

Differences between Soldiers, with and without Emotional Distress, in Number of Primary Care Medical Visits and Type of Presenting Complaints

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Abstract

Background: In 2003 a total of 43 soldiers in the Israel Defense Forces committed suicide; only 20% of them were known to the IDF mental health services. Somatic symptoms are often the only presentation of emotional distress during the primary care visit and may be the key to early identification and treatment.

Objectives: To examine whether the information in the medical records of soldiers can be used to identify those suffering from anxiety, affective or somatoform disorder.

Methods: We conducted a case-control study using the information in the electronic medical records of soldiers who during their 3 year service developed affective disorder, anxiety, or somatoform disorder. A control group was matched for recruitment date, type of unit and occupation in the service, and the Performance Prediction Score. The number and reasons for physician visits were collated.

Results: The files of 285 soldiers were examined: 155 cases and 130 controls. The numbers of visits (mean \pm SD) during the 3 and 6 month periods in the case and control groups were 4.7 \pm 3.3 and 7.1 \pm 5.0, and 4.1 \pm 2.9 and 5.9 \pm 4.6 respectively. The difference was statistically significant only for the 6 month period ($P < 0.05$). The variables that remained significant, after stepwise multivariate regression were the Performance Prediction Score and the presenting complaints of back pain and diarrhea.

Conclusions: These findings may spur the development of a computer-generated warning for the primary care physician who will then be able to interview his or her patient appropriately and identify mental distress earlier.

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Screening for physical and psychological health in the armed forces has a long history. No instrument that can accurately assess psychological vulnerability has yet been identified. There is a high incidence of false positive and false negative identification and a lack of cooperation of the target population who may not wish to share concerns with a medical officer [1,2]. There have been many efforts to identify recruits who may be at risk for psychiatric illness, such as the SHIP questionnaire from the United States Navy [3,4]. Several variables were significantly predictive for psychiatric hospitalization: female gender, low education level, history of abuse, and tobacco smoking. It may be that psychological surveillance and not screening may be the most appropriate tool to identify

soldiers suffering from emotional distress. Results from psychological surveillance programs in Bosnia and Kosovo have shown that it is possible to monitor changes in mental health status of soldiers and that those at risk can then be referred [5]. However, this surveillance tool provides a snapshot of the soldiers' psychological state and is not ongoing. In our study we hypothesized that the information that accumulates in the electronic medical record could serve as an indicator to identify soldiers who might be suffering from mental distress.

It should be noted that the background rate of stress in the civilian population is high and under-diagnosis is common. A World Health Organization study conducted in 14 countries indicated that among people who visited their primary care physician 24% were suffering from mental distress. Of these visits 10.4% were primarily for depression, 7.9% were for anxiety, and 2.7% for substance abuse disorders [6]. According to the WHO five of the ten most common reasons for work absenteeism are emotional problems [7]. Most patients suffering from mental distress visit their family doctor [8], while the majority remains undiagnosed [9,10]. The U.S. Preventive Services Task Force recommends screening adults for depression in clinical practices that have systems in place to assure accurate diagnosis, effective treatment, and follow-up [11]. We could not find examples of a large healthcare organization that has successfully implemented such screening. Thus the challenge for civilian and military primary care remains.

Recent publications in popular journals claim that about 15% of the soldiers recruited for compulsory service in the Israel Defense Forces are discharged during their first year of their service, and that suicide is one of the leading causes of military mortality [12,13]. In July 2004, an Israeli parliamentary committee learned that in 2003 a total of 43 soldiers committed suicide; only 20% of them were known to the IDF mental health services [12,13]. In addition, it is claimed that 70% of the reasons for early discharge of conscript soldiers are for mental disorders [12]. Mental distress can cause reduced efficiency among soldiers, can negatively affect morale, and may burden the military healthcare framework. A recent survey of Turkish conscripts found a prevalence of depression as high as 30% [14].

Depression can be accompanied by somatic symptoms. Up to 66% of depression presentations were with exclusively physical

IDF = Israel Defense Forces

symptoms [15]. In view of the high number of soldier visits to the IDF clinics, the relatively high rate of mental distress among the conscript soldiers and the relative inexperience of their physicians, there is an urgent need to improve identification of soldiers who are suffering from depression or mental distress.

Subjects and Methods

In Israel, military service for males is compulsory at age 18 and lasts 36 months. Army service is not mandatory for Israeli Arabs or ultra-Orthodox Jewish males, who therefore are not included in this study. Our study sample was drawn from the Israel Defense Force database.

At the time of conscription, all subjects are asked to provide a detailed summary of their health history, completed by their family physician on a standard comprehensive form. Thereafter, all conscripts undergo a thorough physical examination by the physicians of the conscription bureau to establish a detailed military profile. The military medical profile comprises specific fault clauses for a wide variety of both medical and psychiatric conditions. It provides a uniform tool to establish whether the soldier is fit to serve in the IDF, and if so, helps the IDF authorities find the appropriate unit in which the soldier will serve in light of his medical limitations. Medical problems that might impair military service are all verified by a committee of two army physicians especially trained in this process, and each diagnosis, including its severity, is designated as a numerical code and recorded in a central database.

Before any psychiatric diagnosis is recorded, the conscript is sent to a board-certified psychiatrist for precise classification of the diagnosis and its severity. A "military profile book" comprising all such potential diagnoses, their specific definition, and their numerical codes, is available to both physician committees and specialists. Psychological assessment of potential recruits during a pre-induction screening includes a Performance Prediction Score [16]. The PPS is a comprehensive index for the prediction of functioning in the army and includes three subscales: Education (years in school), Combat Suitability, which is a structured behavioral and personality assessment interview, and Scholastic Ability measuring intellectual ability. The PPS is revalidated every year by the IDF's Department of Behavioral Sciences.

During army service, the military physician of each unit deals with all the soldiers' medical needs. The soldiers cannot self-refer to specialists. Most primary care encounters in the IDF have been documented by the physician in an electronic medical record for several years. This is a central personal medical record with online access for most primary care physicians. Physicians may refer soldiers for a psychological or psychiatric evaluation in case emotional distress or an underlying psychiatric condition is suspected. Alternatively, all soldiers can self-refer to a military psychologist who in turn can refer the soldier for psychiatric assessment. Whenever a psychiatric diagnosis is made, the soldier is referred back to the profiling committee, and his/her profile is reevaluated. The common result of such a profile change is the allocation of the

soldier to another unit, on a temporary or permanent basis, often closer to his or her parents' home.

Study groups

The cases were male soldiers with no previously known psychiatric problems, who during their 3 year service were diagnosed with anxiety, affective or somatoform disorder. Consecutive cases were identified by the new fault clause in the medical profile that was added after conscription.

The control group comprised soldiers with no change in their military medical profile for the above reasons. Groups were matched for recruitment date, specific unit, and occupation in the service. Cases and controls were taken from soldiers recruited in the year 2000.

The variables examined were the country of birth, medical fitness profile at induction, type of army unit (combat or support), PPS, and the number of primary care physician encounters. The number of encounters in the 6 and 3 month period before diagnosis was recorded for the cases. The number of visits for the matched control in the same unit over the same period was noted. The outcome of the encounters was also recorded: namely, number of referrals to specialists, laboratory tests or radiology, days of sick leave, various special dispensations, referrals to the emergency room, and the number of prescriptions filled in the 3 and 6 month period before the last encounter. The content of each visit was collated for the number of presenting complaints and the number of complaints that could be considered somatic according to the DSM-IV [17].

A researcher extracted the data and was blinded to the soldiers' group (case or control). We also conducted a validation process whereby a random sample of 20 files was re-extracted by a second researcher and the extracted data were compared.

Statistical analysis

Data were analyzed using SPSS 11.0. Variables were compared between groups using chi-square analysis to identify any univariate associations. We used univariate regression analysis to obtain odds ratios and confidence intervals for all the variables found to be significant in the initial analysis. We then constructed a multivariate logistic regression model using the stepwise method to identify the variables which when combined could serve as predictors for the diagnosis of mental distress.

Results

The files of 285 soldiers were examined, of whom 155 were cases and 130 controls. Their characteristics are described in Table 1. The distribution of anxiety, depression and somatoform disorder among the cases was 46%, 37% and 17% respectively.

A large proportion of cases (94.7%) had average or low PPS scores. There was no difference between the groups regarding medical fitness profile. The numbers of visits (mean \pm SD) during the 3 and 6 month periods in the case and control groups were 4.7 ± 3.3 and 7.1 ± 5.0 and 4.1 ± 2.9 and 5.9 ± 4.6 respectively. Although during both periods, soldiers in the case group tended to have more visits, the difference was statistically significant only for the 6 month period ($P < 0.05$). The most frequent complaint in both

PPS = Performance Prediction Score

Table 1. Characteristics of the study and control groups

	Cases	Controls	Significance
Military medical fitness profile			
High	61.9%	57%	NS
Moderate	18.7%	16.4%	
Moderate-low	18.1%	26.6%	
Low	1.3%	0	
Country of birth			
Israel	72.9%	74.6%	NS
Other	27.1%	25.4%	
Type of unit			
Combatant	26.0%	23.4%	NS
Non-combatant	74.0%	76.6%	

Table 2. Results of univariate analysis of significant variables for cases vs. controls

Variable	Variable description	Odds ratio	95% confidence interval	P
PPS	Low vs. high	8.5	1.88–38.4	0.001
Headache	Yes vs. no	1.66	1.03–2.66	< 0.05
Back pain	Yes vs. no	1.82	1.05–3.12	< 0.05
Diarrhea	Yes vs. no	1.99	1.11–3.57	< 0.05
Total somatic complaints	Per patient	1.05	1.001–1.094	< 0.05
No. of medications	Per patient	1.16	1.02–1.33	< 0.05
No. of visits in previous 6 months	> 9 vs. 1–8	1.74	1.005–3.0	< 0.05

Table 3. Results of multivariate analysis for cases vs. controls: significant variables

Variable	Variable description	Odds ratio	95% confidence interval	P	Positive predictive value
PPS	Low vs. high	10.89	2.32–51.2	< 0.01	
Back pain	Yes vs. no	2.2	1.23–3.93	< 0.01	0.65
Diarrhea	Yes vs. no	1.94	1.06–3.53	< 0.05	0.67

groups was headache. However, significant differences in frequency of complaints were found only for back pain, 32.3% of the cases compared with 20.8% of controls ($P < 0.05$), and diarrhea, 27.7% vs. 16.2% ($P < 0.05$). The number of complaints that could be classified as somatic was higher among cases than controls (6.7 ± 6.2 and 5.2 ± 5.7 respectively, $P < 0.05$). When we analyzed the outcomes of the encounters we found that the likelihood of a medication being dispensed was 25.8% in the case group compared to 17.7% in the control group ($P < 0.05$). The results of the univariate analysis and odds ratios are shown in Table 2. Table 3 describes the results of stepwise multivariate regression. The only variables that remain significant are the PPS and the presenting complaints of back pain and diarrhea. Validation of the data extraction from the electronic medical record showed a high inter-observer agreement (over 95%).

Discussion

The object of this study was to examine whether certain characteristics within the information that exists in the EMR could be associated with soldiers diagnosed with anxiety, or affective or somatoform disorder. We found a significant difference in four of the categories examined: PPS, frequency of visits in the last 6 months of treatment, the types of complaints, and the number of prescribed medications. However after multivariate regression the most important predictors were the PPS and presenting complaints of back pain and diarrhea.

In addition to complaints such as back pain and diarrhea, there were more complaints of headache in the study group than in the control group. This however did not reach statistical significance on multivariate regression probably because of a high background rate of headache in the control group. A recent review by Kroenke [18] has shown that somatic symptoms are the leading cause of outpatient medical visits and the predominant reason why patients with common mental disorders such as depression and anxiety initially present to a primary care clinic. Multiple somatic symptoms are strongly associated with coexisting depressive or anxiety disorders. Our finding that back pain is the most frequent somatic symptom is in concordance with previous research on this subject [18].

In a Swedish civilian study, frequent attendees had lower basic education, and had significantly more mental disorders and diseases of the musculoskeletal and digestive systems than the controls [19]. So it is perhaps not surprising that conscripts with psychological or social problems before army service would be more likely to have problems during army service. While univariate analysis showed a higher rate of visits among the study group this disappeared in multivariate regression. This too may be because of the high background rate of physician encounters. Soldiers may be frequent attendees for many reasons that are not strictly medical and the medical officer may have difficulty in identifying the genuinely sick patient. In addition, the physician may himself be exhausted by his many duties.

The average number of primary care consultations per conscript soldier is 10 per year (Medical Corps statistics, internal publication). This is approximately four times higher than that of an age-matched Israeli civilian population [20]. There are a number of possible explanations for this phenomenon. These range from the heavy physical demands on the conscripts to administrative requests. In addition, conscripts may exaggerate illness in order to be exempted from certain duties.

On univariate analysis we found that the visits of our cases were more likely to end with the writing of a prescription than in the control group. A breakdown of the different medications described was beyond the scope of this study. Most of the medical officers are recent graduates and before specialization, and therefore lack experience in primary care and in the biopsychosocial model in particular [21]. This may mean that they lack the expertise to make the diagnosis of mental disorder, or even if they do recognize it as such, are unable to treat or refer in an appropriate manner. Bergh and Marklund [22] described the phenomenon of inappropriate prescribing instead of making the correct diagnosis. However, this too, on multivariate regression was not significant and cannot be

used to build a model for early intervention. In primary care most patients with depression presenting with somatic complaints remain undiagnosed [23]. Since the medical officers do not have access to the PPS this does not influence their medical judgment regarding psychiatric referral. The findings of this study suggest that using the PPS may enhance the physician's ability to identify emotional distress.

Identification of these patients is clearly the first step towards their successful management. This method of targeting soldiers at risk may be an alternative to the use of more traditional screening methods, which have many limitations, in the military setting [24].

Study limitations

Although the EMR is a complete record of physician-patient interaction within the army, it is possible that some soldiers sought help elsewhere and therefore some interactions are missing. However, this should not affect a computerized algorithm for identifying these patients within the army framework. Observer bias may have been present despite the fact that the researcher was blinded to the medical outcome of each case. However, this was probably minimal since the inter-observer variation was very low.

Statistical modeling procedures such as logistic regression are known to maximize fit to the particularities of the sample recruited, potentially limiting generalizability of the findings. Therefore, it would be valuable to cross-validate these findings on a second sample. For that sample we recommend a follow-up prospective cohort study in which other variables, such as socioeconomic status, achievements during service, and unit activities along with the medical variables will be used to predict the development of psychiatric morbidity. If this future research validates the findings it will be possible to build a decision support system within the EMR that will help alert the army physician that his/her patient may be suffering from anxiety, affective or somatoform disorder.

Conclusions

We believe that it is difficult for the army physician to identify soldiers who are suffering from mental distress and are not able to discuss their problems in an open manner. This research examines the possibility of identifying items in the electronic medical record that may be associated with and help to identify anxiety, or affective or somatoform disorder. If this finding is further validated, the information in the EMR could become a basis for surveillance, which would enable the physicians to identify more soldiers suffering from these conditions.

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