Journal of Psychiatric Research 79 (2016) 78–85

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/psychires

The long-term burden of military deployment on the health care system

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ARTICLE INFO

Article history:
Received 23 November 2015
Received in revised form
29 April 2016
Accepted 6 May 2016

Keywords:
Posttraumatic-stress disorder
Mental health
Health care costs
Military deployment

ABSTRACT

Health care providers need to be aware that stress complaints that result from deployment can emerge even after many years. This has important implications for health care policies. The main aim of this study is to investigate the relation between the development of posttraumatic stress and other mental health complaints and the burden on (mental) health care after a deployment. For this study we used data from a large prospective cohort study on stress-factors related to deployment in 1007 Dutch soldiers, who were deployed to Afghanistan. Participants were assessed at six follow up times up until five years after deployment. In a Generalized Estimated Equations model we estimated the relation between mental health complaints and the utilization of psychological treatment and a general practitioner, respectively. Moreover, we studied the relation between mental health complaints and health care costs using bootstrap techniques. The results showed that higher scores for PTSD, depression and fatigue relate to increased use of a psychologist. And lower PTSD scores and higher depression, anxiety and somatization scores relate to increased odds to visit a GP. Furthermore, mental health complaints relate to higher costs. In conclusion, monitoring soldiers is important in order to be informed on the current demand for (mental) health care to satisfy the health care need of veterans. Early treatment, which is enabled by lowering barriers to care, relates to positive results and therefore, lower health care costs.

1. Introduction

The long-term psychiatric consequences of traumatic stress are by now common knowledge. Although many veterans reintegrate into society with relative ease, a substantial minority suffer from various psychological symptoms and physical complaints after military deployment including depression, fatigue and post-traumatic stress (Marmar et al., 2015; Reijnen et al., 2014; Thomas et al., 2010; Wisco et al., 2014).

Previous studies into healthcare utilization of veterans have shown that the financial impact of military deployment is large. Harrison et al. estimated that the US government could anticipate an annual increase of $200 million on PTSD care alone due to returning veterans from Iraq (Harrison et al., 2010). A number of studied have quantified mental health problems among deployed (Cohen et al., 2010; Fear et al., 2010; Hoge et al., 2006, 2004; Smith et al., 2008; Wells et al., 2011, 2010). Most of the studies did not specifically quantify the contribution of the mission on the burden of mental disorders or lacked a non-deployed comparison group. Two studies are different in this respect. Recently analysis of data from a Dutch Mental Health survey has shown a 80% higher incidence of consultations with the Military Mental Health System in Afghanistan-deployed Netherlands Armed Forces personnel in the first year following deployment when compared to personnel never deployed to Afghanistan (Taal et al., 2014). A similar finding was reported for Canadian Armed Forces (Boulos and Zamorski, 2016). Although PTSD is the most prevalent diagnosis among returning veterans, other problems, such as anger and aggression, and mild traumatic brain injury frequently occur and lead to health

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http://dx.doi.org/10.1016/j.jpsychires.2016.05.004
0022-3956/

care utilization (Amara et al., 2014; Deahl et al., 2011; Heesink et al., 2015). Veterans with mental health disorders also have much greater utilization of non-mental healthcare services within the Veterans Administration facilities (Cohen et al., 2010). In addition, health care utilization by veterans may also occur years after the initial traumatic experience, and thus add significant economic burden to a society long after the conflict has passed (Baker, 2014; Sabes-Figuera et al., 2012). In our previous study we showed that stress complaints may emerge up to five years after the initial deployment (Eekhout et al., 2016). It is thus of great importance to assess the utilization of healthcare in veterans at this time-point.

In our previous study, we identified two important effects of deployment on posttraumatic stress symptoms: (1) a short-term symptom increase within the first six months after deployment; (2) a long-term symptom increase at five years after deployment (Eekhout et al., 2016). This implicates an increased demand for psychological care not only immediately after deployment but also even five years after a deployment has taken place. Early treatment of psychological problems might be beneficial to a positive outcome (Kearns et al., 2012). Consequently, it might be important to monitor symptom levels at multiple time-points after deployment for a long time period. Health care providers need to be aware that stress complaints that result from deployment can emerge even after five years. The main aim of the current study is to follow up on the implications from our previous study by investigating the relation between the development of posttraumatic stress and other mental health complaints and the burden on (mental) health care after a deployment. This was investigated via the following four objectives.

First, we investigated the development of mental health care use over time in deployed soldiers after their deployment. In a previous study by Hoge et al (Hoge et al., 2006). the health care use until one year after deployment was investigated. In that study it was found that health care use increased over time. However, the long-term burden of deployment on the health care system has not been investigated yet. In this study we will evaluate the development of (mental) health care use during five years after deployment. Second, the relation between mental health complaints and (mental) health care use was investigated. The relation between mental health problems and (mental) health care use might be influenced by demographic characteristics such as, the age, gender and rank of the soldiers, or combat exposure (McKibben et al., 2013). Hence, the extent to which the relation between mental health complaints and (mental) health care use was affected by demographic characteristics or combat exposure was also studied. Furthermore, in practice, policy makers might be interested in the relation between mental health status after return from deployment to health care use in the future, because results from monitoring moments shortly after deployment might be informative for the burden on health care at the long-term. Moreover, it might even be more interesting to be able to estimate the most optimal monitoring time to get the most realistic view of future health care use. Hence, as a third objective, we aimed to determine the measurement time that was most informative for the (mental) health care use at five years after deployment. As a final objective, we evaluated the (mental) health care costs. We compared the differences in health care costs at five years for soldiers that experienced a large amount of stressors during deployment versus those who experienced few stressors. Moreover, we compared the groups based on demographic characteristics and (mental) health characteristics (i.e, gender, smoking, PTSD, anxiety, depression, somatization, fatigue, and hostility).

These four objectives enable us to obtain an extensive perspective on the relation between the mental health complaints after a deployment and the resulting burden on (mental) health care. The results from this study evaluate the current status of (mental) health care use of veterans, and can inform policy makers in making decisions for the future.

2. Material and methods

2.1. Participants

For this study we used data from a large prospective cohort study on stress-factors related to deployment in military personnel. Originally 1032 Dutch soldiers entered the study, who were preparing for a four month military deployment to Afghanistan as part of the International Security Assistance Forces (ISAF) between 2005 and 2008. 25 participants were eventually not deployed, leaving 1007 participants in the study. Written informed consent was obtained after a written and verbal description of the study and the study was approved by the Institutional Review Board of the University Medical Center Utrecht, The Netherlands.

2.2. Measures

The participants were assessed at six follow up times. The first assessment was performed approximately 1 month prior to deployment. The follow-up measurements were performed at approximately 1 month, 6 months, 12 months, 2 years, and 5 years after the deployment period. The assessment prior deployment and at the 1 and 6 month time-points were performed at the army-base (paper-and-pencil questionnaires) and the 12 month and 2 year measurements were completed by mail (paper-and-pencil). The 5 year measurement was conducted via internet. In order to maximize the response rate, participants were contacted maximally five times at each assessment by mail, email, and telephone. The time-points, measurement procedures and overall response rates are schematically presented in Fig. 1.

2.2.1. Demographic characteristics

At the first assessment, prior to their deployment, participants were asked to report their age, gender and educational level (3 categories: low, medium and high). Furthermore, they filled out the Early Trauma Inventory short form self-report (ETISR-SF) (Bremner et al., 2007), which contains 27 items on potentially traumatic experiences before the age of 18 years. The total score on these items represents the number of different traumatic events experienced. Subsequently, at all six assessments participants reported their rank (4 categories: private, corporal, non-commissioned officer (NCO), and staff officer), smoking behavior (yes versus no), and alcohol use (yes versus no).

2.2.2. Combat exposure

Combat exposure was assessed at one month after deployment by measuring the exposure to potentially traumatic combat related stressors that were experienced during the deployment. The participants filled out a 19-item deployment stressors checklist (DES)(Reijnen et al., 2014). The sum on the checklist indicated the number of experienced stressors.

2.2.3. Mental health complaints

Mental health complaints were assessed with self-report questionnaires at all six assessments. Posttraumatic stress complaints (PTSD) were assessed using the Self Report Inventory for Posttraumatic stress disorder (SRIP) (Hovens et al., 1994; van Zelst et al., 2003), which contains 22 questions with a Likert response ranging from 1 (never) to 4 (very frequent). The sum score for the items ranged from 22 to 88, where a higher score indicates more symptoms. Using the items from the Brief Symptom Inventory (BSI) (Derogatis and Melisaratos, 1983), which is a shortened version of