility to depression and stress related disorders (for example, over-commitment, negative affectivity, sense of coherence). Data regarding personality characteristic are not available in the registers, thus we cannot disentangle this interactive effect or exclude the possibility of reversed causality or confounding by mental health problems prior to diagnosis. Adjustment for socio-demographic background variables seems to be the way we can control for some of these effects. Single status was more common among cases, but otherwise the distribution of sociodemographic factors was similar among the cases and the controls. Adjustment for not employed and duration of total unemployment during the working career to date may to some extent account for the risk related to earlier mental health problems. We are not able, however, in the present study, to distinguish work hazards from effects attributable to selection mechanisms, life circumstances, or personality characteristics.

The increase in risks among human service professionals may also reflect the fact that many of them are working in the settings where mental health services are easily available, in terms of both accessibility and psychological acceptability of seeking psychiatric treatment.

Although the job code reporting procedure is functioning well within the public sector, where most human service professionals are employed, there was a substantial number of missing 4-digit DISCO codes among all those employed. Therefore we have included the group with missing DISCO 4-digit values in our model. We have also re-analysed our data with missing DISCO 4-digit codes included in the reference group. The relative risk levels were only marginally attenuated, indicating that elevated risk estimates are not substantially biased by exposure misclassification.

Conclusion

The present study indicates a strong and consistent association between employment in human service professions and the increased relative risk of affective and stress related disorders. Social workers and teachers have the highest relative risk of both, whereas health professionals display a relative risk of depression only. Relative risks are highest for men working in these typically female occupations. Additional work is needed in order to ascertain whether risks are attributable to specific psychosocial factors within these occupations.

Further studies of selection mechanisms, specific work hazards, and the personality characteristics of the employees could provide some clues regarding the causal web between employment in human service professions and mental health.

Authors' affiliations

J Wieclaw, J P Bonde, Department of Occupational Medicine, Aarhus University Hospital, Denmark

E Agerbo, P B Mortensen, National Centre for Register-Based Research, Aarhus University, Denmark

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