

RESEARCH REPORT

Work related violence and threats and the risk of depression and stress disorders

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Objective: To examine the risk of depression and stress related disorders as a function of occupational exposure to violence and threats.

Design: Population based nested case-control study.

Setting: All gainfully employed Danes.

Cases and controls: 14 166 hospital inpatients and outpatients, aged 18–65, treated for affective or stress related disorders during 1995–1998 selected from The Danish Psychiatric Central Research Register and 58 060 controls matched for age, sex, and time, drawn from Statistics Denmark's Integrated Database for Labour Market Research.

Main outcome measure: Clinical psychiatric diagnosis (WHO ICD-10) of affective (F30–39) or stress related (F40–48) disorders compared with controls by the occupation held the year before treatment. The occupation held the year before treatment was used as exposure proxy.

Results: Potential exposure to occupational violence is associated with significantly increased relative risks of both disorders in either sex (women: depression RR 1.45 CI 1.27 to 1.65, stress RR 1.32 CI 1.19 to 1.46; men: depression RR 1.48 CI 1.18 to 1.86, stress RR 1.55 CI 1.29 to 1.84). Work related threats are associated with increase in the risk of depression in women (RR 1.48 CI 1.23 to 1.79) and the risk of stress related disorders in men (RR 1.59 CI 1.32 to 1.91). Risks rose with increasing prevalence of violence and threats. The results remain significant and only slightly attenuated after controlling for extent of professional contact with people other than colleagues.

Conclusions: Employment in occupations involving exposure to work related threats and violence is a risk factor for depression and stress related disorders in both sexes. These findings have implications for health and safety at work policies.

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Depression and stress related disorders are common and constitute 40% of all new admissions to the Danish psychiatric hospitals. Yet, the precise causes of those disorders remain unknown.

Depression onset is related to genetic and socioeconomic factors as well as to life events.^{1–7} The role of working life experiences has mostly been studied in broad, general terms (job loss, job insecurity or dissatisfaction), except for the effect of traumatic events in firefighters, war combat, police, and emergency personnel, where high levels of post-traumatic stress symptoms have been found.⁸

Research in occupational medicine and psychology shows that work related violence and threats are associated with psychological distress, depression, anxiety, fatigue, job dissatisfaction, and sickness absence.^{9–14} However, these are mostly cross sectional, self report studies of selected occupations, which hampers causal inference and question their generalisability.

We have previously showed occupational differences in the risk of affective and stress related disorders,¹⁵ but the mechanisms behind this finding remain unclear.

This prospective nested case-control study examines the risk of these disorders as a function of potential occupational exposure to violence and threats in the Danish working population.

METHOD

Study population

The study population was established by merging data from two national registers: the Danish Psychiatric Central Research Register and Statistics Denmark's Integrated

Database for Labour Market Research (IDA) (for a detailed description, see Wieclaw *et al*).¹⁵ Cases were selected among all patients in the psychiatric register, aged 18–65, who received a first diagnosis of affective (ICD-10, F 30–39) or stress related (ICD-10, F 40–48) disorder during 1 January 1995 to 31 December 1998.

Using incidence density risk set sampling,¹⁶ five never-admitted referents of the same sex and age were selected for each case in the 5% sample of the Danish population in the IDA. This procedure makes the time at which cases were diagnosed the anchor point for the job held by both cases and referents. The unique person identifier (central person register number (CPR)), logically checkable for errors, was used to identify and merge data across registers.

Classification of occupations

Codes for the occupation held the year before the matching date were extracted for all subjects according to the Danish version of the International System for Classification of Occupation (DISCO 88) from the IDA database. Employers are obliged to submit the employee DISCO codes to the Salary Register, where they are subsequently validated against several other registers in Statistics Denmark.

Persons unregistered as employees upon study entry (students, unemployed, retired) or with missing DISCO code were excluded from the study.

Outcome measure

As outcome measure we used the first diagnosis made by a psychiatrist in charge of hospital or outpatient treatment

according to the World Health Organisation International Classification of Diseases version 10 of affective (F30–39) or stress related disorder (F40–48).

Both diagnostic categories contain several sub-diagnoses: F30–39 include different forms of depression and manic, bipolar and mood disorders, whereas F40–48 include different forms for phobias, anxiety, obsessive and compulsive disorders (OCD), reaction to severe stress (PTSD) as well as adjustment, somatoform, and neurasthenic disorders.

We used broad diagnostic categories, because they are believed to be more reliable than specific sub-categories.¹⁷ In this paper the term depression will be used as shorthand for affective disorders and stress for stress related disorders.

As there are no private psychiatric hospitals in Denmark, we obtained a complete record of all hospitalised cases in the study period.

Exposure to violence and threats

Data on occupational violence and threats were extracted from the Danish work environment cohort study (DWECS) using a telephone survey with a random, representative population sample. In the DWECS the National Institute of Occupational Health gathers, since 1990, data on different aspects of the physical and psychosocial work environment every fifth year.¹⁸ We used data on 5387 employees, with complete occupational and demographical records in 2000. Information on occupation was coded according to the DISCO classification.

Exposure to violence was assessed by two questions in the DWECS. Respondents were asked whether they had been exposed to threats or violence in connection with their job within the past 12 months with the response categories: “No”, “Yes, from a coworker”, “Yes, from a supervisor”, “Yes, from a subordinate”, “Yes, from customers/clients/pupils”. Respondents were also asked how many times each of the events had happened.

The proportion of “yes” answers was calculated for each DISCO job category and sex, which produced a sex specific

job exposure matrix (JEM) for all occupational groups. We then merged the JEM data with our study population by occupation and sex, assigning to each person the exposure level matching their occupational title according to the JEM. Occupation was used as a proxy measure for actual exposure and we used information at the most detailed DISCO level available.

Exposure was then categorised at three levels according to the distribution among controls. In women, exposure up to the upper quartile was classified as low, and above this level as high. In men, where exposure was lower, we used 90% as a cut off point between low and high exposure to obtain a sufficient exposure contrast. No exposure served as a reference category.

To control for the extent of professional contact with non-colleagues, we extracted DWECS data on a single question: “Are you dealing with people who are not employed at your workplace when carrying out your work? (pupils, clients/patients, customers)” with six answer possibilities: never/seldom, 0.25, 0.5, or 0.75 of working hours and almost all working hours. Answers were scored on a 0–100 scale; the mean score was calculated for each DISCO occupational group and then merged by occupation with our dataset.

Statistical analyses

The sex specific relative risk of affective and stress related disorder was calculated as a function of potential exposure to threats and violence, using conditional logistic regression for nested case-control data (PhReg procedure, the SAS version 8 statistical program package). At the second step, we entered the variable “working with people”. The model was adjusted for sex, age, and time by the matched design and for sociodemographic covariates such as: marital status (single/not single), having children living at home (yes/no), socio-economic status (level of education and annual income), total duration of unemployment (less/more than two years), citizenship (Danish/not Danish), and place of residence

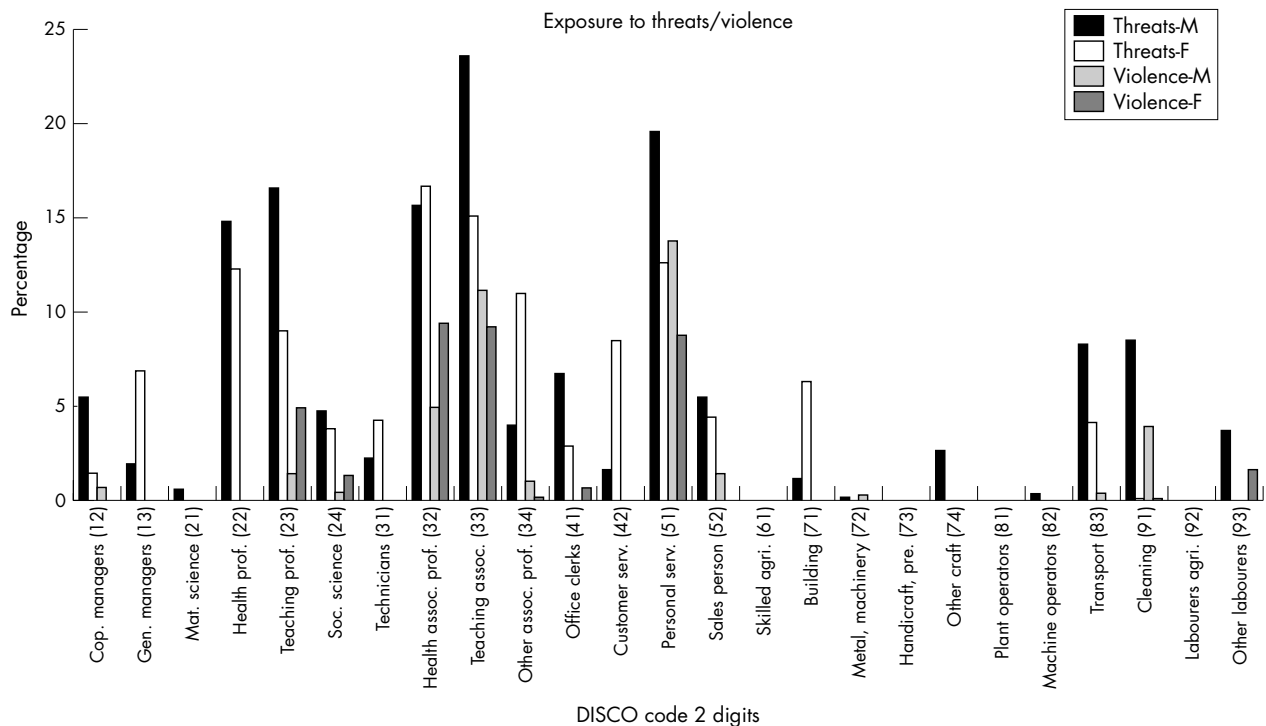


Figure 1 Prevalence of threats and violence according to the DISCO two digit occupational groups.

Table 1 Adjusted* relative risk of affective and stress related disorders according to prevalence of occupational violence and threats (women)

Job prevalence of	Affective disorders				Stress related disorders			
	All	Cases	RR adj	CI 95%	All	Cases	RR adj	CI 95%
Threats								
high >20%	1005	240	1.48	1.23 to 1.79	1760	306	1.14	0.98 to 1.32
0% < low ≤ 20%	9027	1862	1.14	1.04 to 1.26	17470	3648	1.07	1.00 to 1.15
0% (ref)	4661	905	1		9107	1790	1	
Violence								
high >14%	1628	419	1.45	1.27 to 1.65	2991	724	1.32	1.19 to 1.46
0% < low ≤ 14%	5641	1173	1.25	1.03 to 1.23	10666	2216	1.12	1.05 to 1.20
0% (ref)	7424	1415	1		14680	2804	1	

*RRs 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).

(town/country and a geographical location). All covariates were kept for all analyses.

RESULTS

The prevalence of threats in the DWECS was 6.9% for women (n = 2889) and 5.1% for men (n = 3208). In case of violence, the levels were 3.3% and 1.1%, respectively. There was a substantial contrast between occupations; women’s values ranged between 0–100 for threats and 0–50 for violence, men’s between 0–55 for threats and 0–46 for violence. Among those exposed, 48% experienced violence or threats more than once and 20% experienced both. Clients, pupils, customers, or patients were the main source of confrontations; however, a small proportion (5%) experienced threats and violent behaviour from their superiors, colleagues, or subordinates.

Figure 1 shows the one year prevalence of work related threats and violence according to the DISCO two digit level occupational groups.

WHAT THIS STUDY ADDS

- Employment in occupations involving exposure to work related threats and violence is a risk factor for psychiatrically diagnosed affective and stress related disorders in both sexes.
- The magnitude of risk rises with increasing prevalence of violence and threats. Men working in occupations with high prevalence of threats and violence have a more than 50% increase in the risk of stress related disorders. Risks remain unchanged after adjustment for professional contact with people other than colleagues, which suggest that threats and violence are independent risk factors not confined to employment in human service occupations.

What is already known on this topic

A number of cross sectional, self report studies, mostly of human service professions, report an association between high prevalence of work related violence and threats and complaints of poor wellbeing and mental health problems. Little is known about the causal relation between these exposures and serious psychiatric disorders in different occupations.

The prevalence of occupational violence and threats peaked in health services (DISCO code 22 and 32), education (DISCO code 23), social work (DISCO code 33), and health service aids (DISCO code 51). Men in these occupations reported a higher prevalence than women.

Tables 1 and 2 show the relative risk of affective and stress related disorders in either sex as a function of potential exposure to violence and threats among 14 166 cases and 58 060 controls in our study population.

Both sexes in high exposure occupations faced an increased risk of affective and stress related disorders. Among women the risk of affective disorders was highest, and it was related to the exposure level. Men working in occupation with a high prevalence of threats and violence had a more than 50% increase in the risk of stress related disorders. Low exposure levels were not related to an increase in risk in men.

We also analysed different exposure categories (using lower cut off points so that exposure group sizes became more balanced) to check if our results were model dependent. The results were, as expected, attenuated in the direction of slightly lower risks, but the pattern remained the same. The

Table 2 Adjusted* relative risk of affective and stress related disorders according to prevalence of occupational violence and threats (men)

Job prevalence of	Affective disorders				Stress related disorders			
	All	Cases	RR adj	CI 95%	All	Cases	RR adj	CI 95%
Threats								
high >20%	513	105	1.17	0.92 to 1.48	796	194	1.59	1.32 to 1.91
0% < low ≤ 20%	5300	1044	1.07	0.96 to 1.19	8869	1706	1.05	0.97 to 1.15
0% (ref)	4992	892	1		8726	1474	1	
Violence								
high >8%	485	127	1.48	1.18 to 1.86	878	226	1.55	1.29 to 1.84
0% < low ≤ 8%	1869	356	1.03	0.90 to 1.18	3065	565	1.05	0.94 to 1.17
0% (ref)	8451	1558	1		14448	2583	1	

*RRs 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).

results remained significant and only slightly attenuated after controlling for the extent of professional contact with non-colleagues (data not shown).

DISCUSSION

We found a strong association between potential exposure to work related threats and violence and an increased risk of affective and stress related disorders in both sexes. Risks rose with increasing prevalence of violence and threats. The association remained unchanged after adjustment for professional contact with pupils, clients, patients, or customers, which suggests that potential threats and violence are independent risk factors not confined to employment in human service occupations. Earlier studies reported temporary psychological distress and frustration after threats and violence in these professions,^{9 10 19} but this study suggests that threats and violence in any type of employment may entail serious mental disorders requiring specialist hospital or outpatient treatment.

Our results are in line with research that shows increased levels of post-traumatic stress disorder and subsequent depression among firemen, war combats, police, and prison staff who were exposed to highly traumatic events.^{8 20} Experience of a less traumatic work related violence and threats may have a similar effect.¹⁹ Also, the mere awareness of a potential risk of violence or threats while at work may create a state of chronic alertness that contributes to development of depression and stress. Rogers and Kelloway showed the role of fear of violence in predicting psychological wellbeing.¹⁴ Neurobiological research suggests that highly stressful experiences of violence and threats may result in over-activation and deregulation of the autonomous nervous system and translate stress into emotional disorder.^{21 22}

It has also been suggested that even comparatively stable personality traits, for example, coping strategies, sense of coherence, efficacy, or negative affectivity, may be affected by an experience of violence and threats and, in turn, increase employees' vulnerability to stress, anxiety, and depression.^{23 24}

The susceptibility to develop depression or stress related disorders after threats and violence varies with personality, coping strategies and social abilities.^{25 26} The presented risks are average risks for the entire population. However, we cannot rule out that susceptible people are drawn to particular high prevalence occupations, which would bias the risk estimates towards falsely increased levels. It may, for example be speculated that mental health workers are displaying "over-commitment" in their work²⁷ and may therefore be at increased risk for mental disorders and that high occurrence of threats and violence in the human service sector is not a part of the causal web. We rather believe, as suggested by Wilhelm *et al* that the relation between personality and work is bidirectional, so that people are drawn to particular occupations, but the occupational factors then have an effect on their physical and mental health.²⁸

Policy implications

Prevention of violence and threats at workplaces should receive high priority in framing health and safety policies. Training in coping with potentially threatening work situations should be provided for employees. Also, the consequences of occupational violence and threats for the organisation and employees should be minimised and appropriate support provided for victims.

The increased risks in both sexes and across occupations, after adjusting for work in human service professions, support more general interpretation.

Additional research corroborating the findings and quantifying the risks for susceptible subgroups is warranted.

Methodological issues

Our study enjoys several strengths. We used a case-control design where the time of diagnosis was the anchor point of occupational exposure for both cases and controls. All occupational groups in Denmark were covered and we have a complete record of cases in our study period. Information on exposure and outcome was collected independently of this study and the participants' case status; therefore, the results are not affected by recall bias and differential exposure misclassification. The outcome was diagnosed at a highly professional level by trained psychiatrists in charge of hospital treatment.

However, there also are some limitations. We used occupation as a proxy for exposure and assigned the same exposure level to all employed in a particular occupation. We hence obtained an objective exposure measure, but may also have introduced non-differential misclassification by ignoring variability between workers and within a given occupation. Even within the same job title, we may be comparing different job tasks, for example, psychiatric nurse and a nurse in a somatic hospital or different occupational settings, for example, hospital and community nurse. Also, by assigning a mean group score to people, we may have misclassified their exposure and thereby biased the rates downwards, for example, we are not able to know if cases may have been potentially exposed to systematically higher exposure levels.

Our exposure rests on a one year prevalence, which is rather low. However, several studies report higher levels and show that employees often suffer multiple and recurrent incidence of threats and violence.^{9 11 29} In our study the prevalence of reported threats and violence through one year was below 10%–20% in most occupations, which causes a misclassification of individual exposures conferred by the exposure matrix. Therefore, the reliability of the findings could be questioned. However, the limited one year prevalence remains compatible with a much higher cumulative prevalence through several years and multiple accidents. If threats and violence have an impact in the long run, then the apparent misclassification may be far less, as we are probably seeing an effect of exposure accumulated over time.

It is possible that the specific sub-diagnoses within affective and stress related disorders have somewhat different associations with work related violence and threats, and this issue should be given more attention in future research.

Occupational health and safety

Several studies have shown that occupational violence and threats are occupational hazards associated with physical and psychological harm causing high costs to employees, work places, and society (for overview see Wynne *et al*³⁰). Our study shows that these exposures may also carry a substantial risk for the development of psychiatric disorders. This risk is recognised in European countries and internationally as reflected in the provision of prevention guidelines by the European Commission and the International Labour Organisation.^{30 31} Despite these efforts there seems to be no decrease in work related violence, threats, and harassment.³²

The Executive Order on the Performance of Work (June 2004) under The Danish Working Environment Act (1999)³³ stipulates that "All aspects related to work shall be performed so as to ensure health and safety, both in the light of an individual assessment and in the light of an overall assessment of the physical, ergonomic and psychosocial

conditions of the working environment which in the short or the longer term may affect the physical or mental health of the employees" (part 3, and 7) and further specifies that "In connection with the performance of work, it shall be ensured that the work does not involve a risk of physical or mental impairment to health as a result of bullying, including sexual harassment" (and 9a).³⁴ No explicit reference is made to violence and threats as risk factors at work. We believe that the development of effective risk assessment, management and prevention strategies with regard to violence and threats should be given priority in the national legislations regulating work conditions.

CONCLUSION

Employment in occupations involving potential exposure to work related threats and violence is a risk factor for psychiatrically diagnosed affective and stress related disorders in both sexes. The magnitude of risk is related to exposure level. This finding points to the importance of preventing and minimising violence and threats at work as well as providing satisfactory organisational and individual support for victims.

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Conflicts of interest: none.

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