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Risk Factors for Psychiatric Disorders in Female Bundeswehr Personnel

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Abstract

Background: Military service in the German Armed Forces is associated with increasing psychological distress due to structural changes since the end of the cold war but also due to out-of-area deployments. Female Bundeswehr soldiers have shown an increase in utilization of psychiatric services during the past years, which has not been explained yet.
Objective: The aim of this study was to identify psychosocial characteristics of female military personnel with psychiatric disorders.
Method: A group of female psychiatric inpatients at the Bundeswehr Hospital in Berlin (n=83) was evaluated with regard to sociodemographic characteristics and compared with a military control group.
Results: Partnership conflicts, low education and low rank were significantly more frequent features in the soldiers receiving inpatient treatment than in the female control group. Inpatients tended less frequently to be in a steady relationship, tended to have been on fewer out-of-area deployments, and had undergone pre-enlistment examination more frequently in the new federal states.
Conclusions: The study suggests that there are possible risk factors for psychiatric disorders in female Bundeswehr personnel that might be of significance to preventive and therapeutic concepts (German J Psychiatry 2010; 13 (3): 121–126).

Keywords: Bundeswehr personnel, female, sociodemographic characteristics, psychiatric disorders

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Introduction

Since all military careers in the German Armed Forces (Bundeswehr) were opened up to female soldiers on 1 January 2001, the proportion of women, who up to this date had only been employed in the Medical Service, has increased continuously in all Bundeswehr careers. So far, a percentage of approx. 6.8% of all soldiers has been achieved. The aim is 15%, and in the Medical Service 50%. Female soldiers therefore have an increasingly significant part to play as fellow Bundeswehr personnel – also on operations abroad.

Psychiatric disorders have considerable effects on quality of life and working ability of those affected. They also have an important socio-economic dimension that has been a feature of military-related and other studies (Pope et al., 1999; Knapik et al., 2001).

Out of a one-year cohort of American soldiers, for example, 47% left military service (Hoge et al., 2002) within six months after receiving first-time in-patient psychiatric care. In 2006, approx. 61% of all health-related premature discharges from military service in the Bundeswehr were the result of psychiatric disorders (unpublished Military Medical Statistical Institute data).

A comparative analysis of Bundeswehr outpatient and inpatient illness statistics from 2000 and 2006 revealed that the percentage of all female soldiers who had sought outpatient or inpatient medical treatment due to a psychiatric disorder had increased significantly (and more than in male soldiers). The most significant disorders were stress-reactive disorders, including adjustment disorders and post-traumatic stress

disorders (Zimmermann et al., 2009; Zimmermann et al., 2010). The question about relevant pathogenetic stressors has remained unanswered yet.

In former military studies the female sex also turned out to be a risk factor for psychiatric disorders and of increased utilization of mental health supply (Hoge et al., 2002; Riddle et al., 2007).

The most crucial factors in this context were participation in missions abroad involving a higher level of mental vulnerability in women (Litz et al., 1997; Hoge et al., 2004), work-related stress (Pflanz et al., 2002), interpersonal conflicts with comrades and superiors (including sexualised conflicts) (Hankin et al., 1999; Harned et al., 2002), and also general health and sociodemographic developments in the social environment (Riedel-Heller et al., 2004; Wittchen et al., 2005).

No comparable studies have been conducted thus far in the German-speaking area that deal with risk factors of mental disorders in female soldiers.

Thus the aim of this study was to draw a direct comparison between a group of female military patients receiving inpatient psychiatric treatment and a random female military sample in order to form hypotheses concerning possible risk and protective factors of psychiatric disorders in female Bundeswehr soldiers.

Material and Methods

In this study, two groups from different surveys were compared with each other. All female Bundeswehr soldiers admitted to inpatient treatment for a psychiatric disorder at the Bundeswehr Hospital, Berlin in 2005, 2006 and 2007 (n=83) were evaluated retrospectively by two independent medical specialist examiners on the basis of the available treatment records. Table 1 indicates the percentage distribution amongst the ICD-10 diagnoses.

Table 1: Initial psychiatric diagnoses in 83 female Bundeswehr soldiers receiving inpatient treatment

Diagnosis	n=	%
F 10-19 (Addiction Disorders)	1	1.2
F 20-29 (Schizophrenia/Delusion)	0	0
F 30-39 (Affective Disorders)	7	8.4
F 40-45 (Neurotic Disorders)	55	66.3
Anxiety Disorders	5	
Acute Stress Reaction	8	
Posttraumatic Stress Disorder	2	
Adjustment Disorder	35	
Somatoform Disorder	5	
F 50 (Eating Disorders)	6	7.2
F 60-69 (Personality Disorders)	11	13.2
Borderline personality disorder	6	
Histrionic personality disorder	5	
Other	3	3.6

Diagnoses were based on a non-structured medical specialist diagnostic interview in accordance with ICD-10. The average age was 24.2 (SD 7,7) years, n=79 (95.2%) were 29 years of age or younger, and 4 (4.8%) were 30 years of age and older.

The following factors were evaluated (if not specified otherwise, encoded yes/no in each case):

- military rank category (low, medium and high (officer) ranks)
- enlistment term (status): temporary-career volunteer for 4 to 12 years or lifetime career service member, comparable with a civil servant status
- origin: pre-enlistment examination in the old or in the new federal states (rated as approximate parameter for origin); the new federal states in the Eastern parts of Germany have been the "Federal German Republic" with an own socialistic political system until the reunification in 1990
- missions: participation in a Bundeswehr mission abroad in Bosnia, Afghanistan or in Kosovo
- partnership: existence of a long-term partnership (>6 months)
- partnership conflicts: there were significant conflicts in the partnership (e.g. frequent arguments, violence, intentions to separate)
- own children (living in own household)
- school education: Abitur (diploma from German secondary school qualifying for university admission), Realschule (intermediate secondary school), Hauptschule (secondary general school)/Berufsbildungsschulen (vocational training schools), no school qualification,
- completed apprenticeship, and
- serious conflicts with superiors or comrades

The acquired data were compared with the results of a study carried out by the Bundeswehr Institute of Social Sciences and completed in 2008 (Kümmel 2008). This study involved a representative random sample of a total of 5750 female and male soldiers who – between March and June 2005 – answered a postal questionnaire from 2004 that had been developed specifically for this study. In addition to general and military sociodemographic details, the questionnaire primarily contained questions about the respondents' work, their job satisfaction, their self-conception as soldiers, relations between the sexes, and their common understanding of cooperation and performance in the army.

Based on a response rate of 34%, the answers of 1196 women and 603 men were evaluated. Of the female soldiers who responded, n=1064 (89%) were 29 years old or younger, and n=132 (11%) were 30 or older [male soldiers: 289 (47.9%) vs. 314 (52.1%)]. The average age was not documented.

Table 2: Psychosocial features in female patients at the Bundeswehr Hospital, Berlin, and in female soldiers from a random sample (legend: ↑=more frequent in patient group, ↓=less frequent in patient group, Y=yes, N=no, n=number, East=new federal states, West=old federal states, Low=lower military rank, Med=medium rank, High=high rank (officer), temp=temporary-career servicemembers (4-12 years), life=lifetime career service members, no=no school qualification, gen=*Hauptschule* (secondary general school) school-leaving certificate, int=*Realschule* (intermediate secondary school), uni=*Abitur* (diploma from German secondary school qualifying for university admission)

Feature	Patients (female)	Soldiers (female)	Comparison		
	n= (%)	n=	Chi^2	OR (95%-CI)	p=
Mission abroad	Y=7 (8%)	Y=233(19%)	6.24	0.38 (0.173 – 0.836)	**0.013**
(↓)	N=76 (92%)	N=963 (81%)			
Conflicts (↑)	Y=37 (50%)	Y=504 (42%)	1.76	1.37 (0.858 – 2.197)	0.185
Superiors	N=37 (50%)	N=692 (68%)			
Conflicts (↑)	Y=30 (41%)	Y=458 (38%)	0.15	1.1 (0.681 – 1.773)	0.700
Comrades	N=44 (59%)	N=738 (62%)			
Partnership (↓)	Y=42 (59%)	Y=861 (72%)	5.39	0.56 (0.345 – 0.920)	**0.020**
	N=29 (41%)	N=335 (28%)			
Conflicts (↑)	Y=16 (23%)	Y=73 (7%)	23.28	4.02 (2.193 – 7.358)	**<0.001**
Partnership	N=55 (77%)	N=1008 93%			
Own children	Y=4 (5%)	Y=155 (13%)	3.75	0.38 (0.136 – 1.051)	0.053
(↓)	N=71 (95%)	N=1041 87%			
Origin	East=47 (57%)	East=514 (43%)	5.87	1.73 (1.106 – 2.714)	**0.015**
(East ↑)	West=36 (43%)	West=682 (57%)			
Rank	Low=29 (35%)	Low=132 (11%)	41.01	4.33 (2.662 – 7.039)	**<0.001**
(Lower ↑)	Med=46 (55%)	Med=849 (71%)		0.51 (0.324 – 0.797)	
	High=8 (10%)	High=215 (18%)		0.49 (0.231 – 1.024)	
Status	temp=83	temp=1148	3.46		0.069
(shorter ↑)	life=0	life=48 (4%)			
School educa-	no=0	no=0	32.39		**<0.001**
tion	gen=20 (27%)	gen=96 (8%)		4.24 (2.439 – 7.384)	
(lower	int=27 (36,5%)	int=670 (56%)		0.45 (0.277 – 0.734)	
education ↑)	uni=27 (36,5%)	uni=430 (36%)		1.02 (0.628 – 1.667)	
Age			3.16	2.45 (0.883 – 6.799)	0.076
up to 29 (↑)	79 (95%)	1064 (89%)			
≥ 30 years	4 (5%)	132 (11%)			
Total	83	1196			

For drawing a statistical comparison between the two female groups, only those items were used that were comparable in terms of the nature of the question asked or in terms of the information contained in the evaluated medical records (Table 2).

Within the patient group, a check was also carried out to establish whether the evaluated factors had an influence on the patients' military fitness for service upon completion of the treatment. Bundeswehr-internal guidelines (Joint Service Regulation ZDv 46/1) classify all the significant ICD-10 groups of diseases according to type and severity and form the occupational health basis for all Bundeswehr tasks.

An assessment of the patients' fitness or unfitness for military service with the Bundeswehr was based on the overall evaluation of the psychopathological and organic findings obtained. This evaluation was performed by the examining physicians at the end of the patients' hospital stay and took particular account of psychiatric comorbidity, third-party anamnesis specifications regarding behaviour at work, and the patient's motivation to continue military service. In this

study, n=58 (69.9%) were employable and n=25 (30.1%) were no longer employable upon completion of treatment.

Assessment as fit for service resulted in continuation of military service (if applicable with restrictions, e.g. prohibition from driving a Bundeswehr-owned vehicle). For soldiers assessed as unfit for service a premature termination of service resulted.

A comparison with the random sample was not possible because in this case fitness for military service was not examined.

Statistical Analysis

The group of female inpatients and the female soldiers from the general random sample were compared using the chi-square test. The values indicated are the chi-square values and the p-values. The respective odds ratios are also shown. If the odds ratio is greater than 1, the representation of (female) patients is relatively greater with regard to the characteristic specified in Table 2 than that of the (female) soldiers. An odds ratio that is lower than 1 means that the (female) patients are underrepresented. When comparing rank and school education, there were more than two groups, which is why the odds ratio was specified for each of the three groups in comparison to the sum of the other respective two groups.

The p-values specified are the results of the chi-square test; however, this value was inaccurate in those cases in which the expected frequencies were lower than 5 in one of the sections or a feature was not applicable (e.g. no career service members amongst the female patients), this value was inaccurate. In this case, the p-value of the Fisher's exact test was used instead.

The target variable "fitness for military service" was examined to determine whether there were determining factors (independent variables) that can influence the likelihood of the target variable occurring. With the exception of "age", the method applied was the Kruskal-Wallis H-test procedure; for "age", Spearman's correlation was used.

Bonferroni correction: The first evaluation (comparison with random sample) encompassed 11 test comparisons, the second 15 (influencing factors of medical fitness for service). Therefore, the significance threshold for the individual comparisons was assumed to be $p < 0.002$.

Results

As shown in Table 2, there were significant differences between the female military patients receiving treatment at the Bundeswehr Hospital, Berlin and the random sample surveyed in the comparative study.

Conflicts in partnerships as well as a lower educational level [Hauptschule (secondary general school)] and rank in the Bundeswehr (lower rank) were significantly more common in the female patients. There was a less frequent tendency in them (in accordance with the Bonferroni correction method) to have a steady partnership, they were underrepresented with regard to missions abroad, and they tended more frequently to have undergone a pre-enlistment examination in the new federal states. There were no significant differences regarding conflicts with superiors or comrades, whether they had their own children, the length of their term of enlistment (status), or age.

The results for the association of the influencing factors with the medical fitness for service of the female soldiers receiving inpatient psychiatric treatment are not presented in detail.

All the factors examined were not significantly correlated with the target variables.

Discussion

The aim of this study was to identify psychosocial characteristics in which female Bundeswehr soldiers needing inpatient psychiatric treatment differed from a female military comparison group (Kümmel, 2008) and to create hypotheses concerning protective and risk factors for psychiatric disorders in the military context.

So far in the German Armed Forces, there have been no data available on this subject despite their particular interest for the Bundeswehr not only due to the increasing significance of female soldiers when it comes to meeting the demand for qualified personnel but also due to the significant increase in the utilization of outpatient and inpatient psychiatric services in recent years (Zimmermann et al., 2009; Zimmermann et al., 2010).

Since the psychiatric departments of the five Bundeswehr hospitals – apart from their geographical location – have a similar structure, the results obtained at the Bundeswehr Hospital, Berlin appear to be representative for the inpatient care of the Bundeswehr. However, the extent to which these results can be transferred to non-military psychiatric patients is very limited. This is because both the examined patients and the random sample are highly selected in terms of their low average age, their socio-economic status, their working environment, and possibly their personality traits as well.

In line with the results obtained in this study, various studies have revealed that a low level of education represents a risk factor not only for psychiatric disorders in the military context (Eisen et al., 2004; Riddle et al., 2007) but also for a premature discharge from service (Pope et al., 1999; Knapik et al., 2001). An association was also established between this factor and a high risk of post-traumatic stress disorders and other mission-related illnesses (Eisen et al., 2004).

There is an interaction between the level of education and military rank because certain careers (particularly those of officers) are usually unavailable to persons who have achieved what is considered a low level of education. A low rank also proved to be a risk factor for psychiatric disorders

in the military (Mazokopakis et al., 2002; Jones et al., 2006; Fikretoğlu et al., 2008).

Partnership- or separation conflicts and their connection with psychiatric morbidity are a repeatedly discussed phenomenon in the military (Eisen et al., 2004; Kümmel, 2008; Fikretoğlu et al., 2008). In the Bundeswehr, the multifactorial pathogenesis of these conflicts must take into account the structural changes that have been performed in recent years, which involve increasing distances between the home and the workplace, as well as participation in missions abroad. Accordingly, a long-term relationship was less common in the female patient group examined in this study.

The trend for an influence of the location of pre-enlistment examination could be interpreted as a possible indicator for regional differences in morbidity risk in the military context. There have been indications of this, for example, with regard to anxiety and depression illnesses, in recent civilian studies as well. The Eastern German federal states had a higher risk in this respect (Frommer et al., 2004; Bramesfeld et al., 2009). However, the Bundeswehr Hospital, Berlin is in a favourable central location for the federal states in the east, and this might have been another reason for the higher incidence of female patients from this region making use of the available services. A comparison with other Bundeswehr hospitals might shed more light on this matter.

It seems surprising that stressors related to military activity, missions abroad and conflicts with comrades and superiors, were not represented significantly more often in the group of female patients. By contrast there was a tendency of *less* out-of-area deployments in the patients group. It could therefore be the case that these factors do not represent a specific risk factor for psychiatric morbidity in female Bundeswehr soldiers.

This is not consistent with other studies that have revealed that there was a connection above all between participation in missions abroad and considerable psychiatric morbidity (Litz et al., 1997; Hoge et al., 2004). One reason for this could be that potentially stressful or traumatising situations on Bundeswehr missions tended to be infrequent up to 2007 (Litz et al., 1997; Hoge et al., 2004).

Another reason for the tendency in the examined patients to be less frequently involved in missions abroad could be that a medical examination is obligatory before deployment and that this examination usually disqualifies Bundeswehr personnel suffering from florid mental disorders from taking part in such missions (Joint Service Regulation ZDv 46/1).

Equally unexpected was the fact that it was not possible to identify significant predictors for a premature discharge from military service within the group of female patients receiving inpatient treatment. The extensive range of treatments that have been developed in recent years by the psychiatric departments of the Bundeswehr hospitals may have possibly enabled the patients to be stabilised well enough to continue their military service. This could also be due to the fact that serving in the hierarchical Bundeswehr system may primarily involve ego-supporting and thus – with regard to psychiatric disorders – protective elements (Zimmermann et al., 2001; Maguen et al., 2008). However, further studies are necessary in this context.

There are limitations concerning the validity of the study partly because its cross-sectional design only allows initial hypotheses to be formed concerning potential risk factors for psychiatric morbidity in female Bundeswehr soldiers. Further epidemiological and longitudinal studies need to be conducted in this context.

In addition, the data of the female patients receiving inpatient treatment and the comparison groups are based on studies that use different methods and have different sample dimensions. Even though attention was paid when evaluating the data to allowing only comparable items to be incorporated into the evaluation, a systematic error cannot be ruled out because a questionnaire involving self-evaluation and the evaluation of a patient's medical records can produce different results.

Due to the different data sources it was not possible to obtain the original data of the comparison group and perform a logistic regression analysis, which could have clarified more statistical relations.

In addition, it is likely that the random sample also included female soldiers who were currently receiving psychiatric treatment (expectation value approx. 3% (Zimmermann et al., 2010). And so there are no clear control group conditions, and the established statistical associations must be interpreted very carefully.

Conclusions

This study points to a possible role of partnership conflicts, military rank and level of education in the pathogenesis of psychiatric disorders in female Bundeswehr soldiers. Longitudinal studies need to be conducted in order to further verify these hypotheses.

There could be consequences for personnel selection procedures in the Bundeswehr, e.g. with regard to the level of education of the applicants and also to preventive and therapeutic concepts, in which programmes for improving social (and thus partnership) competences should perhaps play a greater role.

Other armed forces have had positive experiences in this respect. Social competence training courses prior to missions abroad, for example, have proved useful as far as prevention of psychiatric disorders is concerned (Maguen et al., 2008; Jones et al., 2008).

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