Police officers: a high risk group for mental health disturbances? A cohort study

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2012-001720
Article Type:	Research
Date Submitted by the Author:	05-Jul-2012
Complete List of Authors:	Velden, Peter G.; Institute for Psychotrauma, ; Tilburg University, INTERVICT Rademaker, Arthur; Dutch Ministry of Defence, Research Center Military Mental Healthcare Vermetten, Eric; Dutch Ministry of Defence, Research Center Military Mental Healthcare Portengen, Marie-anne; Occupational health services ARBOUNIE, Erasmushogeschool . Yzermans, Joris; Netherlands Institute for Health Services Research, Grievink, Linda; National Institute for Public Health and the Environment,
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Occupational and environmental medicine
Keywords:	mental health, psychiatry, OCCUPATIONAL & INDUSTRIAL MEDICINE

Police officers: a high risk group for mental health disturbances? A cohort study.

Peter. G. van der Velden (Ph.D) [a,b,c]

Arthur R. Rademaker (Ph.D)[d]

Eric Vermetten (M.D. Ph.D.)[d]

Marie-Anne Portengen (M.D.)[e]

Joris C. Yzermans (Ph.D.)[f]

Linda Grievink (Ph.D.)[g]

[a] Institute for Psychotrauma, Nienoord 5, Diemen, The Netherlands

[b] INTERVICT, Tilburg University, Tilburg, the Netherlands

[c] Arq Psychotrauma Expert Group, Diemen, The Netherlands

[d] Military Mental Health Research Center and University Medical Center Utrecht, Utrecht, The Netherlands

[e] Occupational health services ARBOUNIE, Dordrecht, The Netherlands

[f] Netherlands Institute for Health Services Research, Utrecht, The Netherlands

[8] National Institute for Public Health and the Environment, Bilthoven, The Netherlands

Keywords

Police officers, Mental health, Comparative study

Word count

2546 (exc. Title page, abstract, references, “what this study adds, and tables)

ABSTRACT

Objectives

Policing is generally considered a high risk profession for mental health problems, but this assumption lacks empirical evidence. Research question of the present study is to what extent officers more often suffer from mental health disturbances, such as (very) severe symptoms of anxiety, depression and hostility than other occupational groups.

Design

Multi-comparative cross sectional study using the data of several cross sectional and longitudinal studies in the Netherlands.

Participants

Two samples of police officers (N=149, N=522), employees of banks (N=1116) and employees of banks who were robbed (N=149); employees of supermarkets (N=331), and a psychiatric hospital (N=220), a governmental social welfare organization (N=91), employees who followed a RET training to strengthen their assertiveness (N=715), soldiers before deployment (N=283) and before re-deployment (N=239), and firefighters (N=129).

Primary outcomes

Prevalences of severe (sub clinical level) and very severe symptoms (clinical level) were computed using the Dutch norm tables (80th percentile en 95th percentile respectively) of the SCL-90-R. All comparisons were controlled for age, gender and education.

Results

Multinomial logistic regression analyses showed that the prevalences of clinical and sub clinical levels of symptoms of anxiety, depression and hostility among police officers were not significantly higher than among comparison groups. The same pattern was found for the other SCL-90-R sub scales.

Conclusions

We found no indications that self-reported mental health disturbances were more prevalent among police officers than among groups of employees that are not considered high risk groups, such as employees of banks, supermarkets, psychiatric hospital and soldiers before deployment.

Police officers are commonly referred to as a high-risk group for mental health disturbances because of the various critical incidents and potential traumatic events they encounter on a more or less daily basis during their career. These so-called operational stressors, such as viewing children die, confrontations with victims of sexual harassment, serious traffic accidents, suicide, and violence, might increase the risk of for example symptoms of anxiety, hostility and fatigue. A (small) minority may develop mental disorders, such as depression and PTSD[1-4.]

On the other hand, research in the past 20 years among police officers has shown that organizational stressors such as conflicts, work load, shifts, and lack of support are more likely adverse sources of stress than operational stressors. In other words, although police officers are more frequently confronted with critical incidents than for example employees of banks or supermarkets, organizational stressors -that are not specific for the police- appear more influential on health and well-being than (daily) operational stressors[2, 5-7.]

This may explain the outcomes of a study[8] in the U.K. ranking 26 professions according to general psychological well-being and physical health. Police officers ranked 9th and 11th place in a ranking based on absolute mean scores with those with most problems at 1th place. Teachers, a professional group that is typically not associated with frequent exposure to potential traumatic stressors, ranked 2th on both well-being and physical health. Similarly, an earlier smaller comparative study reported that police officers showed significantly more favorable levels of well-being and psychological distress when compared to school teachers and the Australian norms[9].

However, to the best of our knowledge, there are no in peer reviewed-journal reviewed published multi-comparative studies available that a.) statistically examined

differences in symptom levels between the police and several other occupational groups while also controlling for confounding factors such as age, gender and education, and b.) focused on specific mental health disturbances such as clinical relevant levels of symptoms (very severe symptoms) of anxiety, depression, and hostility as well as sub clinical levels , i.e. severe levels of symptom scores. Aim of this comparative study was to explore the relative mental health of police officers and to investigate if there are empirical based indications that policing can be considered a high risk profession in this perspective.

METHODS

Samples and procedures

We compared the health of two samples of officers (N^{group1}=149, N^{group2}=524). Group 1 consisted of police officers obtained in the eastern part of the Netherlands (region department North and East Gelderland, N=149, response=60%)[10]. This group was originally obtained to provide reference data for group 2 to examine the consequences of the disaster and other critical incidents on health. Group 2 consisted of police officers who were involved in the Enschede fireworks disaster and the aftermath (The Netherlands, 2000) and participating at a survey 4 years post-event (response= 80.5%)[5]. At that time, only 1 officer (0,2%) suffered from probable disaster-related PTSD. These studies were conducted on behalf of the Dutch Ministry of Health, Welfare and Sports.

We compared the two groups of officers with the following non-clinical groups of employees participating in various Dutch studies on health and critical incidents at work. Futhermore, data from group 6 was obtained to evaluate a training program (see below).

The year of data gathering is presented between brackets and funding for each study will be described. In sum, this study is a clear example of a data-sharing research project of the involved researchers.

- Group 3 and 4 (1991): A nationwide sample of 1294 front office employees of saving banks , of whom 11.5% experienced one of more bank robberies (N^{group3}=1116 and N^{group4}=149 respectively, response=71%)[11]. This cross sectional study was conducted on behalf of a Saving Banks Association, The Netherlands.
- Group 5 (1996): An at random sample of 220 mental health care professionals, i.e. nurses and therapists of a psychiatric hospital (N=220, response=70%)[12]. This cross sectional study was conducted on behalf of a Psychiatric Hospital.
- Group 6 (1997-1998): Employees of various organizations, before participating in a RET training (N=716, response=74%)[13] aimed at improving their assertiveness and well-being. The cross sectional study was provided by a training institute, The Netherlands.
- Group 7 and 8 (2005-2007): Sample of 522 soldiers from a larger prospective cohort study on stress-related disorders who were assessed prior to a 4-month deployment to Afghanistan of whom 241 were deployed before (N^{group7}=281 and N^{group8}=238 respectively, response= 82.5%)[14], was provided by the Ministry of Defense.
- Group 9 (2002): Firefighters from the firefighters department Utrecht (N=129, response=48%)[15]. This cross sectional study conducted on behalf of the Dutch Ministry of Health, Welfare and Sports.
- Group 10 (1995): Employees of a governmental Social Welfare organization who had contact with clients (N=91, response=65%)[16], in the Western part of the Netherlands.

This cross sectional study was conducted to finish the Occupational Physician education program of the researcher.

- Groups 11 (1996): A nationwide at random sample of employees of local supermarkets (N=331, response=88%)[17]. This cross sectional study was conducted on behalf of a large Supermarket Organization in the Netherlands.

All participants of the above mentioned studies received written information about the scientific study aims. None of the above mentioned involved organizations were involved in the study design, analyses and manuscript.

Measures

Besides questions regarding age, gender and education, respondents of all groups minus group 9 completed the total SCL-90-R[18,19]. The SCL–90–R has a five-point Likert scale (from 1, 'not at all' to 5, 'extremely') and assesses symptoms over the previous 7 days. The validity and reliability of the Dutch SCL-90-R has proven to be satisfactory. The Dutch cut-off scores[19] for males and females of a normal population were used to identify participants with a.) at least severe symptoms of anxiety, depression, sleeping problems and hostility (80th percentile,) and b.) with very severe symptoms (95th percentile) that are clinically relevant and may be indicative for a mental disorder. Group 9 was administered a brief scale consisting of 17 at random items of the SCL-90-R. Our control analyses showed that the sum score of the 17 items highly correlated with the total score of the SCL-90-R across several samples who filled in the total SCL-90-R ($r > .95$). Assessments of education levels differed slightly across studies. We were therefore forced to make a distinction between those with high education (university and high professional education level) versus low-medium level (all other levels).

Data analyses

Differences in demographics were assessed using chi-square statistics. Separate series of multinomial logistic regression analyses were conducted with each police sample as reference group, while controlling for age, gender and educational level. We repeated the regression analyses with two composite variables on mental health. They were based on 1.) whether respondents reported very severe anxiety and/or very severe depression and/or very severe hostility symptoms or did not report severe symptoms on any of these three scales, and 2.) a similar computed composite variable based of severe symptoms. ANOVA was used to examine differences in mean scores on the sum score of 17 items between group 1, 2 and 9 while controlling for the same possible confounding factors. SPSS version 18.0 was used to perform the analyses.

RESULTS

The demographics are shown in Table 1 and chi-squares statistics indicate that study groups differ in gender (X^2= 922.7, df=10, p <.001), age (X^2=1324.0, df=20, p <.001) and educational level (X^2=927.7, df=10, p <.001).

The prevalence's of very severe symptoms (95th percentile) are presented (except group 9) in Table 2, as well as the adjusted Odd Ratios (Adj. OR) and the 95% confidence intervals (95% CI). In Table 3, similar statistics are presented with respect to severe symptoms (80th percentile).

Results clearly show that both groups of police officers are relatively healthy: the proportion of officers with very severe symptoms of anxiety, depression, and hostility is extremely low (≤ 1.4%). Compared to all other study groups, police officers had similar or

lower prevalences of clinical levels of mental health problems according to the adjusted odd ratios. Using a less strict criterion of sub clinical levels, i.e. at least severe symptoms instead of very severe symptoms according to the norm tables, the groups of officers still did rank as groups with relatively low prevalence rates. Furthermore, the proportion of officers with severe or very severe symptoms of anxiety or depression or hostility (i.e. composite variables), is not significantly higher than among other groups. Additional multinomial analyses showed similar patterns with respect to the other sub scales of the SCL-90-R (data not shown).

The results of ANOVA (F^{main}=25.5, df=2, p <.001) and post hoc analyses showed that the 2004 sample of police officers had significant lower mean scores on the 17 item sum score than employees of supermarkets, while the 2002 sample did not differ significantly from supermarket employees ($Police^{2002}$: M=20.7, SD=5.9; $Police^{2004}$: M=18.9, SD=4.37; Super market: M=22.6, SD=7.28).

DISCUSSION

We found no indication that police officers had higher prevalences of subclinical mental health problems, i.e. severe symptoms, than other occupational groups in our comparative study. The same pattern was found with respect to very severe symptoms, i.e. a level of symptoms that may be indicative of the presence of mental disorders such as generalized anxiety disorder or major depressive disorder. Surprisingly, findings showed that officers in our comparative study were as healthy as our study groups that are not considered high risk professions, such as employees of banks (not victimized by robberies), supermarket employees, mental health care professionals and soldiers before deployment. Moreover, they strongly differed from employees participating in a RET training because of mental

health problems that were associated with a lack of assertiveness. Although we are not aware of a similar multi-comparative study, these findings appear are in line with the outcomes of a Dutch study on burnout among officers showing that officers had lower levels of emotional exhaustion than one large reference group consisting of various occupations[20], a Norwegian study[1] also showing that officers had lower levels of emotional exhaustions (but higher levels of depersonalization) than physicians, and the outcomes of the aforementioned studies[8,9], but these studies did not control the possible confounding effects of demographics.

How can these findings be explained? In the Dutch situation police officers follow a rigorous selection process: about 90% of those applying to the officer training program is being rejected (personal communication Dr. Annika Smit, Dutch Police Academy). Moreover, officers are trained to deal and cope with critical incidents and as a consequence they may be highly resilient to mental health problems[21]. This may explain why bank employees (not selected to cope with severe incidents nor trained as rigorously as police officers), who were confronted with bank robberies reported significantly more (severe and very severe) mental health disturbances.

Interestingly, in an older true prospective study among police officers involved as body handlers in a disaster no increases in health problems compared with health problems before the disasters were found[22]. These outcomes seriously question the generally held belief that policing is a high risk profession with respect to health: is it perhaps a (partial) myth? In either way, it reminds us of the debate on suicide among officers that once (in fact) has been described as an epidemic[23]: However, the critical review on suicide among officers of Hem and colleagues[23] clearly demonstrated that it is not documented that an elevated

suicide rate among officers really exists and that previous research has serious methodological shortcomings.

Despite the strength of our study, i.e. multiple comparison groups and controlling for age, gender and education, some possible limitations and characteristics should be discussed. First, although very high scores on the SCL-90-R (very severe symptoms) may be indicative of a mental disorder, we did not conduct clinical interviews to examine the prevalences of mental disorders such as generalized anxiety, major depression and PTSD across samples. However, it is not very likely that the prevalence rates obtained from clinician rated instruments would be (much) higher than the prevalence rates obtained by self-report measures such as the SCL-90-R[24].

Second, we did not include a PTSD measure in the present study. Therefore, it is possible that the prevalence of PTSD among police officers is higher than among the other study groups. However, given the marked overlap of PTSD symptoms with other disorders and the typical comorbidity rates of PTSD with for instance depression[25,26], it is unlikely that when police officers suffer from PTSD, that they do not suffer from other severe mental health disturbances as well. Indeed, a large study among UK military personnel (N=10069)[27] showed that 344 out of the 394 PTSD cases (87.3%) reported mental health problems, i.e. were GHQ cases. Only a small group of PTSD cases (N=50, 12.7%) were not identified as being a GHQ case (personal communication dr. Roberto Rona). Control analyses among another sample (N=67) of Dutch employees seeking treatment at the Institute for Psychotrauma for (probable) PTSD following various traumatic events, showed similar results. In total, 86.6% (N=58) of the (probable) PTSD cases (N=67, IES scores of 35 or more[28]) also reported very severe mental health problems according to our composite variable using very severe symptoms. These findings are in line with previous research[28,30],

demonstrating that PTSD and SCL-90-R scores are strongly associated. Thus, an increased prevalence rate for PTSD in the absence of marked mental problems would be highly unlikely.

Third, the two groups of officers were not drawn from national samples of officers. Group 1 was obtained in the eastern part of the Netherlands, but group 2 consisted of officers from several parts of the Netherlands (mainly east, mid and west). We have no data on the non-response of group 1. Although both groups did not differ in prevalence rates of very severe anxiety, depression and hostility symptoms (i.e. clinical level of symptoms), significant differences were found in the prevalence of severe depression symptoms (80th percentile). This may reflect the normal variety of the prevalences of symptoms among sub samples within one occupational group. Finally, one could hypothesize that the data of our study groups are not obtained very recently and that for instance the current prevalences of mental health problems among officers are (much) higher. We have no data or (Dutch) reports based on empirical research to confirm or reject this hypothesis.

Participants of all nine study groups were living in the Netherlands. Therefore, future research is warranted to examine to what extent our findings are applicable to countries with different political, social and juridical systems, and different selection and training procedures. We were not able to control for for example organizational stressors across all study samples, although we do not expect that it would dramatically change our findings. Finally, we did not examine substance use such as alcohol use and smoking. Although the outcomes of Sterud and colleagues[31] did not support the notion of a strong relationship between occupational stress and alcohol use in police officers, it is unclear if they differ in use from other professions.

CONCLUSIONS

Despite these limitations, the present study demonstrates that, although policing is generally viewed as a high risk profession, mental health disturbances are not more prevalent in police officers as compared to various other occupational cohorts in our study. Several of these groups such as bank employees (not being robbed) and supermarket employees, as well as soldiers before deployment are typically not considered as “high risk professions”. These findings suggest that the positive effects of especially the selection process, self-selection and resilience of officers, given the amount of potential stressful and traumatic events they encounter during their career, should not be underestimated.

Abstract

Article focus

- It is generally assumed that police officers, due to the specific nature of their work, are at (high) risk for mental health problems.
- The results of the very few studies that compared the mental health of officers with one of two comparison groups, suggest that this assumption need further proof.
- To assess this assumption, clinical as well as sub clinical levels of mental health problems of officers were compared with 9 other occupational groups while controlling for demographics.

Key messages

- In contrast to this generally held belief, officers were not more at risk for (serious) mental health problems than any of the other examined groups in our multi-comparative study.
- The protective effects of a rigor selections process of recruits, self-selection and the resilience of police officers on mental health disturbances should not be underestimated.

Strenghts and limitations

- To the best of our knowledge, this is the first multi comparative study to examine to what extent clinical as well as sub clinical levels of symptoms of anxiety, depression

and hostility are more prevalent among officers than among other occupations while controlling for demographics.

- We did not conduct clinical interviews

Acknowledgements

We would like to express our gratitude to Professor RJ Rona (Institute of Psychiatry, King's College London) for his courteous help, i.e. providing us the cross tabulation data on PTSD and GHQ cases among UK military. In addition, we like to thank M Bosmans, Msc (INTERVICT, Tilburg University) for his support.

Competing interests

None.

References

1. **Berg AM**, Hem E, Lau B, et al. An exploration of job stress and health in the Norwegian police service: cross sectional study. *J Occup Med Toxicol* 2006; **1**:26.
2. **Maguen S**, Metzler TJ, McCaslin SE, et al. Routine work environment stress and PTSD symptoms in police officers. *J Nerv and Ment Dis* 2009; **197**: 754–760.
3. **Stephens C**, Miller I. Traumatic experiences and posttraumatic stress disorder in the New Zealand police. *Policing* 1998; **21**: 178–191.
4. **Hartley TA**, Violanti JM, Fekedulegn D, et al. Associations between major life events, traumatic incidents, and depression among Buffalo police officers. *Int J Emerg Ment Health* 2007; **9**: 25–35.
5. **Velden PG van der**, Kleber RJ, Grievink L, et al. Confrontations with aggression and mental health problems in police officers: The role of organizational stressors, life-events and previous mental health problems. *Psychol Trauma: Theory, Res, Practice, Policy* 2010; **2**: 135–144.
6. **Liberman AM**, Best SR, Metzler TJ, et al. Routine occupational stress and psychological distress in police. *Policing* 2002; **25**: 421–439.
7. **Huddleston L**, Stephens C, Paton D. An evaluation of traumatic and organizational experiences on the psychological health of New Zealand police recruits. *Work* 2007; **28**: 199–207.
8. **Johnson S**, Cooper C, Cartwright S, et al. The experience of work-related stress across occupations. *J Manag Psychol* 2005; **20**: 178-187.

9. **Hart PM**, Wearing AJ, Headey B. Police stress and well-being: Integrating personality, coping and daily work experiences. *J Occup Organ Psychol* 1995; **68**: 133–165.
10. **Velden PG van der**, Grievink L, Dusseldorp A, et al. *Health victims Enschede fireworks disaster* (In Dutch). Instituut voor Psychotrauma (IvP)/ Rijksinstituut voor Volksgezondheid en Milieu (RIVM), 2002.
11. **Velden PG van der**, Burg S van der, Steinmetz CHD, et al. *Victim of bank robberies* (in Dutch). Bohn Stafleu Van Loghem, 1992.
12. **Velden PG van der**, Herpers TMM. Aggression in a psychiatric hospital (in Dutch). *Gedrag & Gezondheid* 1994; **5**: 209-218.
13. **Velden PG van der**, Kleber RJ, Oostrom I van. *StressMonitor manual* (in Dutch). Instituut voor Psychotrauma/S&N, 2000.
14. **Rademaker AR**, van Zuiden M, Vermetten E, et al. Type D personality and the development of PTSD symptoms: a prospective study. *J Abnorm Psychol* 2011; **120** (2), 299-307.
15. **Velden PG van der**, Christiaanse B, Kleber RJ, et al. The effects of disaster exposure and post-disaster critical incidents on intrusions, avoidance and health problems among firefighters: A comparative study. *Stress, Trauma Crisis: International J* 2006; **9**: 73–93.
16. **Portengen MAF**. *Aggression and violence in social welfare* (in Dutch). Corvu / AMC Amsterdam, 1995.
17. **Velden PG van der**. *Investigation of unsafe situations in supermarkets* (in Dutch). Instituut voor Psychotrauma, 1996.

18. **Derogatis LR**. *SCL-90-R: administration, scoring and procedures manual-I for the R(evised) version*. Johns Hopkins University School of Medicine, Clinical Psychometrics Research Unit, 1977.

19. **Arrindell WA**, Ettema JHM. *SCL-90-R Manual* (in Dutch). Swets & Zeitlinger/ Swets Test publishers, 1986 & 2003.

20. **Kop N**, Euwema M, Schaufeli W. Burnout, job stress and violent behavior among Dutch police officers. *Work & Stress* 1999; **13**: 326-340.

21. **Galatzer-Levy IR**, Madan A, Neylan TC, et al. Peritraumatic and trait dissociation differentiate police officers with resilient versus symptomatic trajectories of posttraumatic stress symptoms. *J Trauma Stress* 2011; **24**: 557-65.

22. **Alexander DA,** Wells A. Reactions of police officers to body handling after a major disaster: a before and after comparison. *Br J Psychiatry* 1991; **159**: 547–555.

23. **Hem E**, Berg AM, Ekeberg AO. Suicide in police--a critical review. *Suicide Life Threat Behav* 2001; **31**: 224-33.

24. **Engelhard IM**, van den Hout MA, et al. Deployment-related stress and trauma in Dutch soldiers returning from Iraq. Prospective study. *Br J Psychiatry* 2007; **191**: 140-145.

25. **Deering CG**, Glover SG, Ready D, et al. Unique patterns of comorbidity in posttraumatic stress disorder from different sources of trauma. *Compr Psychiatry* 1996; ***37***: 336-346.

26. **Blanchard EB**, Buckley TC, Hickling EJ, Taylor AE. Posttraumatic stress disorder and comorbid major depression: is the correlation an illusion? *J Anxiety Disord* 1998; **12**: 21-37.

27. **Rona RJ**, Jones M, Iversen A, et al. The impact of posttraumatic stress disorder on impairment in the UK military at the time of the Iraq war. *J Psychiatry Res* 2009; **43** (6): 649-55.

28. **Neal LA**, Busutti W, Rollins JI, et al. convergent validity of measures of Post-Traumatic Stress Disorder in a mixed military and civilian population. *J Trauma Stress* 1994; **7**: 447-455.

29. **Saunders BE**, Mandoki Arata C, Kilpatrick D. Development of a crime-related Post-Traumatic Stress Disorder scale for women within the symptom checklist-90-revised. *J Trauma Stress* 1990; **3**: 439-448.

30. **Weathers FW**, Litz BT, Keane TM, et al. The utility of the SCL-90-R for the diagnosis of war-zone related Posttraumatic Stress Disorder. *J Trauma Stress* 1996; **9**: 111-128.

31. **Sterud T**, Hem E, Ekeberg O, et al. Occupational stress and alcohol use: a study of two nationwide samples of operational police and ambulance, personnel in Norway. Stud Alcohol Drugs 2007; **68** (6):896-904.

Table 1 Demographics

		Gender		Age (years)			Education	
	N	males	females	18-30	31-45	46-65	low-medium	high
		%	%	%	%	%	%	%
1 Police officers	149	85,9	14,1	4,7	49,0	46,3	96,5	3,5
2 Police officers	522	88,5	11,5	6,2	56,5	37,2	91,7	8,3
3 Bank employees, not victim bankrobbery	1116	34,1	65,9	48,6	38,2	13,2	81,0	19,0
4 Bank employees, victim bankrobbery	149	47,3	52,7	37,8	44,6	17,6	79,1	20,9
5 Psychiatric hospital employees	220	37,7	62,3	41,4	47,7	10,9	61,6	38,4
6 Trainees AT	715	68,2	31,8	28,7	58,1	13,2	34,0	66,0
7 Soldiers, not deployed before	281	88,1	11,9	80,2	16,1	3,7	88,9	11,1
8 Soldiers, deployed before	238	93,9	6,1	43,4	43,0	13,5	85,1	14,9
9 Firefighters	129	96,9	3,1	18,3	39,7	42,0	94,5	5,5
10 Social welfare	91	44,4	55,6	15,7	49,4	34,9	39,5	60,5
11Supermarkets	331	56,1	43,9	100	-	-	86,9	13,1
Total	3944	62,1	37,9	41,8	41,0	17,2	74,2	25,8

Table 2 Differences in prevalences of very severe anxiety, depression and/or hostility symptoms (scores 95th centile).

	Total	Very severe symptoms		Police A reference				Police B reference			
	N	N	%	Adj. OR	(95% CI)		p	Adj. OR	(95% CI)		p
ANXIETY											
1 Police officers	149	2	1.3	1							
2 Police officers	522	3	0.6	0.53	(0.23 -	1.23)	.14	1			
3 Bank employees, not victim bankrobbery	1116	9	0.8	1.59	(0.76 -	3.33)	.22	2.98	(1.69 -	5.24)	.00
4 Bank employees, victim bankrobbery	148	7	4.7	5.41	(2.43 -	12.04)	.00	10.14	(5.33 -	19.26)	.00
5 Psychiatric hospital employees	220	1	0.5	2.35	(1.02 -	5.40)	.04	4.41	(2.23 -	8.70)	.00
6 Trainees AT	715	32	4.5	5.98	(2.88 -	12.45)	.00	11.22	(6.46 -	19.48)	.00
7 Soldiers, not deployed before	281	2	0.7	1.14	(0.46 -	2.80)	.77	2.14	(1.00 -	4.55)	.05
8 Soldiers, deployed before	241	0	0.0	n.a.				n.a.			
9 Firefighters	129	0	0.0	n.a.				n.a.			
10 Social welfare	85	1	1.2	4.32	(1.70 -	10.97)	.00	8.10	(3.64 -	18.02)	.00
DEPRESSION											
1 Police officers	149	2	1.3	1							
2 Police officers	518	6	1.2	0.86	(0.17 -	4.33)	.86	1			
3 Bank employees, not victim bankrobbery	1116	30	2.7	2.33	(0.53 -	10.16)	.26	2.70	(1.07 -	6.79)	.04

4 Bank employees, victim bankrobbery	148	13	8.8	7.85	(	1.70	-	36.18	)	.01	9.08	(	3.31	-	24.94	)	.00
5 Psychiatric hospital employees	220	13	5.9	5.29	(	1.14	-	24.53	)	.03	6.12	(	2.21	-	16.94	)	.00
6 Trainees AT	716	69	9.6	8.87	(	2.07	-	37.96	)	.00	10.27	(	4.22	-	25.00	)	.00
7 Soldiers, not deployed before	283	2	0.7	0.46	(	0.06	-	3.52	)	.46	0.54	(	0.10	-	2.84	)	.46
8 Soldiers, deployed before	239	2	0.8	0.58	(	0.08	-	4.26	)	.59	0.67	(	0.13	-	3.42	)	.63
9 Firefighters	129	2	1.6	1.14	(	0.16	-	8.24	)	.90	1.32	(	0.26	-	6.63	)	.74
10 Social welfare	85	5	5.9	4.68	(	0.81	-	27.09	)	.09	5.41	(	1.43	-	20.50	)	.01
HOSTILITY																	
1 Police officers	149	2	1.3	1													
2 Police officers	524	5	1.0	0.72	(	0.14	-	3.73	)	.69	1		-				
3 Bank employees, not victim bankrobbery	1116	28	2.5	2.00	(	0.45	-	8.82	)	.36	2.79	(	1.02	-	7.65	)	.05
4 Bank employees, victim bankrobbery	148	9	6.1	5.11	(	1.06	-	24.71	)	.04	7.14	(	2.29	-	22.28	)	.00
5 Psychiatric hospital employees	220	7	3.2	2.74	(	0.54	-	13.86	)	.22	3.83	(	1.15	-	12.70	)	.03
6 Trainees AT	714	44	6.2	6.32	(	1.45	-	27.49	)	.01	8.83	(	3.30	-	23.61	)	.00
7 Soldiers, not deployed before	281	7	2.5	1.62	(	0.31	-	8.49	)	.57	2.27	(	0.66	-	7.81	)	.20
8 Soldiers, deployed before	241	4	1.7	1.17	(	0.21	-	6.68	)	.86	1.64	(	0.42	-	6.33	)	.47
9 Firefighters	130	2	1.5	1.13	(	0.16	-	8.19	)	.90	1.58	(	0.30	-	8.27	)	.59
10 Social welfare	85	8	9.4	9.85	(	1.91	-	50.80	)	.01	13.76	(	4.03	-	46.99	)	.00
COMPOSITE VARIABLE: ANY MENTAL HEALTH PROBLEM[1]																	
1 Police officers	149	3	2.0	1													
2 Police officers	516	7	1.4	0.67	(	0.17	-	2.65	)	.57	1						

3 Bank employees, not victim bankrobbery	1116	51	4.6	2.72	(	0.81	-	9.06	)	.10	4.03	(	1.76	-	9.22	)	.00
4 Bank employees, victim bankrobbery	148	19	12.8	8.17	(	2.32	-	28.79	)	.00	12.12	(	4.89	-	30.02	)	.00
5 Psychiatric hospital employees	220	16	7.3	4.54	(	1.27	-	16.28	)	.02	6.73	(	2.65	-	17.08	)	.00
6 Trainees AT	714	96	13.4	9.33	(	2.83	-	30.78	)	.00	13.83	(	6.14	-	31.16	)	.00
7 Soldiers, not deployed before	281	9	3.2	1.52	(	0.38	-	6.01	)	.55	2.25	(	0.78	-	6.48	)	.13
8 Soldiers, deployed before	238	6	2.5	1.22	(	0.30	-	5.07	)	.78	1.81	(	0.59	-	5.55	)	.30
9 Firefighters	128	3	2.3	1.15	(	0.23	-	5.82	)	.87	1.70	(	0.43	-	6.69	)	.44
10 Social welfare	85	11	12.9	8.13	(	2.07	-	31.97	)	.00	12.05	(	4.19	-	34.64	)	.00

Adj. OR = Odds ratio adjusted for age, gender and education. 95% CI = 95% confidence interval.

N.a = Not applicable because the prevalences of very severe anxiety symptoms among firefighter is zero. This group was therefore omitted from this analyses because OR cannot be computed.

[1] Anxiety and/or depression and/or hostility.

Due to missing data the number of respondents per groups differs a little on each SCL-90-R sub scale

Table 3 Differences in prevalences of severe anxiety, depression and/or hostility symptoms (scores 80^{the} centile).

	Total	Severe/ very severe symptoms		Police A reference			Police B reference		
	N	N	%	Adj. OR	(95% CI)		Adj. OR	(95% CI)	
ANXIETY									
1 Police officers	149	11	7.4	1					
2 Police officers	522	17	3.3	0.53	(0.23 - 1.23)	.14	1		
3 Bank employees, not victim bankrobbery	1116	80	7.2	1.61	(0.77 - 3.37)	.21	3.01	(1.71 - 5.29)	.00
4 Bank employees, victim bankrobbery	148	32	21.6	5.46	(2.45 - 12.15)	.00	10.22	(5.38 - 19.42)	.00
5 Psychiatric hospital employees	220	22	10.0	2.38	(1.04 - 5.47)	.04	4.46	(2.26 - 8.80)	.00
6 Trainees AT	715	161	22.5	6.08	(2.92 - 12.62)	.00	11.37	(6.56 - 19.74)	.00
7 Soldiers, not deployed before	281	18	6.4	1.13	(0.47 - 2.75)	.78	2.12	(1.01 - 4.47)	.05
8 Soldiers, deployed before	241	12	5.0	0.90	(0.36 - 2.23)	.81	1.68	(0.78 - 3.64)	.19
9 Firefighters	129	5	3.9	0.64	(0.21 - 1.95)	.43	1.19	(0.43 - 3.29)	.74
10 Social welfare	85	15	17.6	4.39	(1.73 - 11.12)	.00	8.21	(3.69 - 18.26)	.00
DEPRESSION									
1 Police officers	149	17	11.4	1					
2 Police officers	518	26	5.0	0.41	(0.22 - 0.79)	.01	1		
3 Bank employees, not victim bankrobbery	1116	134	12.0	1.39	(0.79 - 2.45)	.25	3.37	(2.13 - 5.35)	.00

4 Bank employees, victim bankrobbery	148	31	20.9	2.56	(	1.32	-	4.95	)	.01	6.19	(	3.49	-	11.00	)	.00
5 Psychiatric hospital employees	220	36	16.4	1.95	(	1.03	-	3.73	)	.04	4.73	(	2.71	-	8.25	)	.00
6 Trainees AT	716	261	36.5	5.20	(	2.96	-	9.12	)	.00	12.58	(	7.97	-	19.86	)	.00
7 Soldiers, not deployed before	283	23	8.1	0.77	(	0.38	-	1.58	)	.48	1.87	(	1.00	-	3.52	)	.05
8 Soldiers, deployed before	239	18	7.5	0.69	(	0.34	-	1.41	)	.31	1.67	(	0.88	-	3.14	)	.12
9 Firefighters	129	16	12.4	1.10	(	0.53	-	2.29	)	.80	2.66	(	1.38	-	5.14	)	.00
10 Social welfare	85	20	23.5	2.75	(	1.28	-	5.91	)	.01	6.65	(	3.32	-	13.32	)	.00
HOSTILITY																	
1 Police officers	149	17	11.4	1													
2 Police officers	524	34	6.5	0.55	(	0.29	-	1.04	)	.07	1						
3 Bank employees, not victim bankrobbery	1116	150	13.4	1.76	(	0.99	-	3.11	)	.05	3.17	(	2.09	-	4.82	)	.00
4 Bank employees, victim bankrobbery	148	30	20.3	2.70	(	1.38	-	5.29	)	.00	4.88	(	2.81	-	8.44	)	.00
5 Psychiatric hospital employees	220	29	13.2	1.79	(	0.91	-	3.50	)	.09	3.23	(	1.87	-	5.58	)	.00
6 Trainees AT	714	225	31.5	5.12	(	2.89	-	9.10	)	.00	9.25	(	6.07	-	14.09	)	.00
7 Soldiers, not deployed before	281	58	20.6	1.85	(	0.98	-	3.49	)	.06	3.33	(	2.02	-	5.51	)	.00
8 Soldiers, deployed before	241	44	18.3	1.74	(	0.92	-	3.27	)	.09	3.13	(	1.91	-	5.15	)	.00
9 Firefighters	130	17	13.1	1.20	(	0.58	-	2.48	)	.63	2.16	(	1.16	-	4.02	)	.02
10 Social welfare	85	20	23.5	3.56	(	1.64	-	7.72	)	.00	6.42	(	3.28	-	12.57	)	.00
COMPOSITE VARIABLE: ANY MENTAL HEALTH PROBLEM[1]																	
1 Police officers	149	29	19.5	1													
2 Police officers	516	50	9.7	0.49	(	0.29	-	0.82	)	.01	1						

3 Bank employees, not victim bankrobbery	1116	236	21.1	1.58	(	0.99	-	2.53	)	.06	3.22	(	2.26	-	4.58	)	.00
4 Bank employees, victim bankrobbery	148	49	33.1	2.78	(	1.59	-	4.87	)	.00	5.66	(	3.55	-	9.03	)	.00
5 Psychiatric hospital employees	220	52	23.6	1.84	(	1.06	-	3.18	)	.03	3.75	(	2.39	-	5.89	)	.00
6 Trainees AT	714	333	46.6	4.80	(	2.97	-	7.75	)	.00	9.78	(	6.81	-	14.04	)	.00
7 Soldiers, not deployed before	281	70	24.9	1.32	(	0.77	-	2.28	)	.31	2.70	(	1.73	-	4.20	)	.00
8 Soldiers, deployed before	238	52	21.8	1.23	(	0.71	-	2.11	)	.46	2.50	(	1.61	-	3.88	)	.00
9 Firefighters	128	25	19.5	1.11	(	0.60	-	2.05	)	.73	2.27	(	1.34	-	3.85	)	.00
10 Social welfare	85	24	28.2	2.31	(	1.17	-	4.57	)	.02	4.72	(	2.57	-	8.65	)	.00

Adj. OR = Odds ratio adjusted for age, gender and education. 95% CI = 95% confidence interval.

[1] Anxiety and/or depression and/or hostility.

Due to missing data the number of respondents per groups differs a little on each SCL-90-R sub scale

Police officers: a high risk group for the development of mental health disturbances? A cohort study

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2012-001720.R1
Article Type:	Research
Date Submitted by the Author:	19-Nov-2012
Complete List of Authors:	Velden, Peter G.; Institute for Psychotrauma, ; Tilburg University, INTERVICT Rademaker, Arthur; Dutch Ministry of Defence, Research Center Military Mental Healthcare Vermetten, Eric; Dutch Ministry of Defence, Research Center Military Mental Healthcare Portengen, Marie-anne; Occupational health services ARBOUNIE, Erasmushogeschool . Yzermans, Joris; Netherlands Institute for Health Services Research, Grievink, Linda; National Institute for Public Health and the Environment,
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Occupational and environmental medicine
Keywords:	MENTAL HEALTH, PSYCHIATRY, OCCUPATIONAL & INDUSTRIAL MEDICINE

Police officers: a high risk group for the development of mental health disturbances? A cohort study

Peter. G. van der Velden (Ph.D) [a,b,c]

Arthur R. Rademaker (Ph.D)[d]

Eric Vermetten (M.D. Ph.D.)[d]

Marie-Anne Portengen (M.D.)[e]

Joris C. Yzermans (Ph.D.)[f]

Linda Grievink (Ph.D.)[g]

[a] Institute for Psychotrauma, Nienoord 5, Diemen, The Netherlands

[b] INTERVICT, Tilburg University, Tilburg, the Netherlands

[c] Arq Psychotrauma Expert Group, Diemen, The Netherlands

[d] Military Mental Health Research Center and University Medical Center Utrecht, Utrecht, The Netherlands

[e] Occupational health services ARBOUNIE, Dordrecht, The Netherlands

[f] Netherlands Institute for Health Services Research, Utrecht, The Netherlands

[8] National Institute for Public Health and the Environment, Bilthoven, The Netherlands

Keywords

Police officers**,** Anxiety, Depression, Hostility, Comparative study

Word count

2925 (exc. Title page, abstract, references, “what this study adds”, and tables)

ABSTRACT

Objectives

Policing is generally considered a high risk profession for the development of mental health problems, but this assumption lacks empirical evidence. Research question of the present study is to what extent mental health disturbances, such as (very) severe symptoms of anxiety, depression and hostility are more prevalent among police officers than among other occupational groups.

Design

Multi-comparative cross sectional study using the data of several cross sectional and longitudinal studies in the Netherlands.

Participants

Two samples of police officers (N=144, N=503), employees of banks (N=1113) and employees of banks who were robbed (N=148); employees of supermarkets (N=335), and a psychiatric hospital (N=219), employees of a governmental social welfare organization (N=76), employees who followed a training based on Rational-motive therapy (RET) to strengthen their assertiveness (N=710), soldiers before deployment (N=278) and before re-deployment (N=236), and firefighters (N=123). The numbers refer to respondents with complete data.

Primary outcomes

Prevalence of severe (sub clinical level) and very severe symptoms (clinical level) were computed using the Dutch norm tables (80th percentile en 95th percentile respectively) of the SCL-90-R. All comparisons were controlled for age, gender and education.

Results

Multivariate logistic regression and analyses showed that the prevalence of clinical and sub clinical levels of symptoms of anxiety, depression and hostility among police officers were not significantly higher than among comparison groups. The same pattern was found for the other SCL-90-R sub scales.

Conclusions

We found no indications that self-reported mental health disturbances were more prevalent among police officers than among groups of employees that are not considered high risk groups, such as employees of banks, supermarkets, psychiatric hospital and soldiers before deployment.

Police officers are commonly considered to be a high-risk group for the development of mental health disturbances because of the various critical incidents and potential traumatic events they encounter during their career. These so-called operational stressors, such as witnessing the death of children, confrontations with victims of sexual harassment, serious traffic accidents, suicide, and experiencing violence, might increase the risk of symptoms of anxiety, hostility and fatigue. A (small) minority may develop mental disorders, such as depression and PTSD[1-4.]

On the other hand, research in the past 20 years among police officers has shown that organizational stressors such as conflicts, work load, and lack of support are more likely to be adverse sources of stress than operational stressors. In other words, although police officers are more frequently confronted with critical incidents than for example employees of banks or supermarkets, organizational stressors -which are not specific for the police- appear to have more impact on health and well-being than (daily) operational stressors[2, 5-7.]

This may explain the outcomes of a study[8] in the U.K. which ranked 26 professions according to their scores on general psychological well-being and physical health. The rank orders for police officers was 9th and 11^{th,} with the first place denoting the professional occupation with the highest absolute mean score of health problems . Teachers, a professional group that is not typically associated with frequent exposure to potential traumatic stressors, ranked 2nd on both well-being and physical health. Similarly, an earlier smaller Australian comparative study reported that police officers showed significantly more favorable levels of well-being and psychological distress than school teachers and the general population (i.e. Australian norm scores)[9].

However, to the best of our knowledge there is no, peer reviewed- published multi-comparative study that a.) statistically examined differences in symptom levels between the police and several other occupational groups while also controlling for confounding factors such as age, gender and education, and b.) focused on specific mental health disturbances including sub clinical and clinically relevant levels of symptoms of anxiety, depression, and hostility. Aim of this comparative study was to explore self-reported mental health of police officers compared to members of other professions, to investigate whether there are empirically based indications that policing may be considered a high risk profession for the development of mental health disturbances.

METHODS

Samples and procedures

In the present study we compared police officers with nine other occupational groups. The presented numbers of each group refer to the number of respondents of each study group with complete data.

We compared the health of two samples of officers (N^{group1}=144, N^{group2}=503) with other occupational groups. Group 1 consisted of police officers working in the eastern part of the Netherlands (region department North and East Gelderland, response=60%)[10]. This group was originally selected in 2002 to provide reference data for group 2 to examine the consequences of the disaster and other critical incidents on health. Group 2 consisted of police officers who were involved in the Enschede fireworks disaster and its aftermath (The Netherlands, 2000), and participated in a survey 4 years post-event (2004, response=

80.5%)[5]. At that time, only one officer (0,2%) suffered from probable disaster-related PTSD. These studies were conducted on behalf of the Dutch Ministry of Health, Welfare and Sports.

We compared the two groups of officers with the following non-clinical groups of employees participating in various Dutch studies on health and critical incidents at work. Furthermore, data from group 6 was obtained to evaluate a training program (see below). The year of data gathering is presented between brackets and funding for each study will be described. This study is a clear example of a data-sharing research project of the researchers involved.

- Group 3 and 4 (1991): A nationwide sample of 1257 front office employees of savings banks , of whom 11.5% experienced one of more bank robberies (N^{group3}=1113 and N^{group4}=144 respectively, response=71%)[11]. This cross sectional study was conducted on behalf of a Savings Banks Association, The Netherlands.
- Group 5 (1996): A random sample of mental health care professionals, i.e. nurses and therapists of a psychiatric hospital (N=219, response=70%)[12]. This cross sectional study was conducted on behalf of a Psychiatric Hospital.
- Group 6 (1997-1998): Random sample of employees of various organizations, before participating in a RET training (N=710, response=74%)[13] aimed at improving their assertiveness and well-being. The cross sectional study was conducted on behalf of a training institute in the Netherlands.
- Group 7 and 8 (2005-2007): Sample of 524 soldiers from a larger prospective cohort study on stress-related disorders who were assessed prior to a 4-month deployment to Afghanistan of whom 241 were deployed before (N^{group7}=278 and N^{group8}=236

respectively, response= 82.5%)[14], conducted on behalf of the Dutch Ministry of Defense.

- Group 9 (2002): Firefighters from the Utrecht firefighters department (N=123, response=48%)[15]. This cross sectional study was conducted on behalf of the Dutch Ministry of Health, Welfare and Sport.
- Group 10 (1995): Employees of a governmental social welfare organization in the Western part of the Netherlands, who had direct contact with clients of the organization (N=76, response=65%)[16]. This cross sectional study was conducted to finish the Occupational Physician education program of the researcher.
- Groups 11 (1996): A nationwide random sample of employees of local supermarkets (N=335, response=88%)[17]. This cross sectional study was conducted on behalf of a large supermarket organization in the Netherlands.

All participants in the studies mentioned above, received written information about the scientific study aims. None of the funding organizations mentioned above were involved in the present study design, analyses and manuscript.

Measures

Besides questions regarding age, gender and education, respondents of all groups, except group 11, completed the total Symptom Check List Revised (SCL-90-R)[18,19]. This instrument uses a five-point Likert scale (from 1, 'not at all' to 5, 'extremely') and assesses symptoms over the previous 7 days. The validity and reliability of the Dutch SCL-90-R has proven to be satisfactory[19]. The Dutch cut-off scores[19] from 1986 for males and females of a normal population were used to identify participants with a.) at least severe symptoms of anxiety, depression, sleeping problems and hostility (80th percentile,) and b.) with very severe

symptoms (95th percentile) that are clinically relevant and may be indicative for a mental disorder. Group 11 was administered a brief scale consisting of 17 random items of the SCL-90-R. Our control analyses showed that the sum score of the 17 items correlated highly with the total score of the SCL-90-R across several samples ($r > .95$). Education levels differed slightly across studies. We therefore made a distinction between those with high education levels (university and higher professional education) versus low to medium level (all other levels).

Data analyses

Differences in demographics were assessed using chi-square statistics. Multivariate logistic regression analyses were used to examine to what extent very severe symptoms and severe symptoms were more prevalent among police officers, while controlling for age, gender and education level. Two composite variables on mental health were computed. The first composite variable was based on whether respondents reported very severe anxiety, very severe depression and/or very severe hostility symptoms or did not report very severe symptoms on any of these three scales. A similar composite variable was based on severe symptoms. The multivariate logistic regression analyses were repeated with these composite variables as dependent variables, and group membership, age, gender and education as independent variables (predictors). ANOVA was used to examine differences in mean scores on the sum score of 17 items between group 1, 2 and 11 while controlling for the same possible confounding factors. SPSS version 18.0 was used to perform the analyses.

RESULTS

The demographics are shown in Table 1. Chi-squares statistics indicated that study groups differed in gender (χ^2= 897.6, df=9, p <.001), age (χ^2=798, df=18, p <.001) and educational level (χ^2=852.4, df=9, p <.001).

The prevalence's of very severe symptoms (95th percentile) are presented (except group 11) in Table 2, as well as the adjusted Odd Ratios (Adj. OR) and the 95% confidence intervals (95% CI). In Table 3, similar statistics are presented with respect to severe symptoms (80th percentile). A table of the bivariate OR's is available on request (see appendix A)

Results clearly show that both groups of police officers are relatively healthy: the proportion of officers with very severe symptoms of anxiety, depression, and hostility is extremely low (≤ 1.4%). Compared to all other study groups, police officers had similar or lower prevalence of clinical levels of mental health problems according to the adjusted odd ratios. When using a less strict criterion of sub clinical levels, i.e. at least severe symptoms instead of very severe symptoms according to the norm tables, the groups of officers still ranked as groups with relatively low prevalence rates. Furthermore, the proportion of officers with severe or very severe symptoms of anxiety or depression or hostility (i.e. composite variables), was not significantly higher than among other groups. Additional analyses showed similar patterns with respect to the other sub scales of the SCL-90-R (data not shown).

The results of ANOVA (F^{main}=25.5, df=2, p <.001) and post hoc analyses reveal the 2004 sample of police officers to exhibit significantly lower mean scores on the 17 item sum score than employees of supermarkets, while the 2002 sample did not differ significantly from supermarket employees (Police^{2002}: M=20.7, SD=5.9; Police^{2004}: M=18.9, SD=4.37; Super market: M=22.6, SD=7.28).

DISCUSSION

We found no indications that sub clinical mental health problems, i.e. severe symptoms, were more prevalent amongst police officers than amongst other occupational groups in our comparative study. The same pattern was observed with respect to very severe symptoms, i.e. a level of self-reported symptoms that may be indicative of the presence of mental disorders such as generalized anxiety disorder or major depressive disorder. Surprisingly, findings showed that officers in our comparative study were as healthy as study groups that are not considered high risk professions, such as employees of banks (not victimized by robberies), supermarket employees, mental health care professionals and soldiers before deployment. Moreover, they strongly differed from employees participating in a RET training because of mental health problems that were associated with a lack of assertiveness. Although we are not aware of a similar multi-comparative study, these findings appear to be in line with the outcomes of a Dutch study on burnout among officers showing that officers had lower levels of emotional exhaustion than one large reference group consisting of various occupations[20], a Norwegian study[1] showing that officers exhibited lower levels of emotional exhaustion (but higher levels of depersonalization) than physicians, and the outcomes of the aforementioned studies[8,9]. However, these studies did not control of adjust for the possible confounding effects of demographics in contrast to our study.

How can these findings be explained? In the Dutch situation police officers follow a rigorous selection process: about 90% of those applying to the officer training program is rejected (personal communication Dr. Annika Smit, Dutch Police Academy). Moreover, officers are trained to deal and cope with critical incidents and as a consequence may be highly resilient to mental health problems[21]. This may explain why bank employees (not

selected to cope with severe incidents nor trained as rigorously as police officers), who were confronted with bank robberies reported significantly more (severe and very severe) mental health disturbances.

Interestingly, in an older prospective study among police officers involved as body handlers in a disaster, no increases in health problems compared with pre-disaster levels were observed[22]. These findings seriously question the generally held belief that policing is a high risk profession with respect to mental health: is it perhaps a (partial) myth? Either way, it reminds us of the debate on suicide among officers that once (in fact) has been described as an epidemic[23]. However, the critical review on suicide among officers of Hem and colleagues[23] clearly demonstrated that no evidence of an elevated suicide rate among officers actually exists and that previous research had serious methodological shortcomings.

Despite the strength of our study, i.e. multiple comparison groups and controlling for age, gender and education, some possible limitations and characteristics should be discussed. First, although very high scores on the SCL-90-R (very severe symptoms) may be indicative of a mental disorder, we did not conduct clinical interviews to examine the prevalence of mental disorders such as generalized anxiety, major depression and PTSD across samples. Very severe symptoms are considered to be clinically relevant. According to the Dutch norm tables[19] the mean scores of a norm group of psychiatric patients on the subscales anxiety and depression were 26.0 (sd=9.9) and 41.9 (sd=14.8) respectively. In our total sample the mean scores of those with very severe anxiety and depression symptoms were 27.7 (sd=5.2) and 43.3 (sd=8.1) respectively. Therefore, it is not very likely that the prevalence rates obtained from clinician rated instruments would be (much) higher than the prevalence rates obtained by self-report measures such as the SCL-90-R[24].

Second, we were not able to compare the prevalence of PTSD across our study samples. Therefore, it is possible that the prevalence of PTSD among police officers is higher than among the other study groups. However, given the marked overlap of PTSD symptoms with other disorders and the typical comorbidity rates of PTSD with for instance depression[25,26], it is unlikely that police officers with PTSD, did not suffer from other severe mental health disturbances. Indeed, a large study among UK military personnel (N=10069)[27] showed that 344 out of the 394 PTSD cases (87.3%) reported severe mental health problems, i.e. were GHQ cases (high scores on the General Health Questionnaire). Only a small group of PTSD cases (N=50, 12.7%) were not identified as being a GHQ case (personal communication prof. Roberto Rona). Control analyses among another sample (N=67) of Dutch employees seeking treatment at the Institute for Psychotrauma for (probable) PTSD following various traumatic events, showed similar results. In total, 86.6% (N=58) of the (probable) PTSD cases (N=67, Scores on the Impact of Event Scale (IES) of 35 or more[28]) also reported very severe mental health problems according to our composite variable of very severe symptoms. These findings are in line with previous research[28,30], demonstrating that PTSD and SCL-90-R scores are strongly associated. Thus, an increased prevalence rate for PTSD in the absence of marked mental health problems would be highly unlikely.

Third, the two groups of officers were not drawn from national samples of officers. Group 1 was obtained in the eastern part of the Netherlands, but group 2 consisted of officers from several regions in the Netherlands (mainly east, mid and west). We have no data on the non-response of group 1. Although both groups did not differ in prevalence rates of very severe anxiety, depression and hostility symptoms (i.e. clinical level of symptoms), significant differences were found in the prevalence of severe depression symptoms (80th percentile). This may reflect the normal variety of the prevalence of symptoms among sub

samples within one occupational group. In addition, table 2 showed that females in our study less often had severe symptoms than males (although the prevalence of very severe symptoms did not differ between both sub groups) while in the general population the opposite is found[19]. However, our study samples do not reflect the general population (see table 1). We used the Dutch norm tables for males and females: the cuf-offs scores for females are slightly higher than for males to enable such comparisons[19].

Finally, one could hypothesize that the data of our study groups were not all obtained very recently and that for instance the current prevalence of mental health problems among police officers is (much) higher. The data were in fact obtained in the period 1991-2007. It is possible in principle that the stability of the prevalence of assessed clinical and sub clinical symptoms varied across the study groups during this period. Therefore we cannot rule out the possibility that for instance mental health problems among police officers increased over these years, while those of bank employees decreased and those of soldiers remained stable. Unfortunately, we are not aware of any study assessing and demonstrating differences in trajectories of prevalence between the study groups over a period of 16 years. However, epidemiological studies among the general population examining 12-months prevalence of mental disorders may shed more light on this issue. Kessler and collegues[31] showed that the 12-months prevalence of any mental disorder was more or less stable over a 10-years period, i.e. 29.5% and 26.2% respectively. With respect to the Netherlands, the NEMESIS study[32] showed similar outcomes: in contrast to the expectations of mental health professional the 12-months prevalence remained stable at about 17%[33] in a similar period. These important results suggest that, although the studies were conducted among the general population, it is more likely that the prevalence of assessed mental health problems was relatively stable and did not differ significantly across occupational groups over time.

Participants of all eleven study groups were inhabitants of the Netherlands. Therefore, future research is warranted to examine to what extent our findings can be generalized to countries with different political, social, medical and legal systems, and selection and training procedures of officers. We were not able to control for other influential factors such as organizational characteristics . Finally, we did not examine the extent of substance use such as the consumption of alcohol and smoking. Although the outcomes of Sterud and colleagues[34] did not support the notion of a strong relationship between occupational stress and alcohol use in police officers, it is unclear whether alcohol use differs from the other groups in our study.

CONCLUSIONS

Despite these limitations, the present study demonstrates that, although policing is generally viewed as a high risk profession, mental health disturbances are not more prevalent in police officers as compared to various other occupational cohorts in our study. Several of these groups such as bank employees (not being robbed) and supermarket employees, as well as soldiers before deployment are typically not considered to be “high risk professions”. These findings suggest that the positive effects on the mental health of police offices of the selection process, self-selection and resilience, given the amount of potential stressful and traumatic events they encounter during their career, should not be underestimated.

Abstract

Article focus

- It is generally assumed that police officers, due to the specific nature of their work, are at (high) risk for the development of mental health problems.
- The results of the very limited number of studies that compared the mental health of officers with one or two comparison groups, suggest that this assumption needs further proof.
- To assess this assumption, clinical as well as sub clinical levels of mental health problems of officers were compared with 9 other occupational groups while controlling for demographics.

Key messages

- In contrast to this generally held belief, officers did not report more (serious) mental health problems than any of the other examined groups in our multi-comparative study.
- The protective effects of self-selection, the resilience of police officers and a rigorous selection-process of recruits, might be an explanation of the relatively low prevalence rates of mental health disturbances.

Strengths and limitations

- To the best of our knowledge, this is the first multi-comparative study examining to what extent clinical as well as sub clinical levels of symptoms of anxiety, depression and hostility are more prevalent among police officers than among people in other occupations, while controlling for demographics.
- We did not conduct clinical interviews

Acknowledgements

We would like to express our gratitude to Professor RJ Rona (Institute of Psychiatry, King's College London) for his courteous help, i.e. providing us the cross tabulation data on PTSD and GHQ cases among UK military. In addition, we like to thank M Bosmans (Msc), and A Pemberton (PhD, INTERVICT, Tilburg University) for their help en support, and A Smit (PhD, Dutch Police Academy) for providing information on the selection process of officers.

Competing interests

None.

References

1. **Berg AM**, Hem E, Lau B, et al. An exploration of job stress and health in the Norwegian police service: cross sectional study. *J Occup Med Toxicol* 2006; **1**:26.
2. **Maguen S**, Metzler TJ, McCaslin SE, et al. Routine work environment stress and PTSD symptoms in police officers. *J Nerv and Ment Dis* 2009; **197**: 754–760.
3. **Stephens C**, Miller I. Traumatic experiences and posttraumatic stress disorder in the New Zealand police. *Policing* 1998; **21**: 178–191.
4. **Hartley TA**, Violanti JM, Fekedulegn D, et al. Associations between major life events, traumatic incidents, and depression among Buffalo police officers. *Int J Emerg Ment Health* 2007; **9**: 25–35.
5. **Velden PG van der**, Kleber RJ, Grievink L, et al. Confrontations with aggression and mental health problems in police officers: The role of organizational stressors, life-events and previous mental health problems. *Psychol Trauma: Theory, Res, Practice, Policy* 2010; **2**: 135–144.
6. **Liberman AM**, Best SR, Metzler TJ, et al. Routine occupational stress and psychological distress in police. *Policing* 2002; **25**: 421–439.
7. **Huddleston L**, Stephens C, Paton D. An evaluation of traumatic and organizational experiences on the psychological health of New Zealand police recruits. *Work* 2007; **28**: 199–207.
8. **Johnson S**, Cooper C, Cartwright S, et al. The experience of work-related stress across occupations. *J Manag Psychol* 2005; **20**: 178-187.

9. **Hart PM**, Wearing AJ, Headey B. Police stress and well-being: Integrating personality, coping and daily work experiences. *J Occup Organ Psychol* 1995; **68**: 133–165.
10. **Velden PG van der**, Grievink L, Dusseldorp A, et al. *Health victims Enschede fireworks disaster* (In Dutch). Instituut voor Psychotrauma (IvP)/ Rijksinstituut voor Volksgezondheid en Milieu (RIVM), 2002.
11. **Velden PG van der**, Burg S van der, Steinmetz CHD, et al. *Victim of bank robberies* (in Dutch). Bohn Stafleu Van Loghem, 1992.
12. **Velden PG van der**, Herpers TMM. Aggression in a psychiatric hospital (in Dutch). *Gedrag & Gezondheid* 1994; **5**: 209-218.
13. **Velden PG van der**, Kleber RJ, Oostrom I van. *StressMonitor manual* (in Dutch). Instituut voor Psychotrauma/S&N, 2000.
14. **Rademaker AR**, van Zuiden M, Vermetten E, et al. Type D personality and the development of PTSD symptoms: a prospective study. *J Abnorm Psychol* 2011; **120** (2), 299-307.
15. **Velden PG van der**, Christiaanse B, Kleber RJ, et al. The effects of disaster exposure and post-disaster critical incidents on intrusions, avoidance and health problems among firefighters: A comparative study. *Stress, Trauma Crisis: International J* 2006; **9**: 73–93.
16. **Portengen MAF**. *Aggression and violence in social welfare* (in Dutch). Corvu / AMC Amsterdam, 1995.
17. **Velden PG van der**. *Investigation of unsafe situations in supermarkets* (in Dutch). Instituut voor Psychotrauma, 1996.

18. **Derogatis LR**. *SCL-90-R: administration, scoring and procedures manual-I for the R(evised) version*. Johns Hopkins University School of Medicine, Clinical Psychometrics Research Unit, 1977.

19. **Arrindell WA**, Ettema JHM. *SCL-90-R Manual* (in Dutch). Swets & Zeitlinger/ Swets Test publishers, 1986 & 2003.

20. **Kop N**, Euwema M, Schaufeli W. Burnout, job stress and violent behavior among Dutch police officers. *Work & Stress* 1999; **13**: 326-340.

21. **Galatzer-Levy IR**, Madan A, Neylan TC, et al. Peritraumatic and trait dissociation differentiate police officers with resilient versus symptomatic trajectories of posttraumatic stress symptoms. *J Trauma Stress* 2011; **24**: 557-65.

22. **Alexander DA,** Wells A. Reactions of police officers to body handling after a major disaster: a before and after comparison. *Br J Psychiatry* 1991; **159**: 547–555.

23. **Hem E**, Berg AM, Ekeberg AO. Suicide in police--a critical review. *Suicide Life Threat Behav* 2001; **31**: 224-33.

24. **Engelhard IM**, van den Hout MA, et al. Deployment-related stress and trauma in Dutch soldiers returning from Iraq. Prospective study. *Br J Psychiatry* 2007; **191**: 140-145.

25. **Deering CG**, Glover SG, Ready D, et al. Unique patterns of comorbidity in posttraumatic stress disorder from different sources of trauma. *Compr Psychiatry* 1996; ***37***: 336-346.

26. **Blanchard EB**, Buckley TC, Hickling EJ, Taylor AE. Posttraumatic stress disorder and comorbid major depression: is the correlation an illusion? *J Anxiety Disord* 1998; **12**: 21-37.

27. **Rona RJ**, Jones M, Iversen A, et al. The impact of posttraumatic stress disorder on impairment in the UK military at the time of the Iraq war. *J Psychiatry Res* 2009; **43**: 649-55.

28. **Neal LA**, Busutti W, Rollins JI, et al. convergent validity of measures of Post-Traumatic Stress Disorder in a mixed military and civilian population. *J Trauma Stress* 1994; **7**: 447-455.

29. **Saunders BE**, Mandoki Arata C, Kilpatrick D. Development of a crime-related Post-Traumatic Stress Disorder scale for women within the symptom checklist-90-revised. *J Trauma Stress* 1990; **3**: 439-448.

30. **Weathers FW**, Litz BT, Keane TM, et al. The utility of the SCL-90-R for the diagnosis of war-zone related Posttraumatic Stress Disorder. *J Trauma Stress* 1996; **9**: 111-128.

31. **Kessler RC**, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005; **62**: 617-627.

32. **Vollebergh WAM**, Iedema J, Bijl RV, Graaf R de, Smit F, Ormel J. The structure and stability of common mental disorders: the Nemesis-study. *Arch Gen Psychiatry* 2001; **58**: 597-603.

33. **Graaf R de**, Have M ten, Dorsselaer S van. De psychische gezondheid van de Nederlandse bevolking NEMESIS-2: Opzet en eerste resultaten [The mental health of the Dutch population NEMISIS-2: Design and first results. In Dutch]. Utrecht, Trimbos.

34. **Sterud T**, Hem E, Ekeberg O, et al. Occupational stress and alcohol use: a study of two nationwide samples of operational police and ambulance, personnel in Norway. Stud Alcohol Drugs 2007; **68** (6):896-904.

Table 1 Gender, age and education level of study groups[1]

		Gender		Age (years)			Education	
	N	males	females	18-30	31-45	46-65	low-medium	high
		%	%	%	%	%	%	%
1 Police officers	144	86.1	13.9	4.9	47.9	47.2	96.5	3.5
2 Police officers	503	88.7	11.3	6.0	56.5	37.6	91.7	8.3
3 Bank employees, not victim robbery	1113	34.1	65.9	48.7	38.3	13.0	81.0	19.0
4 Bank employees, victim robbery	148	47.3	52.7	37.8	44.6	17.6	79.1	20.9
5 Psychiatric hospital employees	219	37.9	62.1	41.6	47.5	11.0	61.6	38.4
6 Trainees AT	710	68.2	31.8	29.0	57.9	13.1	33.8	66.2
7 Soldiers, not deployed before	278	87.8	12.2	81.3	14.7	4.0	88.8	11.2
8 Soldiers, deployed before	236	94.5	5.5	43.6	43.2	13.1	85.2	14.8
9 Firefighters	123	96.7	3.3	17.1	39.0	43.9	94.3	5.7
10 Social welfare	76	40.8	59.2	15.8	50.0	34.2	42.1	57.9
11Supermarkets	335	56.1	43.9	100	-	-	86.6	13.4
Total	3885	61.5	38.5	41.9	40.9	17.2	74.1	25.9

[1] Demographic characteristics of respondents with complete data

Table 2 Differences in prevalence of severe anxiety. depression and/or hostility symptoms (scores 80^{the} centile) between study groups (N=3885).

	Severe Anxiety Symptoms												Severe Depression Symptoms											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	9	6.2	1										17	11.8	1									
Police officers 2 (Ref. second colomn)	17	3.4	0.54	0.24	to	1.24	.15	1					26	5.2	0.41	0.22	to	0.79	.01					
Bank empl., not victim robbery	80	7.2	1.52	0.73	to	3.17	.26	2.82	1.61	to	4.92	.00	134	12.0	1.26	0.72	to	2.20	.41	3.10	1.97	to	4.89	.00
Bank empl., victim robbery	32	21.6	5.24	2.37	to	11.59	.00	9.71	5.14	to	18.35	.00	31	20.9	2.35	1.22	to	4.52	.01	5.76	3.25	to	10.19	.00
Psychiatric hospital empl.	22	10.0	2.32	1.01	to	5.30	.05	4.31	2.19	to	8.48	.00	36	16.4	1.82	0.96	to	3.46	.07	4.50	2.59	to	7.82	.00
Trainees AT	161	22.7	5.98	2.89	to	12.35	.00	11.27	6.53	to	19.44	.00	257	36.2	4.83	2.77	to	8.44	.00	11.98	7.62	to	18.82	.00
Soldiers, not deployed before	17	6.1	1.02	0.43	to	2.42	.97	1.91	0.93	to	3.93	.08	20	7.2	0.60	0.29	to	1.21	.15	1.47	0.78	to	2.75	.23
Soldiers, deployed before	12	5.1	0.85	0.34	to	2.09	.72	1.58	0.74	to	3.41	.24	18	7.6	0.63	0.31	to	1.29	.21	1.56	0.83	to	2.92	.17
Firefighters	5	4.1	0.62	0.20	to	1.89	.40	1.14	0.41	to	3.14	.81	16	13.0	1.08	0.52	to	2.24	.84	2.60	1.35	to	5.03	.00
Social welfare	13	17.1	4.32	1.72	to	10.88	.00	8.04	3.64	to	17.77	.00	17	22.4	2.56	1.20	to	5.47	.02	6.25	3.14	to	12.45	.00
Education																								
Low-medium (Ref.)	231	8.9	1					1					336	13.0	1					1				
High	137	14.3	0.77	0.59	to	1.01	.06	0.75	0.57	to	0.98	.03	236	24.6	1.00	0.80	to	1.26	.99	0.99	0.79	to	1.24	.90
Age																								
18-30 (Ref.)	127	9.8	1					1					195	15.1	1					1				
31-35	168	10.6	0.85	0.60	to	1.21	.36	0.83	0.58	to	1.18	.29	266	16.7	0.86	0.64	to	1.15	.31	0.81	0.60	to	1.10	.17
46-65	73	10.9	0.73	0.54	to	1.00	.05	0.72	0.52	to	0.99	.04	111	16.6	0.76	0.58	to	0.99	.04	0.72	0.55	to	0.94	.02
Gender																								
Males (Ref.)	240	10.9	1					1					371	16.8	1					1				
Females	128	9.5	0.70	0.53	to	0.91	.01	0.71	0.54	to	0.93	.01	201	14.9	0.72	0.58	to	0.90	.00	0.72	0.58	to	0.91	.01

Table 2 Continued

	Severe Hostility Symptoms												Severe Symptoms Composite Variable											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	16	11.1	1										26	18.1	1									
Police officers 2 (Ref. second colomn)	33	6.6	0.57	0.30	to	1.06	.08	1					49	9.7	0.49	0.29	to	0.83	.01	1				
Bank empl., not victim robbery	150	13.5	1.68	0.96	to	2.96	.07	2.97	1.96	to	4.50	.00	236	21.2	1.49	0.94	to	2.38	.09	3.05	2.15	to	4.33	.00
Bank empl., victim robbery	30	20.3	2.62	1.34	to	5.10	.00	4.62	2.68	to	7.98	.00	49	33.1	2.66	1.52	to	4.64	.00	5.43	3.42	to	8.63	.00
Psychiatric hospital empl.	29	13.2	1.74	0.89	to	3.40	.10	3.07	1.78	to	5.31	.00	52	23.7	1.78	1.03	to	3.08	.04	3.66	2.34	to	5.72	.00
Trainees AT	224	31.5	5.06	2.86	to	8.94	.00	8.96	5.90	to	13.59	.00	328	46.2	4.66	2.90	to	7.49	.00	9.59	6.71	to	13.71	.00
Soldiers, not deployed before	56	20.1	1.83	0.98	to	3.42	.06	3.25	1.99	to	5.30	.00	66	23.7	1.26	0.74	to	2.14	.40	2.59	1.68	to	3.99	.00
Soldier, deployed before	44	18.6	1.73	0.93	to	3.25	.08	3.07	1.87	to	5.02	.00	52	22.0	1.20	0.70	to	2.05	.50	2.47	1.60	to	3.81	.00
Firefighters	17	13.8	1.20	0.58	to	2.49	.63	2.13	1.14	to	3.97	.02	25	20.3	1.09	0.59	to	2.01	.79	2.21	1.30	to	3.75	.00
Social welfare	17	22.4	3.62	1.68	to	7.82	.00	6.42	3.30	to	12.51	.00	21	27.6	2.31	1.17	to	4.53	.02	4.71	2.58	to	8.59	.00
Education																								
Low-medium (Ref.)	419	16.2	1					1					591	22.8	1					1				
High	197	20.5	0.70	0.55	to	0.88	.00	0.69	0.55	to	0.87	.00	313	32.6	0.85	0.69	to	1.03	.10	0.84	0.69	to	1.02	.08
Age																								
18-30 (Ref.)	234	18.1	1					1					346	26.7	1					1				
31-35	276	17.4	1.12	0.84	to	1.49	.46	1.13	0.84	to	1.51	.43	403	25.4	1.11	0.87	to	1.44	.40	1.08	0.84	to	1.40	.55
46-65	106	15.9	0.92	0.71	to	1.20	.55	0.94	0.72	to	1.23	.65	155	23.2	0.90	0.71	to	1.13	.35	0.87	0.69	to	1.10	.25
Gender																								
Males (Ref.)	433	19.7	1					1					698	27.1	1					1				
Females	183	13.6	0.55	0.44	to	0.68	.00	0.55	0.44	to	0.69	.00	306	22.7	0.63	0.52	to	0.77	.00	0.64	0.53	to	0.78	.00

Adj. OR = Odds ratio adjusted for all study variables. 95 CI = 95 confidence interval. Ref. =Reference group
N.a = Not applicable because the prevalence of very severe anxiety symptoms among firefighter is zero.
1 Anxiety and/or depression and/or hostility.

Table 3 Differences in prevalence of very severe anxiety, depression and/or hostility symptoms (scores 95^{the} centile) between study groups (N=3885).

	Very Severe Anxiety Symptoms												Very Severe Depression Symptoms											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	2	1.4	1										2	1.4	1									
Police officers 2 (Ref. second colomn)	3	0.6	0.41	0.07	to	2.50	.34	1					6	1.2	0.86	0.17	to	4.32	.86	1				
Bank empl., not victim robbery	9	0.8	0.73	0.15	to	3.56	.69	1.74	0.45	to	6.78	.42	30	2.7	2.09	0.48	to	9.03	.33	2.41	0.96	to	6.02	.06
Bank empl., victim robbery	7	4.7	4.08	0.81	to	20.62	.09	9.81	2.44	to	39.50	.00	13	8.8	7.22	1.58	to	33.11	.01	8.35	3.06	to	22.80	.00
Psychiatric hospital empl.	1	0.5	0.38	0.03	to	4.41	.44	0.91	0.09	to	9.12	.94	13	5.9	4.92	1.07	to	22.71	.04	5.68	2.06	to	15.64	.00
Trainees AT	32	4.5	3.20	0.70	to	14.53	.13	7.67	2.18	to	27.04	.00	69	9.7	8.39	1.97	to	35.67	.00	9.70	4.02	to	23.44	.00
Soldiers, not deployed before	2	0.7	0.54	0.07	to	4.14	.55	1.30	0.20	to	8.38	.78	1	0.4	0.22	0.02	to	2.52	.22	0.26	0.03	to	2.19	.21
Soldiers, deployed before	0	0.0	N.A										2	0.8	0.56	0.08	to	4.09	.57	0.65	0.13	to	3.30	.61
Firefighters	0	0.0	N.A										2	1.6	1.12	0.15	to	8.06	.91	1.30	0.26	to	6.52	.75
Social welfare	1	1.3	1.04	0.09	to	12.24	.97	2.50	0.25	to	25.41	.44	4	5.3	4.63	0.81	to	26.49	.08	5.34	1.43	to	19.96	.01
Education																								
Low-medium (Ref.)	29	1.1	1										82	3.2	1									
High	28	2.9	1.19	0.64	to	2.21	.58	1.20	0.64	to	2.24	.56	60	6.2	0.87	0.59	to	1.30	.50	0.87	0.59	to	1.30	.51
Age																								
18-30 (Ref.)	16	1.2	1										52	4.0	1									
31-35	32	2.0	0.98	0.40	to	2.42	.96	0.99	0.39	to	2.49	.98	67	4.2	1.18	0.68	to	2.04	.56	1.18	0.68	to	2.05	.57
46-65	9	1.3	1.15	0.53	to	2.49	.72	1.16	0.52	to	2.59	.71	23	3.4	0.93	0.56	to	1.53	.76	0.92	0.56	to	1.54	.76
Gender																								
Males (Ref.)	41	1.9	1										86	3.9	1									
Females	16	1.2	0.61	0.32	to	1.17	.14	0.62	0.32	to	1.19	.15	56	4.2	0.79	0.53	to	1.18	.25	0.80	0.54	to	1.19	.27

Table 3 Continued

	Very Severe Hostility Symptoms												Very Severe Symptoms Composite Variable											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	2	1.4	1										3	2.1	1									
Police officers 1 (Ref. second column)	5	1.0	0.73	0.14	to	3.79	.70	1					7	1.4	0.67	0.17	to	2.62	.56	1				
Bank empl., not victim robbery	28	2.5	1.67	0.38	to	7.31	.50	2.25	0.83	to	6.12	.11	51	4.6	2.31	0.70	to	7.64	.17	3.42	1.50	to	7.78	.00
Bank empl., victim robbery	9	6.1	4.41	0.92	to	21.20	.06	5.97	1.92	to	18.54	.00	19	12.8	7.16	2.04	to	25.10	.00	10.63	4.31	to	26.21	.00
Psychiatric hospital empl.	7	3.2	2.40	0.48	to	12.07	.29	3.23	0.98	to	10.65	.05	16	7.3	4.02	1.13	to	14.36	.03	5.95	2.36	to	15.05	.00
Trainees AT	44	6.2	5.71	1.32	to	24.72	.02	7.71	2.90	to	20.49	.00	96	13.5	8.38	2.55	to	27.51	.00	12.43	5.55	to	27.83	.00
Soldiers, not deployed before	7	2.5	1.26	0.25	to	6.42	.78	1.70	0.51	to	5.72	.39	8	2.9	1.12	0.29	to	4.43	.87	1.67	0.58	to	4.82	.34
Soldiers, deployed before	4	1.7	1.02	0.18	to	5.75	.99	1.38	0.36	to	5.30	.64	6	2.5	1.10	0.27	to	4.54	.89	1.64	0.54	to	5.00	.38
Firefighters	2	1.6	1.07	0.15	to	7.76	.94	1.49	0.28	to	7.78	.64	3	2.4	1.11	0.22	to	5.59	.90	1.66	0.42	to	6.51	.47
Social welfare	7	9.2	9.20	1.81	to	46.91	.01	12.57	3.73	to	42.40	.00	9	11.8	7.68	1.97	to	29.89	.00	11.41	4.01	to	32.45	.00
Education																								
Low-medium (Ref.)	78	3.0	1					1					134	5.2	1									
High	37	3.9	0.62	0.39	to	0.99	.05	0.62	0.39	to	0.99	.05	84	8.7	0.79	0.56	to	1.10	.16	0.79	0.56	to	1.10	.16
Age																								
18-30 (Ref.)	53	4.1	1					1					88	6.8	1									
31-35	44	2.8	1.56	0.85	to	2.85	.15	1.67	0.89	to	3.11	.11	96	6.0	1.28	0.82	to	2.02	.28	1.31	0.83	to	2.06	.25
46-65	18	2.7	0.87	0.49	to	1.54	.63	0.95	0.52	to	1.72	.86	34	5.1	0.92	0.60	to	1.39	.69	0.94	0.61	to	1.44	.77
Gender																								
Males (Ref.)	66	3.0	1					1					130	5.9	1					1				
Females	49	3.6	0.87	0.55	to	1.35	.53	0.88	0.56	to	1.37	.56	88	6.5	0.81	0.58	to	1.12	.20	0.81	0.59	to	1.13	.22

Adj. OR = Odds ratio adjusted for all study variables. 95 CI = 95 confidence interval. Ref. =Reference group
N.a = Not applicable because the prevalence of very severe anxiety symptoms among firefighter is zero.
[1] Anxiety and/or depression and/or hostility.

Appendix A Bivariate associations between predictors and dependent variables

	Severe Anxiety symptoms				Severe Depression symptoms				Severe hostility symptoms				Severe Symptoms Composite			
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
Groups																
Police officers 1 (Ref.)	1				1				1				1			
Police officers 2 (Ref. second colomn)	0.53	.13	1		0.41	.01	1		0.56	.07	1		0.49	.01	1	
Bank employees, not victim robbery	1.16	.68	2.21	.00	1.02	.94	2.51	.00	1.25	.43	2.22	.00	1.22	.38	2.49	.00
Bank employees, victim robbery	4.14	.00	7.89	.00	1.98	.04	4.86	.00	2.03	.03	3.62	.00	2.25	.00	4.59	.00
Psychiatric hospital employees	1.68	.21	3.19	.00	1.47	.22	3.61	.00	1.22	.55	2.17	.00	1.41	.20	2.89	.00
Trainees AT	4.40	.00	8.38	.00	4.24	.00	10.41	.00	3.69	.00	6.56	.00	3.90	.00	7.96	.00
Soldiers, not deployed before	0.98	.96	1.86	.08	0.58	.12	1.42	.25	2.02	.02	3.59	.00	1.41	.18	2.88	.00
Soldiers, deployed before	0.80	.63	1.53	.27	0.62	.18	1.52	.19	1.83	.05	3.26	.00	1.28	.35	2.62	.00
Firefighters	0.64	.43	1.21	.71	1.12	.77	2.74	.00	1.28	.50	2.28	.01	1.16	.64	2.36	.00
Social welfare	3.10	.01	5.90	.00	2.15	.04	5.29	.00	2.31	.03	4.10	.00	1.73	.10	3.54	.00
Education																
Low-medium	1				1				1				1			
High	1.70	.00	1.63	.00	2.18	.00	2.15	.00	1.34	.00	1.31	.01	1.63	.00	1.60	.00
Age																
18-30	1				1				1				1			
31-35	0.89	.43	0.83	.25	0.89	.36	0.83	.16	1.17	.23	1.14	.31	1.21	.09	1.15	.22
46-65	0.96	.79	0.93	.63	1.01	.95	0.96	.73	1.11	.39	1.12	.39	1.12	.29	1.09	.44
Gender																
Males	1				1				1				1			
Females	0.86	.19	0.85	.18	0.87	.13	0.85	.10	0.64	.00	0.63	.00	0.79	.00	0.78	.00

Appendix A Continued

	Very Severe Anxiety symptoms				Very Severe Depression symptoms				Very Severe hostility symptoms				Very Severe symmtoms Composite			
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
Groups																
Police officers 1 (Ref.)	1				1				1				1			
Police officers 2 (Ref. second colomn)	0.43	.35	1		0.86	.85	1		0.71	.69	1		0.66	.56	1	
Bank employees, not victim robbery	0.58	.49	1.36	.65	1.97	.36	2.30	.07	1.83	.41	2.57	.05	2.26	.18	3.40	.00
Bank employees, victim robbery	3.53	.12	8.27	.00	6.84	.01	7.98	.00	4.60	.05	6.45	.00	6.92	.00	10.44	.00
Psychiatric hospital employees	0.33	.36	0.77	.82	4.48	.05	5.23	.00	2.34	.29	3.29	.04	3.70	.04	5.59	.00
Trainees AT	3.35	.10	7.87	.00	7.64	.01	8.92	.00	4.69	.03	6.58	.00	7.35	.00	11.08	.00
Soldiers, not deployed before	0.51	.51	1.21	.84	0.26	.27	0.30	.27	1.83	.45	2.57	.11	1.39	.63	2.10	.16
Soldiers, deployed before	0.00	1.00	0.00	1.00	0.61	.62	0.71	.67	1.22	.82	1.72	.42	1.23	.78	1.85	.27
Firefighters	0.00	1.00	0.00	1.00	1.17	.87	1.37	.70	1.17	.87	1.65	.55	1.18	.85	1.77	.41
Social welfare	0.95	.97	2.22	.49	3.94	.12	4.60	.02	7.20	.02	10.10	.00	6.31	.01	9.52	.00
Education																
Low-medium	1				1				1				1			
High	2.65	.00	2.71	.00	2.04	.00	1.98	.00	1.29	.21	1.26	.26	1.76	.00	1.71	.00
Age																
18-30	1				1				1				1			
31-35	0.92	.83	0.93	.87	1.17	.53	1.10	.70	1.54	.12	1.57	.12	1.36	.14	1.30	.22
46-65	1.50	.28	1.54	.28	1.23	.40	1.19	.49	1.03	.93	1.09	.78	1.20	.38	1.18	.43
Gender																
Males	1				1				1				1			
Females	0.63	.13	0.64	.13	1.07	.71	1.05	.80	1.22	.30	1.21	.33	1.12	.45	1.09	.54

30

OR = Odds ratio.
Ref. =Reference group

Police officers: a high risk group for the development of mental health disturbances? A cohort study

Peter. G. van der Velden (Ph.D) [a,b,c]

Arthur R. Rademaker (Ph.D)[d]

Eric Vermetten (M.D. Ph.D.)[d]

Marie-Anne Portengen (M.D.)[e]

Joris C. Yzermans (Ph.D.)[f]

Linda Grievink (Ph.D.)[g]

[a] Institute for Psychotrauma, Nienoord 5, Diemen, The Netherlands

[b] INTERVICT, Tilburg University, Tilburg, the Netherlands

[c] Arq Psychotrauma Expert Group, Diemen, The Netherlands

[d] Military Mental Health Research Center and University Medical Center Utrecht, Utrecht, The Netherlands

[e] Occupational health services ARBOUNIE, Dordrecht, The Netherlands

[f] Netherlands Institute for Health Services Research, Utrecht, The Netherlands

[8] National Institute for Public Health and the Environment, Bilthoven, The Netherlands

Keywords

Police officers, Anxiety, Depression, Hostility, Comparative study

Word count

2925 (exc. Title page, abstract, references, “what this study adds”, and tables)

ABSTRACT

Objectives

Policing is generally considered a high risk profession for the development of mental health problems, but this assumption lacks empirical evidence. Research question of the present study is to what extent mental health disturbances, such as (very) severe symptoms of anxiety, depression and hostility are more prevalent among police officers than among other occupational groups.

Design

Multi-comparative cross sectional study using the data of several cross sectional and longitudinal studies in the Netherlands.

Participants

Two samples of police officers (N=144, N=503), employees of banks (N=1113) and employees of banks who were robbed (N=148); employees of supermarkets (N=335), and a psychiatric hospital (N=219), employees of a governmental social welfare organization (N=76), employees who followed a training based on Rational-motive therapy (RET) to strengthen their assertiveness (N=710), soldiers before deployment (N=278) and before re-deployment (N=236), and firefighters (N=123). The numbers refer to respondents with complete data.

Primary outcomes

Prevalence of severe (sub clinical level) and very severe symptoms (clinical level) were computed using the Dutch norm tables (80th percentile en 95th percentile respectively) of the SCL-90-R. All comparisons were controlled for age, gender and education.

Results

Multivariate logistic regression and analyses showed that the prevalence of clinical and sub clinical levels of symptoms of anxiety, depression and hostility among police officers were not significantly higher than among comparison groups. The same pattern was found for the other SCL-90-R sub scales.

Conclusions

We found no indications that self-reported mental health disturbances were more prevalent among police officers than among groups of employees that are not considered high risk groups, such as employees of banks, supermarkets, psychiatric hospital and soldiers before deployment.

Police officers are commonly considered to be a high-risk group for the development of mental health disturbances because of the various critical incidents and potential traumatic events they encounter during their career. These so-called operational stressors, such as witnessing the death of children, confrontations with victims of sexual harassment, serious traffic accidents, suicide, and experiencing violence, might increase the risk of symptoms of anxiety, hostility and fatigue. A (small) minority may develop mental disorders, such as depression and PTSD[1-4.]

On the other hand, research in the past 20 years among police officers has shown that organizational stressors such as conflicts, work load, and lack of support are more likely to be adverse sources of stress than operational stressors. In other words, although police officers are more frequently confronted with critical incidents than for example employees of banks or supermarkets, organizational stressors -which are not specific for the police- appear to have more impact on health and well-being than (daily) operational stressors[2, 5-7.]

This may explain the outcomes of a study[8] in the U.K. which ranked 26 professions according to their scores on general psychological well-being and physical health. The rank orders for police officers was 9th and 11^{th,} with the first place denoting the professional occupation with the highest absolute mean score of health problems . Teachers, a professional group that is not typically associated with frequent exposure to potential traumatic stressors, ranked 2nd on both well-being and physical health. Similarly, an earlier smaller Australian comparative study reported that police officers showed significantly more favorable levels of well-being and psychological distress than school teachers and the general population (i.e. Australian norm scores)[9].

However, to the best of our knowledge there is no, peer reviewed- published multi-comparative study that a.) statistically examined differences in symptom levels between the police and several other occupational groups while also controlling for confounding factors such as age, gender and education, and b.) focused on specific mental health disturbances including sub clinical and clinically relevant levels of symptoms of anxiety, depression, and hostility. Aim of this comparative study was to explore self-reported mental health of police officers compared to members of other professions, to investigate whether there are empirically based indications that policing may be considered a high risk profession for the development of mental health disturbances.

METHODS

Samples and procedures

In the present study we compared police officers with nine other occupational groups. The presented numbers of each group refer to the number of respondents of each study group with complete data.

We compared the health of two samples of officers (N^{group1}=144, N^{group2}=503) with other occupational groups. Group 1 consisted of police officers working in the eastern part of the Netherlands (region department North and East Gelderland, response=60%)[10]. This group was originally selected in 2002 to provide reference data for group 2 to examine the consequences of the disaster and other critical incidents on health. Group 2 consisted of police officers who were involved in the Enschede fireworks disaster and its aftermath (The Netherlands, 2000), and participated in a survey 4 years post-event (2004, response=

80.5%)[5]. At that time, only one officer (0,2%) suffered from probable disaster-related PTSD. These studies were conducted on behalf of the Dutch Ministry of Health, Welfare and Sports.

We compared the two groups of officers with the following non-clinical groups of employees participating in various Dutch studies on health and critical incidents at work. Furthermore, data from group 6 was obtained to evaluate a training program (see below). The year of data gathering is presented between brackets and funding for each study will be described. This study is a clear example of a data-sharing research project of the researchers involved.

- Group 3 and 4 (1991): A nationwide sample of 1257 front office employees of savings banks , of whom 11.5% experienced one of more bank robberies (N^{group3}=1113 and N^{group4}=144 respectively, response=71%)[11]. This cross sectional study was conducted on behalf of a Savings Banks Association, The Netherlands.
- Group 5 (1996): A random sample of mental health care professionals, i.e. nurses and therapists of a psychiatric hospital (N=219, response=70%)[12]. This cross sectional study was conducted on behalf of a Psychiatric Hospital.
- Group 6 (1997-1998): Random sample of employees of various organizations, before participating in a RET training (N=710, response=74%)[13] aimed at improving their assertiveness and well-being. The cross sectional study was conducted on behalf of a training institute in the Netherlands.
- Group 7 and 8 (2005-2007): Sample of 524 soldiers from a larger prospective cohort study on stress-related disorders who were assessed prior to a 4-month deployment to Afghanistan of whom 241 were deployed before (N^{group7}=278 and N^{group8}=236

respectively, response= 82.5%)[14], conducted on behalf of the Dutch Ministry of Defense.

- Group 9 (2002): Firefighters from the Utrecht firefighters department (N=123, response=48%)[15]. This cross sectional study was conducted on behalf of the Dutch Ministry of Health, Welfare and Sport.
- Group 10 (1995): Employees of a governmental social welfare organization in the Western part of the Netherlands, who had direct contact with clients of the organization (N=76, response=65%)[16]. This cross sectional study was conducted to finish the Occupational Physician education program of the researcher.
- Groups 11 (1996): A nationwide random sample of employees of local supermarkets (N=335, response=88%)[17]. This cross sectional study was conducted on behalf of a large supermarket organization in the Netherlands.

All participants in the studies mentioned above, received written information about the scientific study aims. None of the funding organizations mentioned above were involved in the present study design, analyses and manuscript.

Measures

Besides questions regarding age, gender and education, respondents of all groups, except group 11, completed the total Symptom Check List Revised (SCL-90-R)[18,19]. This instrument uses a five-point Likert scale (from 1, 'not at all' to 5, 'extremely') and assesses symptoms over the previous 7 days. The validity and reliability of the Dutch SCL-90-R has proven to be satisfactory[19]. The Dutch cut-off scores[19] from 1986 for males and females of a normal population were used to identify participants with a.) at least severe symptoms of anxiety, depression, sleeping problems and hostility (80th percentile,) and b.) with very severe

symptoms (95th percentile) that are clinically relevant and may be indicative for a mental disorder. Group 11 was administered a brief scale consisting of 17 random items of the SCL-90-R. Our control analyses showed that the sum score of the 17 items correlated highly with the total score of the SCL-90-R across several samples ($r > .95$). Education levels differed slightly across studies. We therefore made a distinction between those with high education levels (university and higher professional education) versus low to medium level (all other levels).

Data analyses

Differences in demographics were assessed using chi-square statistics. Multivariate logistic regression analyses were used to examine to what extent very severe symptoms and severe symptoms were more prevalent among police officers, while controlling for age, gender and education level. Two composite variables on mental health were computed. The first composite variable was based on whether respondents reported very severe anxiety, very severe depression and/or very severe hostility symptoms or did not report very severe symptoms on any of these three scales. A similar composite variable was based on severe symptoms. The multivariate logistic regression analyses were repeated with these composite variables as dependent variables, and group membership, age, gender and education as independent variables (predictors). ANOVA was used to examine differences in mean scores on the sum score of 17 items between group 1, 2 and 11 while controlling for the same possible confounding factors. SPSS version 18.0 was used to perform the analyses.

RESULTS

The demographics are shown in Table 1. Chi-squares statistics indicated that study groups differed in gender (χ^2= 897.6, df=9, p <.001), age (χ^2=798, df=18, p <.001) and educational level (χ^2=852.4, df=9, p <.001).

The prevalence's of very severe symptoms (95th percentile) are presented (except group 11) in Table 2, as well as the adjusted Odd Ratios (Adj. OR) and the 95% confidence intervals (95% CI). In Table 3, similar statistics are presented with respect to severe symptoms (80th percentile). A table of the bivariate OR's is available on request (see appendix A)

Results clearly show that both groups of police officers are relatively healthy: the proportion of officers with very severe symptoms of anxiety, depression, and hostility is extremely low (≤ 1.4%). Compared to all other study groups, police officers had similar or lower prevalence of clinical levels of mental health problems according to the adjusted odd ratios. When using a less strict criterion of sub clinical levels, i.e. at least severe symptoms instead of very severe symptoms according to the norm tables, the groups of officers still ranked as groups with relatively low prevalence rates. Furthermore, the proportion of officers with severe or very severe symptoms of anxiety or depression or hostility (i.e. composite variables), was not significantly higher than among other groups. Additional analyses showed similar patterns with respect to the other sub scales of the SCL-90-R (data not shown).

The results of ANOVA (F^{main}=25.5, df=2, p <.001) and post hoc analyses reveal the 2004 sample of police officers to exhibit significantly lower mean scores on the 17 item sum score than employees of supermarkets, while the 2002 sample did not differ significantly from supermarket employees (Police^{2002}: M=20.7, SD=5.9; Police^{2004}: M=18.9, SD=4.37; Super market: M=22.6, SD=7.28).

DISCUSSION

We found no indications that sub clinical mental health problems, i.e. severe symptoms, were more prevalent amongst police officers than amongst other occupational groups in our comparative study. The same pattern was observed with respect to very severe symptoms, i.e. a level of self-reported symptoms that may be indicative of the presence of mental disorders such as generalized anxiety disorder or major depressive disorder. Surprisingly, findings showed that officers in our comparative study were as healthy as study groups that are not considered high risk professions, such as employees of banks (not victimized by robberies), supermarket employees, mental health care professionals and soldiers before deployment. Moreover, they strongly differed from employees participating in a RET training because of mental health problems that were associated with a lack of assertiveness. Although we are not aware of a similar multi-comparative study, these findings appear to be in line with the outcomes of a Dutch study on burnout among officers showing that officers had lower levels of emotional exhaustion than one large reference group consisting of various occupations[20], a Norwegian study[1] showing that officers exhibited lower levels of emotional exhaustion (but higher levels of depersonalization) than physicians, and the outcomes of the aforementioned studies[8,9]. However, these studies did not control of adjust for the possible confounding effects of demographics in contrast to our study.

How can these findings be explained? In the Dutch situation police officers follow a rigorous selection process: about 90% of those applying to the officer training program is rejected (personal communication Dr. Annika Smit, Dutch Police Academy). Moreover, officers are trained to deal and cope with critical incidents and as a consequence may be highly resilient to mental health problems[21]. This may explain why bank employees (not

selected to cope with severe incidents nor trained as rigorously as police officers), who were confronted with bank robberies reported significantly more (severe and very severe) mental health disturbances.

Interestingly, in an older prospective study among police officers involved as body handlers in a disaster, no increases in health problems compared with pre-disaster levels were observed[22]. These findings seriously question the generally held belief that policing is a high risk profession with respect to mental health: is it perhaps a (partial) myth? Either way, it reminds us of the debate on suicide among officers that once (in fact) has been described as an epidemic[23]. However, the critical review on suicide among officers of Hem and colleagues[23] clearly demonstrated that no evidence of an elevated suicide rate among officers actually exists and that previous research had serious methodological shortcomings.

Despite the strength of our study, i.e. multiple comparison groups and controlling for age, gender and education, some possible limitations and characteristics should be discussed. First, although very high scores on the SCL-90-R (very severe symptoms) may be indicative of a mental disorder, we did not conduct clinical interviews to examine the prevalence of mental disorders such as generalized anxiety, major depression and PTSD across samples. Very severe symptoms are considered to be clinically relevant. According to the Dutch norm tables[19] the mean scores of a norm group of psychiatric patients on the subscales anxiety and depression were 26.0 (sd=9.9) and 41.9 (sd=14.8) respectively. In our total sample the mean scores of those with very severe anxiety and depression symptoms were 27.7 (sd=5.2) and 43.3 (sd=8.1) respectively. Therefore, it is not very likely that the prevalence rates obtained from clinician rated instruments would be (much) higher than the prevalence rates obtained by self-report measures such as the SCL-90-R[24].

Second, we were not able to compare the prevalence of PTSD across our study samples. Therefore, it is possible that the prevalence of PTSD among police officers is higher than among the other study groups. However, given the marked overlap of PTSD symptoms with other disorders and the typical comorbidity rates of PTSD with for instance depression[25,26], it is unlikely that police officers with PTSD, did not suffer from other severe mental health disturbances. Indeed, a large study among UK military personnel (N=10069)[27] showed that 344 out of the 394 PTSD cases (87.3%) reported severe mental health problems, i.e. were GHQ cases (high scores on the General Health Questionnaire). Only a small group of PTSD cases (N=50, 12.7%) were not identified as being a GHQ case (personal communication prof. Roberto Rona). Control analyses among another sample (N=67) of Dutch employees seeking treatment at the Institute for Psychotrauma for (probable) PTSD following various traumatic events, showed similar results. In total, 86.6% (N=58) of the (probable) PTSD cases (N=67, Scores on the Impact of Event Scale (IES) of 35 or more[28]) also reported very severe mental health problems according to our composite variable of very severe symptoms. These findings are in line with previous research[28,30], demonstrating that PTSD and SCL-90-R scores are strongly associated. Thus, an increased prevalence rate for PTSD in the absence of marked mental health problems would be highly unlikely.

Third, the two groups of officers were not drawn from national samples of officers. Group 1 was obtained in the eastern part of the Netherlands, but group 2 consisted of officers from several regions in the Netherlands (mainly east, mid and west). We have no data on the non-response of group 1. Although both groups did not differ in prevalence rates of very severe anxiety, depression and hostility symptoms (i.e. clinical level of symptoms), significant differences were found in the prevalence of severe depression symptoms (80th percentile). This may reflect the normal variety of the prevalence of symptoms among sub

samples within one occupational group. In addition, table 2 showed that females in our study less often had severe symptoms than males (although the prevalence of very severe symptoms did not differ between both sub groups) while in the general population the opposite is found[19]. However, our study samples do not reflect the general population (see table 1). We used the Dutch norm tables for males and females: the cuf-offs scores for females are slightly higher than for males to enable such comparisons[19].

Finally, one could hypothesize that the data of our study groups were not all obtained very recently and that for instance the current prevalence of mental health problems among police officers is (much) higher. The data were in fact obtained in the period 1991-2007. It is possible in principle that the stability of the prevalence of assessed clinical and sub clinical symptoms varied across the study groups during this period. Therefore we cannot rule out the possibility that for instance mental health problems among police officers increased over these years, while those of bank employees decreased and those of soldiers remained stable. Unfortunately, we are not aware of any study assessing and demonstrating differences in trajectories of prevalence between the study groups over a period of 16 years. However, epidemiological studies among the general population examining 12-months prevalence of mental disorders may shed more light on this issue. Kessler and collegues[31] showed that the 12-months prevalence of any mental disorder was more or less stable over a 10-years period, i.e. 29.5% and 26.2% respectively. With respect to the Netherlands, the NEMESIS study[32] showed similar outcomes: in contrast to the expectations of mental health professional the 12-months prevalence remained stable at about 17%[33] in a similar period. These important results suggest that, although the studies were conducted among the general population, it is more likely that the prevalence of assessed mental health problems was relatively stable and did not differ significantly across occupational groups over time.

Participants of all eleven study groups were inhabitants of the Netherlands. Therefore, future research is warranted to examine to what extent our findings can be generalized to countries with different political, social, medical and legal systems, and selection and training procedures of officers. We were not able to control for other influential factors such as organizational characteristics . Finally, we did not examine the extent of substance use such as the consumption of alcohol and smoking. Although the outcomes of Sterud and colleagues[34] did not support the notion of a strong relationship between occupational stress and alcohol use in police officers, it is unclear whether alcohol use differs from the other groups in our study.

CONCLUSIONS

Despite these limitations, the present study demonstrates that, although policing is generally viewed as a high risk profession, mental health disturbances are not more prevalent in police officers as compared to various other occupational cohorts in our study. Several of these groups such as bank employees (not being robbed) and supermarket employees, as well as soldiers before deployment are typically not considered to be “high risk professions”. These findings suggest that the positive effects on the mental health of police offices of the selection process, self-selection and resilience, given the amount of potential stressful and traumatic events they encounter during their career, should not be underestimated.

Abstract

Article focus

- It is generally assumed that police officers, due to the specific nature of their work, are at (high) risk for the development of mental health problems.
- The results of the very limited number of studies that compared the mental health of officers with one or two comparison groups, suggest that this assumption needs further proof.
- To assess this assumption, clinical as well as sub clinical levels of mental health problems of officers were compared with 9 other occupational groups while controlling for demographics.

Key messages

- In contrast to this generally held belief, officers did not report more (serious) mental health problems than any of the other examined groups in our multi-comparative study.
- The protective effects of self-selection, the resilience of police officers and a rigorous selection-process of recruits, might be an explanation of the relatively low prevalence rates of mental health disturbances.

Strengths and limitations

- To the best of our knowledge, this is the first multi-comparative study examining to what extent clinical as well as sub clinical levels of symptoms of anxiety, depression and hostility are more prevalent among police officers than among people in other occupations, while controlling for demographics.
- We did not conduct clinical interviews

Acknowledgements

We would like to express our gratitude to Professor RJ Rona (Institute of Psychiatry, King's College London) for his courteous help, i.e. providing us the cross tabulation data on PTSD and GHQ cases among UK military. In addition, we like to thank M Bosmans (Msc), and A Pemberton (PhD, INTERVICT, Tilburg University) for their help en support, and A Smit (PhD, Dutch Police Academy) for providing information on the selection process of officers.

Competing interests

None.

References

1. **Berg AM**, Hem E, Lau B, et al. An exploration of job stress and health in the Norwegian police service: cross sectional study. *J Occup Med Toxicol* 2006; **1**:26.
2. **Maguen S**, Metzler TJ, McCaslin SE, et al. Routine work environment stress and PTSD symptoms in police officers. *J Nerv and Ment Dis* 2009; **197**: 754–760.
3. **Stephens C**, Miller I. Traumatic experiences and posttraumatic stress disorder in the New Zealand police. *Policing* 1998; **21**: 178–191.
4. **Hartley TA**, Violanti JM, Fekedulegn D, et al. Associations between major life events, traumatic incidents, and depression among Buffalo police officers. *Int J Emerg Ment Health* 2007; **9**: 25–35.
5. **Velden PG van der**, Kleber RJ, Grievink L, et al. Confrontations with aggression and mental health problems in police officers: The role of organizational stressors, life-events and previous mental health problems. *Psychol Trauma: Theory, Res, Practice, Policy* 2010; **2**: 135–144.
6. **Liberman AM**, Best SR, Metzler TJ, et al. Routine occupational stress and psychological distress in police. *Policing* 2002; **25**: 421–439.
7. **Huddleston L**, Stephens C, Paton D. An evaluation of traumatic and organizational experiences on the psychological health of New Zealand police recruits. *Work* 2007; **28**: 199–207.
8. **Johnson S**, Cooper C, Cartwright S, et al. The experience of work-related stress across occupations. *J Manag Psychol* 2005; **20**: 178-187.

9. **Hart PM**, Wearing AJ, Headey B. Police stress and well-being: Integrating personality, coping and daily work experiences. *J Occup Organ Psychol* 1995; **68**: 133–165.
10. **Velden PG van der**, Grievink L, Dusseldorp A, et al. *Health victims Enschede fireworks disaster* (In Dutch). Instituut voor Psychotrauma (IvP)/ Rijksinstituut voor Volksgezondheid en Milieu (RIVM), 2002.
11. **Velden PG van der**, Burg S van der, Steinmetz CHD, et al. *Victim of bank robberies* (in Dutch). Bohn Stafleu Van Loghem, 1992.
12. **Velden PG van der**, Herpers TMM. Aggression in a psychiatric hospital (in Dutch). *Gedrag & Gezondheid* 1994; **5**: 209-218.
13. **Velden PG van der**, Kleber RJ, Oostrom I van. *StressMonitor manual* (in Dutch). Instituut voor Psychotrauma/S&N, 2000.
14. **Rademaker AR**, van Zuiden M, Vermetten E, et al. Type D personality and the development of PTSD symptoms: a prospective study. *J Abnorm Psychol* 2011; **120** (2), 299-307.
15. **Velden PG van der**, Christiaanse B, Kleber RJ, et al. The effects of disaster exposure and post-disaster critical incidents on intrusions, avoidance and health problems among firefighters: A comparative study. *Stress, Trauma Crisis: International J* 2006; **9**: 73–93.
16. **Portengen MAF**. *Aggression and violence in social welfare* (in Dutch). Corvu / AMC Amsterdam, 1995.
17. **Velden PG van der**. *Investigation of unsafe situations in supermarkets* (in Dutch). Instituut voor Psychotrauma, 1996.

18. **Derogatis LR**. *SCL-90-R: administration, scoring and procedures manual-I for the R(evised) version*. Johns Hopkins University School of Medicine, Clinical Psychometrics Research Unit, 1977.

19. **Arrindell WA**, Ettema JHM. *SCL-90-R Manual* (in Dutch). Swets & Zeitlinger/ Swets Test publishers, 1986 & 2003.

20. **Kop N**, Euwema M, Schaufeli W. Burnout, job stress and violent behavior among Dutch police officers. *Work & Stress* 1999; **13**: 326-340.

21. **Galatzer-Levy IR**, Madan A, Neylan TC, et al. Peritraumatic and trait dissociation differentiate police officers with resilient versus symptomatic trajectories of posttraumatic stress symptoms. *J Trauma Stress* 2011; **24**: 557-65.

22. **Alexander DA,** Wells A. Reactions of police officers to body handling after a major disaster: a before and after comparison. *Br J Psychiatry* 1991; **159**: 547–555.

23. **Hem E**, Berg AM, Ekeberg AO. Suicide in police--a critical review. *Suicide Life Threat Behav* 2001; **31**: 224-33.

24. **Engelhard IM**, van den Hout MA, et al. Deployment-related stress and trauma in Dutch soldiers returning from Iraq. Prospective study. *Br J Psychiatry* 2007; **191**: 140-145.

25. **Deering CG**, Glover SG, Ready D, et al. Unique patterns of comorbidity in posttraumatic stress disorder from different sources of trauma. *Compr Psychiatry* 1996; ***37***: 336-346.

26. **Blanchard EB**, Buckley TC, Hickling EJ, Taylor AE. Posttraumatic stress disorder and comorbid major depression: is the correlation an illusion? *J Anxiety Disord* 1998; **12**: 21-37.

27. **Rona RJ**, Jones M, Iversen A, et al. The impact of posttraumatic stress disorder on impairment in the UK military at the time of the Iraq war. *J Psychiatry Res* 2009; **43**: 649-55.

28. **Neal LA**, Busutti W, Rollins JI, et al. convergent validity of measures of Post-Traumatic Stress Disorder in a mixed military and civilian population. *J Trauma Stress* 1994; **7**: 447-455.

29. **Saunders BE**, Mandoki Arata C, Kilpatrick D. Development of a crime-related Post-Traumatic Stress Disorder scale for women within the symptom checklist-90-revised. *J Trauma Stress* 1990; **3**: 439-448.

30. **Weathers FW**, Litz BT, Keane TM, et al. The utility of the SCL-90-R for the diagnosis of war-zone related Posttraumatic Stress Disorder. *J Trauma Stress* 1996; **9**: 111-128.

31. **Kessler RC**, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005; **62**: 617-627.

32. **Vollebergh WAM**, Iedema J, Bijl RV, Graaf R de, Smit F, Ormel J. The structure and stability of common mental disorders: the Nemesis-study. *Arch Gen Psychiatry* 2001; **58**: 597-603.

33. **Graaf R de**, Have M ten, Dorsselaer S van. De psychische gezondheid van de Nederlandse bevolking NEMESIS-2: Opzet en eerste resultaten [The mental health of the Dutch population NEMISIS-2: Design and first results. In Dutch]. Utrecht, Trimbos.

34. **Sterud T**, Hem E, Ekeberg O, et al. Occupational stress and alcohol use: a study of two nationwide samples of operational police and ambulance, personnel in Norway. Stud Alcohol Drugs 2007; **68** (6):896-904.

Table 1 Gender, age and education level of study groups[1]

		Gender		Age (years)			Education	
	N	males	females	18-30	31-45	46-65	low-medium	high
		%	%	%	%	%	%	%
1 Police officers	144	86.1	13.9	4.9	47.9	47.2	96.5	3.5
2 Police officers	503	88.7	11.3	6.0	56.5	37.6	91.7	8.3
3 Bank employees, not victim robbery	1113	34.1	65.9	48.7	38.3	13.0	81.0	19.0
4 Bank employees, victim robbery	148	47.3	52.7	37.8	44.6	17.6	79.1	20.9
5 Psychiatric hospital employees	219	37.9	62.1	41.6	47.5	11.0	61.6	38.4
6 Trainees AT	710	68.2	31.8	29.0	57.9	13.1	33.8	66.2
7 Soldiers, not deployed before	278	87.8	12.2	81.3	14.7	4.0	88.8	11.2
8 Soldiers, deployed before	236	94.5	5.5	43.6	43.2	13.1	85.2	14.8
9 Firefighters	123	96.7	3.3	17.1	39.0	43.9	94.3	5.7
10 Social welfare	76	40.8	59.2	15.8	50.0	34.2	42.1	57.9
11Supermarkets	335	56.1	43.9	100	-	-	86.6	13.4
Total	3885	61.5	38.5	41.9	40.9	17.2	74.1	25.9

[1] Demographic characteristics of respondents with complete data

Table 2 Differences in prevalence of severe anxiety. depression and/or hostility symptoms (scores 80^{the} centile) between study groups (N=3885).

	Severe Anxiety Symptoms												Severe Depression Symptoms											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	9	6.2	1										17	11.8	1									
Police officers 2 (Ref. second colomn)	17	3.4	0.54	0.24	to	1.24	.15	1					26	5.2	0.41	0.22	to	0.79	.01					
Bank empl., not victim robbery	80	7.2	1.52	0.73	to	3.17	.26	2.82	1.61	to	4.92	.00	134	12.0	1.26	0.72	to	2.20	.41	3.10	1.97	to	4.89	.00
Bank empl., victim robbery	32	21.6	5.24	2.37	to	11.59	.00	9.71	5.14	to	18.35	.00	31	20.9	2.35	1.22	to	4.52	.01	5.76	3.25	to	10.19	.00
Psychiatric hospital empl.	22	10.0	2.32	1.01	to	5.30	.05	4.31	2.19	to	8.48	.00	36	16.4	1.82	0.96	to	3.46	.07	4.50	2.59	to	7.82	.00
Trainees AT	161	22.7	5.98	2.89	to	12.35	.00	11.27	6.53	to	19.44	.00	257	36.2	4.83	2.77	to	8.44	.00	11.98	7.62	to	18.82	.00
Soldiers, not deployed before	17	6.1	1.02	0.43	to	2.42	.97	1.91	0.93	to	3.93	.08	20	7.2	0.60	0.29	to	1.21	.15	1.47	0.78	to	2.75	.23
Soldiers, deployed before	12	5.1	0.85	0.34	to	2.09	.72	1.58	0.74	to	3.41	.24	18	7.6	0.63	0.31	to	1.29	.21	1.56	0.83	to	2.92	.17
Firefighters	5	4.1	0.62	0.20	to	1.89	.40	1.14	0.41	to	3.14	.81	16	13.0	1.08	0.52	to	2.24	.84	2.60	1.35	to	5.03	.00
Social welfare	13	17.1	4.32	1.72	to	10.88	.00	8.04	3.64	to	17.77	.00	17	22.4	2.56	1.20	to	5.47	.02	6.25	3.14	to	12.45	.00
Education																								
Low-medium (Ref.)	231	8.9	1					1					336	13.0	1					1				
High	137	14.3	0.77	0.59	to	1.01	.06	0.75	0.57	to	0.98	.03	236	24.6	1.00	0.80	to	1.26	.99	0.99	0.79	to	1.24	.90
Age																								
18-30 (Ref.)	127	9.8	1					1					195	15.1	1					1				
31-35	168	10.6	0.85	0.60	to	1.21	.36	0.83	0.58	to	1.18	.29	266	16.7	0.86	0.64	to	1.15	.31	0.81	0.60	to	1.10	.17
46-65	73	10.9	0.73	0.54	to	1.00	.05	0.72	0.52	to	0.99	.04	111	16.6	0.76	0.58	to	0.99	.04	0.72	0.55	to	0.94	.02
Gender																								
Males (Ref.)	240	10.9	1					1					371	16.8	1					1				
Females	128	9.5	0.70	0.53	to	0.91	.01	0.71	0.54	to	0.93	.01	201	14.9	0.72	0.58	to	0.90	.00	0.72	0.58	to	0.91	.01

Table 2 Continued

	Severe Hostility Symptoms												Severe Symptoms Composite Variable											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	16	11.1	1										26	18.1	1									
Police officers 2 (Ref. second colomn)	33	6.6	0.57	0.30	to	1.06	.08	1					49	9.7	0.49	0.29	to	0.83	.01	1				
Bank empl., not victim robbery	150	13.5	1.68	0.96	to	2.96	.07	2.97	1.96	to	4.50	.00	236	21.2	1.49	0.94	to	2.38	.09	3.05	2.15	to	4.33	.00
Bank empl., victim robbery	30	20.3	2.62	1.34	to	5.10	.00	4.62	2.68	to	7.98	.00	49	33.1	2.66	1.52	to	4.64	.00	5.43	3.42	to	8.63	.00
Psychiatric hospital empl.	29	13.2	1.74	0.89	to	3.40	.10	3.07	1.78	to	5.31	.00	52	23.7	1.78	1.03	to	3.08	.04	3.66	2.34	to	5.72	.00
Trainees AT	224	31.5	5.06	2.86	to	8.94	.00	8.96	5.90	to	13.59	.00	328	46.2	4.66	2.90	to	7.49	.00	9.59	6.71	to	13.71	.00
Soldiers, not deployed before	56	20.1	1.83	0.98	to	3.42	.06	3.25	1.99	to	5.30	.00	66	23.7	1.26	0.74	to	2.14	.40	2.59	1.68	to	3.99	.00
Soldier, deployed before	44	18.6	1.73	0.93	to	3.25	.08	3.07	1.87	to	5.02	.00	52	22.0	1.20	0.70	to	2.05	.50	2.47	1.60	to	3.81	.00
Firefighters	17	13.8	1.20	0.58	to	2.49	.63	2.13	1.14	to	3.97	.02	25	20.3	1.09	0.59	to	2.01	.79	2.21	1.30	to	3.75	.00
Social welfare	17	22.4	3.62	1.68	to	7.82	.00	6.42	3.30	to	12.51	.00	21	27.6	2.31	1.17	to	4.53	.02	4.71	2.58	to	8.59	.00
Education																								
Low-medium (Ref.)	419	16.2	1					1					591	22.8	1					1				
High	197	20.5	0.70	0.55	to	0.88	.00	0.69	0.55	to	0.87	.00	313	32.6	0.85	0.69	to	1.03	.10	0.84	0.69	to	1.02	.08
Age																								
18-30 (Ref.)	234	18.1	1					1					346	26.7	1					1				
31-35	276	17.4	1.12	0.84	to	1.49	.46	1.13	0.84	to	1.51	.43	403	25.4	1.11	0.87	to	1.44	.40	1.08	0.84	to	1.40	.55
46-65	106	15.9	0.92	0.71	to	1.20	.55	0.94	0.72	to	1.23	.65	155	23.2	0.90	0.71	to	1.13	.35	0.87	0.69	to	1.10	.25
Gender																								
Males (Ref.)	433	19.7	1					1					698	27.1	1					1				
Females	183	13.6	0.55	0.44	to	0.68	.00	0.55	0.44	to	0.69	.00	306	22.7	0.63	0.52	to	0.77	.00	0.64	0.53	to	0.78	.00

Adj. OR = Odds ratio adjusted for all study variables. 95 CI = 95 confidence interval. Ref. =Reference group
N.a = Not applicable because the prevalence of very severe anxiety symptoms among firefighter is zero.
1 Anxiety and/or depression and/or hostility.

Table 3 Differences in prevalence of very severe anxiety, depression and/or hostility symptoms (scores 95^{the} centile) between study groups (N=3885).

	Very Severe Anxiety Symptoms												Very Severe Depression Symptoms											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	2	1.4	1										2	1.4	1									
Police officers 2 (Ref. second colomn)	3	0.6	0.41	0.07	to	2.50	.34	1					6	1.2	0.86	0.17	to	4.32	.86	1				
Bank empl., not victim robbery	9	0.8	0.73	0.15	to	3.56	.69	1.74	0.45	to	6.78	.42	30	2.7	2.09	0.48	to	9.03	.33	2.41	0.96	to	6.02	.06
Bank empl., victim robbery	7	4.7	4.08	0.81	to	20.62	.09	9.81	2.44	to	39.50	.00	13	8.8	7.22	1.58	to	33.11	.01	8.35	3.06	to	22.80	.00
Psychiatric hospital empl.	1	0.5	0.38	0.03	to	4.41	.44	0.91	0.09	to	9.12	.94	13	5.9	4.92	1.07	to	22.71	.04	5.68	2.06	to	15.64	.00
Trainees AT	32	4.5	3.20	0.70	to	14.53	.13	7.67	2.18	to	27.04	.00	69	9.7	8.39	1.97	to	35.67	.00	9.70	4.02	to	23.44	.00
Soldiers, not deployed before	2	0.7	0.54	0.07	to	4.14	.55	1.30	0.20	to	8.38	.78	1	0.4	0.22	0.02	to	2.52	.22	0.26	0.03	to	2.19	.21
Soldiers, deployed before	0	0.0	N.A										2	0.8	0.56	0.08	to	4.09	.57	0.65	0.13	to	3.30	.61
Firefighters	0	0.0	N.A										2	1.6	1.12	0.15	to	8.06	.91	1.30	0.26	to	6.52	.75
Social welfare	1	1.3	1.04	0.09	to	12.24	.97	2.50	0.25	to	25.41	.44	4	5.3	4.63	0.81	to	26.49	.08	5.34	1.43	to	19.96	.01
Education																								
Low-medium (Ref.)	29	1.1	1										82	3.2	1									
High	28	2.9	1.19	0.64	to	2.21	.58	1.20	0.64	to	2.24	.56	60	6.2	0.87	0.59	to	1.30	.50	0.87	0.59	to	1.30	.51
Age																								
18-30 (Ref.)	16	1.2	1										52	4.0	1									
31-35	32	2.0	0.98	0.40	to	2.42	.96	0.99	0.39	to	2.49	.98	67	4.2	1.18	0.68	to	2.04	.56	1.18	0.68	to	2.05	.57
46-65	9	1.3	1.15	0.53	to	2.49	.72	1.16	0.52	to	2.59	.71	23	3.4	0.93	0.56	to	1.53	.76	0.92	0.56	to	1.54	.76
Gender																								
Males (Ref.)	41	1.9	1										86	3.9	1									
Females	16	1.2	0.61	0.32	to	1.17	.14	0.62	0.32	to	1.19	.15	56	4.2	0.79	0.53	to	1.18	.25	0.80	0.54	to	1.19	.27

Table 3 Continued

	Very Severe Hostility Symptoms												Very Severe Symptoms Composite Variable											
	Symptoms		Adj.					Adj.					Symptoms		Adj.					Adj.				
	N	%	OR	95 C.I.			p	OR	95 C.I.			p	N	%	OR	95 C.I.			p	OR	95 C.I.			p
Groups																								
Police officers 1 (Ref.)	2	1.4	1										3	2.1	1									
Police officers 1 (Ref. second column)	5	1.0	0.73	0.14	to	3.79	.70	1					7	1.4	0.67	0.17	to	2.62	.56	1				
Bank empl., not victim robbery	28	2.5	1.67	0.38	to	7.31	.50	2.25	0.83	to	6.12	.11	51	4.6	2.31	0.70	to	7.64	.17	3.42	1.50	to	7.78	.00
Bank empl., victim robbery	9	6.1	4.41	0.92	to	21.20	.06	5.97	1.92	to	18.54	.00	19	12.8	7.16	2.04	to	25.10	.00	10.63	4.31	to	26.21	.00
Psychiatric hospital empl.	7	3.2	2.40	0.48	to	12.07	.29	3.23	0.98	to	10.65	.05	16	7.3	4.02	1.13	to	14.36	.03	5.95	2.36	to	15.05	.00
Trainees AT	44	6.2	5.71	1.32	to	24.72	.02	7.71	2.90	to	20.49	.00	96	13.5	8.38	2.55	to	27.51	.00	12.43	5.55	to	27.83	.00
Soldiers, not deployed before	7	2.5	1.26	0.25	to	6.42	.78	1.70	0.51	to	5.72	.39	8	2.9	1.12	0.29	to	4.43	.87	1.67	0.58	to	4.82	.34
Soldiers, deployed before	4	1.7	1.02	0.18	to	5.75	.99	1.38	0.36	to	5.30	.64	6	2.5	1.10	0.27	to	4.54	.89	1.64	0.54	to	5.00	.38
Firefighters	2	1.6	1.07	0.15	to	7.76	.94	1.49	0.28	to	7.78	.64	3	2.4	1.11	0.22	to	5.59	.90	1.66	0.42	to	6.51	.47
Social welfare	7	9.2	9.20	1.81	to	46.91	.01	12.57	3.73	to	42.40	.00	9	11.8	7.68	1.97	to	29.89	.00	11.41	4.01	to	32.45	.00
Education																								
Low-medium (Ref.)	78	3.0	1					1					134	5.2	1									
High	37	3.9	0.62	0.39	to	0.99	.05	0.62	0.39	to	0.99	.05	84	8.7	0.79	0.56	to	1.10	.16	0.79	0.56	to	1.10	.16
Age																								
18-30 (Ref.)	53	4.1	1					1					88	6.8	1									
31-35	44	2.8	1.56	0.85	to	2.85	.15	1.67	0.89	to	3.11	.11	96	6.0	1.28	0.82	to	2.02	.28	1.31	0.83	to	2.06	.25
46-65	18	2.7	0.87	0.49	to	1.54	.63	0.95	0.52	to	1.72	.86	34	5.1	0.92	0.60	to	1.39	.69	0.94	0.61	to	1.44	.77
Gender																								
Males (Ref.)	66	3.0	1					1					130	5.9	1					1				
Females	49	3.6	0.87	0.55	to	1.35	.53	0.88	0.56	to	1.37	.56	88	6.5	0.81	0.58	to	1.12	.20	0.81	0.59	to	1.13	.22

Adj. OR = Odds ratio adjusted for all study variables. 95 CI = 95 confidence interval. Ref. =Reference group
N.a = Not applicable because the prevalence of very severe anxiety symptoms among firefighter is zero.
[1] Anxiety and/or depression and/or hostility.

Appendix A Bivariate associations between predictors and dependent variables

	Severe Anxiety symptoms				Severe Depression symptoms				Severe hostility symptoms				Severe Symptoms Composite			
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
Groups																
Police officers 1 (Ref.)	1				1				1				1			
Police officers 2 (Ref. second colomn)	0.53	.13	1		0.41	.01	1		0.56	.07	1		0.49	.01	1	
Bank employees, not victim robbery	1.16	.68	2.21	.00	1.02	.94	2.51	.00	1.25	.43	2.22	.00	1.22	.38	2.49	.00
Bank employees, victim robbery	4.14	.00	7.89	.00	1.98	.04	4.86	.00	2.03	.03	3.62	.00	2.25	.00	4.59	.00
Psychiatric hospital employees	1.68	.21	3.19	.00	1.47	.22	3.61	.00	1.22	.55	2.17	.00	1.41	.20	2.89	.00
Trainees AT	4.40	.00	8.38	.00	4.24	.00	10.41	.00	3.69	.00	6.56	.00	3.90	.00	7.96	.00
Soldiers, not deployed before	0.98	.96	1.86	.08	0.58	.12	1.42	.25	2.02	.02	3.59	.00	1.41	.18	2.88	.00
Soldiers, deployed before	0.80	.63	1.53	.27	0.62	.18	1.52	.19	1.83	.05	3.26	.00	1.28	.35	2.62	.00
Firefighters	0.64	.43	1.21	.71	1.12	.77	2.74	.00	1.28	.50	2.28	.01	1.16	.64	2.36	.00
Social welfare	3.10	.01	5.90	.00	2.15	.04	5.29	.00	2.31	.03	4.10	.00	1.73	.10	3.54	.00
Education																
Low-medium	1				1				1				1			
High	1.70	.00	1.63	.00	2.18	.00	2.15	.00	1.34	.00	1.31	.01	1.63	.00	1.60	.00
Age																
18-30	1				1				1				1			
31-35	0.89	.43	0.83	.25	0.89	.36	0.83	.16	1.17	.23	1.14	.31	1.21	.09	1.15	.22
46-65	0.96	.79	0.93	.63	1.01	.95	0.96	.73	1.11	.39	1.12	.39	1.12	.29	1.09	.44
Gender																
Males	1				1				1				1			
Females	0.86	.19	0.85	.18	0.87	.13	0.85	.10	0.64	.00	0.63	.00	0.79	.00	0.78	.00

Appendix A Continued

	Very Severe Anxiety symptoms				Very Severe Depression symptoms				Very Severe hostility symptoms				Very Severe symmtoms Composite			
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
Groups																
Police officers 1 (Ref.)	1				1				1				1			
Police officers 2 (Ref. second colomn)	0.43	.35	1		0.86	.85	1		0.71	.69	1		0.66	.56	1	
Bank employees, not victim robbery	0.58	.49	1.36	.65	1.97	.36	2.30	.07	1.83	.41	2.57	.05	2.26	.18	3.40	.00
Bank employees, victim robbery	3.53	.12	8.27	.00	6.84	.01	7.98	.00	4.60	.05	6.45	.00	6.92	.00	10.44	.00
Psychiatric hospital employees	0.33	.36	0.77	.82	4.48	.05	5.23	.00	2.34	.29	3.29	.04	3.70	.04	5.59	.00
Trainees AT	3.35	.10	7.87	.00	7.64	.01	8.92	.00	4.69	.03	6.58	.00	7.35	.00	11.08	.00
Soldiers, not deployed before	0.51	.51	1.21	.84	0.26	.27	0.30	.27	1.83	.45	2.57	.11	1.39	.63	2.10	.16
Soldiers, deployed before	0.00	1.00	0.00	1.00	0.61	.62	0.71	.67	1.22	.82	1.72	.42	1.23	.78	1.85	.27
Firefighters	0.00	1.00	0.00	1.00	1.17	.87	1.37	.70	1.17	.87	1.65	.55	1.18	.85	1.77	.41
Social welfare	0.95	.97	2.22	.49	3.94	.12	4.60	.02	7.20	.02	10.10	.00	6.31	.01	9.52	.00
Education																
Low-medium	1				1				1				1			
High	2.65	.00	2.71	.00	2.04	.00	1.98	.00	1.29	.21	1.26	.26	1.76	.00	1.71	.00
Age																
18-30	1				1				1				1			
31-35	0.92	.83	0.93	.87	1.17	.53	1.10	.70	1.54	.12	1.57	.12	1.36	.14	1.30	.22
46-65	1.50	.28	1.54	.28	1.23	.40	1.19	.49	1.03	.93	1.09	.78	1.20	.38	1.18	.43
Gender																
Males	1				1				1				1			
Females	0.63	.13	0.64	.13	1.07	.71	1.05	.80	1.22	.30	1.21	.33	1.12	.45	1.09	.54

30

OR = Odds ratio.
Ref. =Reference group