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Sleep disturbances among Swedish soldiers after military service abroad

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ABSTRACT

Aims Since 1956, more than 100,000 Swedish soldiers have served abroad on various international missions. The aim of this paper was to determine whether there was a connection between military service abroad and sleep disorders among Swedish soldiers.

Methods The prevalence of sleep disturbances among 1,080 veterans from Kosovo and Afghanistan was compared with almost 27,000 Swedes from a general population sample, using propensity score matching and logistic regression. The sleep disturbances studied were *habitual snoring*, *difficulty inducing sleep* (DIS), *difficulty maintaining sleep* (DMS), *early morning awakenings* (EMA), and *excessive daytime sleepiness* (EDS). Insomnia was defined as having at least one of DIS, DMS, or EMA. The covariates used in the matching and adjustments were age, gender, smoking habits, BMI, education, ever having had asthma, moist snuff, and exercise habits.

Results The veterans had a significantly lower prevalence of insomnia (26.2% versus 30.4%) and EDS (22.7% versus 29.4%) compared with a matched group from the reference population, using propensity score matching. Analyses with logistic regression showed that belonging to the military population was related to a lower risk of having DMS (adjusted OR (95% CI) 0.77 (0.64–0.91)), insomnia (OR 0.82 (0.71–0.95)), and EDS (OR 0.74 (0.63–0.86)), whereas no significant difference was found for snoring, DIS, and EMA.

Conclusion Swedish veterans have fewer problems with insomnia and daytime sleepiness than the general Swedish population. The explanation of our findings may be the selection processes involved in becoming a soldier and when sampling personnel for military assignments abroad.

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Introduction

A review of health records from the US Veterans Health Administration showed that, in 2010, 3.4% of all soldiers and 14% of the soldiers who had been deployed to military service abroad received an insomnia diagnosis (1). The strongest independent association among demographic characteristics was deployment to Iraq or Afghanistan. The Millennium Study, with more than 40,000 participating soldiers and veterans, reports that between 20% and 30% of a military population had trouble sleeping (2). The risk increased by 28% during deployment and 21% after returning home, compared with those not deployed. There was, however, a difference between being deployed on a high-risk mission, such as Afghanistan or Iraq, and missions with a lower risk, such as being stationed on an aircraft carrier on patrol in the Pacific Ocean. The risk of having some degree of sleeping problems was doubled for soldiers who had been deployed on a high-risk mission (3). Seelig et al. reported that soldiers involved in combat during deployment were 52%–74% more likely to report trouble sleeping than those with no combat experience (2). Part of the association between insomnia and having been part of a high-risk mission may be due to post-traumatic stress disorder (PTSD) (3–5).

Swedish soldiers have taken part in peace-keeping and peace-enforcement military operations under the UN flag since November 1956, when the first Swedish battalion was deployed to Suez. To date, the Swedish Defence Forces have contributed more than 100,000 soldiers to 120 missions in 60 different countries (6). From March 2006 to June 2014, the Swedish contingent was responsible for a Provincial Reconstruction Team in Masar-e-Sharif, as well as manning the International Security Assistance Force (ISAF) headquarters in Kabul. During this time, the lack of protection was a constant cause of concern, at the same time as the frequency of improvised explosive devices (IED) increased. According to the official webpage of the Swedish Armed Forces, 27 attacks with hand-held weapons and IEDs occurred in 2008. It is estimated that, in 2009, the Swedish forces were attacked 82 times (7), and, during this year, 521 NATO soldiers were killed, 60% of them by IEDs (8). In 2006 and 2007, Sweden was the lead nation for the Multinational Task Force Centre, with mission objectives to 'maintain stability and security in the central parts of Kosovo'. The main safety issues in Kosovo were inter-ethnic incidents and criminality, mostly involving weapon confiscation (9).

To our knowledge, no study has been performed on the prevalence of sleep disturbances in Swedish soldiers. The aim of this paper was therefore to determine whether there was a connection between military service abroad and sleep disorders among Swedish soldiers.

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Methodology

Population

The cases in the study population consisted of soldiers and officers who had completed at least one period of military service abroad. Of these, the vast majority (96%) had served either in Afghanistan or in Kosovo. The units were KS13 to KS16, which served in Kosovo from December 2005 to April 2008, and FS15 to FS17, which served in Afghanistan from April 2008 to December 2009. The Swedish Armed Forces Headquarters released the names and addresses of the study participants. The randomization of the soldiers that would be approached and asked to participate was made by the institution's research administrator to avoid bias. Letters containing information and instructions on how to take part in the study were sent out to the sampled addresses. A reminder in the form of a postcard was sent to the sampled population. Information, as well as a link to the study, was posted on the *Fredsbaskrarnas* (a Swedish veteran organization) Facebook page and in their magazine *Fredsbaskern* (The Peace Beret).

The data were collected using a web-based system (Webropol, Helsinki, Finland).

Among those eligible for the investigation, 24 subjects were living under a protected identity or had emigrated. One was killed in action, and one had died of natural causes. Thirty-one subjects actively declined to participate. A total of 1080 (56%) were willing to take part in the study.

The results were compared with a group of individuals based on a general population of almost 27,000 participants living in Stockholm, Gothenburg, Umeå, or Uppsala who participated in the Global Asthma and Allergy European Network (GA^2LEN) study (10).

Questionnaire

The questionnaire consisted of two parts; a copy of the GA^2LEN study questionnaire (10) and a part with a more military-focused inquiry. The GA^2LEN study is a study in which data on respiratory disease and allergies have been collected from different centres in Europe. Questions of importance to this study were smoking habits, height, weight, date of birth, date of answering the questionnaire, gender, educational level, sleep disturbances, moist snuff, and exercise.

The military part of the questionnaire contained several questions about the participants' assignments abroad, such as the number of missions abroad, the country of the assignment, whether the participant was deployed in a staff position or spent more of the time serving in the field, and whether the participant spent a considerable time in vehicles—the last-mentioned was important due to the risk of IEDs while travelling in vehicles.

The study was examined and approved by the regional ethics committee in Uppsala (Dnr 2011/344).

Sleep disturbances

Habitual snoring was defined as reported loud and disturbing snoring at least three nights a week (11). *Difficulty inducing sleep* (DIS) was defined as having trouble falling asleep in the evening at least three nights a week. *Difficulty maintaining sleep* (DMS) was defined as waking up several times during the night at least three nights a week. *Early morning awakenings* (EMA) were defined as waking up early in the morning and being unable to go back to sleep at least three nights a week. *Insomnia* was defined as at least one of DIS, DMS, or EMA (12). *Excessive daytime sleepiness* (EDS) was defined as having problems with feeling drowsy or sleepy during the daytime at least three days a week (13).

Other variables

Current smoking was defined as an affirmative answer to both 'Have you smoked one or more cigarettes a day for more than 1 year?' and 'Have you smoked at all during the last month?'. An *ex-smoker* was a person who had stopped smoking at least 1 month ago.

A person who *currently used smokeless tobacco* gave positive answers to 'Have you used moist snuff daily for more than 6 months?' and 'Do you use moist snuff now?'. A history of asthma was defined as answering yes to the question: 'Have you ever had asthma?'. Body mass index (BMI) was calculated using self-reported weight and height.

Physical exercise was defined as a physical activity which resulted in sweating or breathlessness, and was divided into three groups: less than twice a week, two to three times a week, and more than three times a week (10).

The different levels of *education* were also divided into three groups; no university education, university education less than 3 years, and university education 3 years or more.

Statistical calculations

All analyses were performed using STATA software, version intercooled STATA 12 (Stata Corporation, College Station, TX, USA). The prevalence of sleep disturbances was calculated in both groups before and after matching. Every soldier was matched to one person from the reference group. The matching was made with propensity score matching using the psmatch2 command in STATA. One-to-one matching was used, and the covariates used in the matching were age, gender, smoking habits, BMI, education, moist snuff, and exercise habits. Secondary analyses with binomial logistic regression were also made. Chi-square and *t* test were used in univariate analyses of unmatched data. A p value of <0.05 was considered statistically significant.

Results

The demographic characteristics of both the study population and the control group are shown in Table I. The military population differed from the control group in several respects; they were mostly male, younger, and were less likely to have a history of asthma. They were more likely not to be smokers but used oral tobacco to a greater extent. The veterans exercised more often but at the same time had a higher mean BMI. The military population also had a higher

educational level than the average population. No significant difference was found between the groups in the above variables after propensity score matching.

The prevalence of sleep disturbances in the non-matched and matched populations is presented in Table 2. After propensity score matching, we found that the military population had significantly less insomnia and excessive daytime sleepiness compared with the reference group, whereas no difference was found for habitual snoring, DIS, DMS, and EMA.

Table 3 shows the determinants of sleep disturbances using logistic regression. Belonging to the military population was related to a lower risk of having DMS, insomnia, and EDS, whereas no significant difference was found for snoring, DIS, and EMA. Being a woman was related to a lower risk of snoring but a higher risk for all other sleep disorders. A history of asthma, higher BMI, and smoking was related to all the studied sleep disorders, while the associations varied more for the other included independent variables.

Table 1. Characteristics of the population before adjustment (% and mean ± SD).

	Military (n = 1080)	Control (n = 26,723)	p value
Men	89.4	45.3	<0.0001
Age	36.1 ± 9.9	43.8 ± 16.1	<0.0001
BMI	25.6 ± 3.4	24.8 ± 4.4	<0.0001
Ever having had asthma	12.6	10.1	0.01
Smoking history			<0.0001
Never	79.0	60.6	
Ex	14.1	25.4	
Current	6.9	14.0	
Oral tobacco (moist snuff)	27.5	10.8	<0.0001
Educational level			<0.0001
No university education	33.4	50.1	
University less than 3 years	30.7	14.0	
University 3 years or more	35.8	35.9	
Physical exercise			<0.0001
Less than twice a week	24.6	49.3	
Two to three times a week	40.9	32.5	
More than three times a week	34.6	18.2	

Military population

Of those who had taken part in military service abroad, 687 (64.2%) had been in Afghanistan. The prevalence of sleep disturbances in those who had been in Kosovo and Afghanistan was compared in Table 4. There was a trend towards fewer sleep disturbances for those who had been in Afghanistan, but these associations became statistically non-significant after adjustment for potential confounders. No association was found between the number of missions abroad and sleep disturbances.

In those who had been in Afghanistan, we looked at different aspects of their service. Participants who spent a lot of time in vehicles had a higher prevalence of DIS (15.0% versus 8.7%, $p = 0.04$) and a lower prevalence of habitual snoring (13.0% versus 20.4%, $p = 0.02$). No significant differences were

Table 2. Prevalence of sleep disturbances (at least three times a week) before and after propensity score matching[a] (%).

	Before adjustment		After matching		
	Military (n = 1080)	Controls (n = 26,723)	Military (n = 1030)	Controls (n = 1030)	p value after adjustment
Snoring	16.3	16.1	16.3	14.0	0.50
Difficulty inducing sleep	13.1	13.3	13.1	11.0	0.86
Difficulty maintaining sleep	15.5	27.6	15.6	18.5	0.11
Early morning awakenings	8.7	14.3	8.7	11.2	0.08
Insomnia[b]	26.2	37.3	26.2	30.4	0.047
Excessive daytime sleepiness	22.7	29.4	22.7	27.9	0.01

[a]Matched for age, gender, ever having had asthma, body mass index, smoking, oral tobacco, educational level, and physical activity level.
[b]Insomnia = difficulty inducing sleep, difficulty maintaining sleep, and/or early morning awakenings.

Table 3. Determinants of sleep disturbances. Adjusted odds ratio (95% confidence interval), i.e. for the whole group, veterans, and control group, except in military service abroad.

	Snoring	DIS	DMS	EMA	Insomnia	EDS
Military assignment	1.00 (0.83–1.19)	1.10 (0.91–1.34)	0.77 (0.64–0.91)	0.89 (0.71–1.11)	0.82 (0.71–0.95)	0.74 (0.63–0.86)
Women	0.49 (0.45–0.53)	1.46 (1.35–1.58)	1.53 (1.44–1.62)	1.32 (1.23–1.43)	1.46 (1.38–1.54)	1.37 (1.30–1.46)
Age (per 10 years)	1.25 (1.23–1.29)	0.91 (0.88–0.93)	1.29 (1.26–1.31)	1.25 (1.22–1.28)	1.18 (1.15–1.19)	0.77 (0.76–0.79)
BMI (per 5 units)	1.73 (1.66–1.80)	1.13 (1.09–1.18)	1.12 (1.09–1.16)	1.13 (1.09–1.18)	1.1 (1.08–1.15)	1.17 (1.14–1.21)
Ever having had asthma	1.28 (1.15–1.41)	1.48 (1.34–1.63)	1.29 (1.19–1.41)	1.50 (1.36–1.66)	1.37 (1.27–1.48)	1.47 (1.36–1.59)
Smoking history						
Never	1	1	1	1	1	1
Ex	1.39 (1.27–1.51)	1.28 (1.17–1.41)	1.34 (1.25–1.43)	1.32 (1.21–1.43)	1.33 (1.25–1.42)	1.27 (1.19–1.37)
Current	1.92 (1.73–2.12)	2.14 (1.94–2.36)	1.12 (1.03–1.22)	1.31 (1.18–1.46)	1.32 (1.22–1.43)	1.43 (1.32–1.55)
Oral tobacco (moist snuff)	1.28 (1.15–1.41)	1.65 (1.48–1.83)	0.74 (0.67–0.82)	0.81 (0.72–0.92)	1.02 (0.94–1.11)	1.11 (1.02–1.22)
Educational level						
No university education	1	1	1	1	1	1
University less than 3 years	0.99 (0.89–1.10)	0.82 (0.73–0.90)	1.00 (0.92–1.09)	0.82 (0.73–0.91)	0.96 (0.89–1.04)	1.02 (0.94–1.11)
University 3 years or more	0.93 (0.86–1.01)	0.73 (0.67–0.80)	1.07 (1.00–1.14)	0.80 (0.74–0.87)	0.95 (0.90–1.01)	1.03 (0.97–1.10)
Physical exercise						
Less than twice a week	1	1	1	1	1	1
Two to three times a week	0.81 (0.75–0.88)	0.83 (0.76–0.90)	0.86 (0.80–0.92)	0.86 (0.80–0.94)	0.86 (0.81–0.92)	0.76 (0.71–0.81)
More than three times a week	0.74 (0.66–0.81)	0.97 (0.88–1.07)	0.99 (0.92–1.07)	1.00 (0.90–1.10)	0.99 (0.92–1.06)	0.78 (0.72–0.84)

Adjusted for all the variables in the table and a history of asthma.
DIS = difficulty inducing sleep; DMS = difficulty maintaining sleep; EDS = excessive daytime sleepiness; EMA = early morning awakenings.

Table 3. Prevalence of sleep disturbances (at least three times a week) in subjects who had been assigned to Kosovo and Afghanistan (%) and adjusted[a] odds ratios for having sleep disturbances after having been assigned to Afghanistan compared with assignment to Kosovo.[b]

	Kosovo (n= 369)	Afghanistan (n = 371)	Odds ratio (95% CI)	p value after adjustment
Snoring	19.0	13.5	0.82 (0.53–1.26)	0.36
Difficulty inducing sleep	11.6	11.6	1.01 (0.63–1.63)	0.96
Difficulty maintaining sleep	18.8	12.9	0.76 (0.50–1.16)	0.20
Early morning awakenings	9.0	8.4	0.99 (0.58–1.70)	0.98
Insomnia[c]	28.7	22.6	0.81 (0.58–1.14)	0.23
Excessive daytime sleepiness	24.8	22.4	1.01 (0.70–1.45)	0.97

[a]Matched for age, gender, ever having had asthma, body mass index, smoking, oral tobacco, educational level, and physical activity level.
[b]Participants who had been on missions to both Kosovo and Afghanistan were omitted from this analysis.
[c]Insomnia = difficulty inducing sleep, difficulty maintaining sleep, and/or early morning awakenings.

found between those who had served in a staff or field position.

Discussion

The main finding in the present study was that the Swedish veterans had fewer problems with insomnia and daytime sleepiness than a matched control group from the general Swedish population.

The finding of a lower prevalence of sleep disturbances in the military group was unexpected and in contrast to what has been found in studies from other countries (1,2,14). As an example, the US Behavioural Risk Factor Surveillance System showed that veterans were less likely to sleep the average 7 hours than non-veteran soldiers (15). Among more than 3,000 soldiers returning from Iraq in 2006–2007, almost three-quarters of the soldiers reported sleeping fewer than 6 hours, 90 or 180 days after completing their deployment (16).

The prevalence of sleep disturbances was on the same level as that seen in previous population studies (12,17). The study thereby confirms that sleep disturbances are common in society. Apart from social disabilities, this high prevalence of sleep disturbances also leads to increased sick leave and care seeking, generating significant socio-economic costs in terms of health care costs and production loss. In 2008, sleep disturbance-related costs in Sweden were estimated at 3 billion SEK (18).

Current smoking was closely related to all our measured sleeping disorder variables. This concurs with other Swedish studies (12,19). Smoking and oral tobacco were related to a higher risk of snoring and DIS, which confirms the effects of smoke and nicotine on sleep (20,21). The proportion of never-smokers was higher among the Swedish veterans than has been found in general population studies (22). This is beneficial, as smoking US veterans report twice as much insufficient rest as non-smoking veterans (15,23). On the other hand, the Swedish veterans were almost three times more likely to use oral tobacco than the reference group. This may increase the risk of DIS (24), which was also a finding in this report. Other risk factors for sleep disturbances were also those expected from other studies, such as a having a history of asthma (12) and a high BMI (25–27).

We had no data on the extent to which the Swedish veterans had been involved in combat, which is unfortunate, as combat has been shown to increase the risk of sleeping disturbances (2). Even if the individual veterans had not been involved in combat, the missions in Afghanistan in particular must be regarded as high-risk missions, due to the high IED threat. High-risk missions double the risk of sleeping problems (3), but once again this did not agree with our findings for the Swedish veterans. Another weakness is the lack of questions related to problems with depression, anxiety, or post-traumatic stress syndrome. The choice of control group may also not be ideal. The optimal control group would probably have been soldiers not serving abroad. The validity of our results is therefore dependent on whether or not we managed to account for confounders. It was therefore important that the association between fewer problems with insomnia and EDS in the military population was found when using both propensity score matching and logistic regression. Another strength of our study is that it is fairly large and that we used well-established questions on sleep disturbances that have been used in several international studies (10,13). The order of the questions was also the same in both the military and the control group.

Our conclusion is that Swedish veterans sleep better and experience less daytime sleepiness than the general Swedish population.

The explanation of our findings may be the selection processes involved in becoming a soldier and when sampling personnel for military assignments abroad. Another explanation may be that the Swedish soldiers were much less likely to have taken part in combat than, for example, US veterans. The risk involved in the missions studied in this investigation was therefore lower than in the studies showing an increased prevalence of sleep disturbances among veterans.

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The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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References

1. Hermes E, Rosenheck R. Prevalence, pharmacotherapy and clinical correlates of diagnosed insomnia among Veterans Health Administration service users nationally. Sleep Med. 2014;15:508–14.

2. Seelig AD, Jacobson IG, Smith B, Hooper TI, Boyko EJ, Gackstetter GD, et al. Millennium Cohort Study T: sleep patterns before, during, and after deployment to Iraq and Afghanistan. Sleep 2010;33:1615–22.
3. McLay RN, Klam WP, Volkert SL. Insomnia is the most commonly reported symptom and predicts other symptoms of post-traumatic stress disorder in U.S. service members returning from military deployments. Mil Med. 2010;175:759–62.
4. Macera CA, Aralis HJ, Rauh MJ, MacGregor AJ. Do sleep problems mediate the relationship between traumatic brain injury and development of mental health symptoms after deployment? Sleep. 2013;36:83–90.
5. Gehrman P, Seelig AD, Jacobson IG, Boyko EJ, Hooper TI, Gackstetter GD, et al. Predeployment sleep duration and insomnia symptoms as risk factors for new-onset mental health disorders following military deployment. Sleep. 2013;36:1009–18.
6. Historiska internationella insatser. [Historical international missions. Swedish Armed Forces]. Available at: http://www.forsvarsmakten.se/sv/information-och-fakta/var-historia/internationella-insatser/. Accessed 12/06/2015.
7. Kraftig ökning av attacker i norra Afghanistan. [Sharp increase in attacks in northern Afghanistan Swedish Armed Forces]. Available at: http://www.forsvarsmakten.se/sv/aktuellt/2009/08/kraftig-okning-av-attacker-i-norra-afghanistan/. Accessed 12/06/2015.
8. Casualities Operation Enduring Freedom. iCasualties. Available at: http://icasualties.org/OEF/Index.aspx. Accessed 12/06/2015.
9. Försvarsmakten: Årsredovisning 2006. [Swedish Armed Forces Annual Report 2006.] http://www.forsvarsmakten.se/siteassets/4-om-myndigheten/dokumentfiler/arsredovisningar/arsredovisning-2006/ar06.pdf. 2007. Accessed 12/06/2015.
10. Burney P, Potts J, Makowska J, Kowalski M, Phillips J, Gnatiuc L, et al. A case-control study of the relation between plasma selenium and asthma in European populations: a GAL2EN project. Allergy. 2008;63:865–71.
11. Franklin KA. The influence of active and passive smoking on habitual snoring. Am J Respir Crit Care Med. 2004;170:799–803.
12. Sundbom F, Lindberg E, Bjerg A, Forsberg B, Franklin K, Gunnbjornsdottir M, et al. Asthma symptoms and nasal congestion as independent risk factors for insomnia in a general population: results from the GA(2)LEN survey. Allergy. 2013;68:213–19.
13. Janson C, De Backer W, Gislason T, Plaschke P, Bjornsson E, Hetta J, et al. Increased prevalence of sleep disturbances and daytime sleepiness in subjects with bronchial asthma: a population study of young adults in three European countries. Eur Respir J. 1996;9:2132–8.
14. Lewis V, Creamer M, Failla S. Is poor sleep in veterans a function of post-traumatic stress disorder? Mil Med. 2009;174:948–51.
15. Faestel PM, Littell CT, Vitiello MV, Forsberg CW, Littman AJ. Perceived insufficient rest or sleep among veterans: Behavioral Risk Factor Surveillance System 2009. J Clin Sleep Med. 2013;9:577–84.
16. Luxton DD, Greenburg D, Ryan J, Niven A, Wheeler G, Mysliwiec V. Prevalence and impact of short sleep duration in redeployed OIF soldiers. Sleep. 2011;34:1189–95.
17. Mallon L, Broman JE, Akerstedt T, Hetta J. Insomnia in Sweden: a population-based survey. Sleep Disord. 2014;2014:843126.
18. Behandling av sömnbesvär hos vuxna. Statens beredning för medicinsk utvärdering; [Treatment of insomnia in adults. Swedish Agency for Health Technology Assessment and Assessment of Social Services]. http://www.sbu.se/upload/Publikationer/Content0/1/Behandling_somnbesvar_vuxna_fulltext.pdf. 2010. Accessed 12/06/2015.
19. Larsson LG, Lindberg A, Franklin KA, Lundback B. Symptoms related to obstructive sleep apnoea are common in subjects with asthma, chronic bronchitis and rhinitis in a general population. Respir Med. 2001;95:423–9.
20. Balaguer C, Palou A, Alonso-Fernandez A. Smoking and sleep disorders. Arch Bronconeumol. 2009;45:449–58.
21. Dome P, Lazary J, Kalapos MP, Rihmer Z. Smoking, nicotine and neuropsychiatric disorders. Neurosci Biobehav Rev. 2010;34:295–342.
22. Statistiska Centralbyrån: Alkohol och tobaksbruk. [Statistics Sweden Alcohol and tobacco use]. In: Living Conditions; http://www.scb.se/statistik/_publikationer/LE0101_2004I05_BR_LE114SA0701.pdf. 2007. Accessed 12/06/2015.
23. Sabanayagam C, Shankar A. The association between active smoking, smokeless tobacco, second-hand smoke exposure and insufficient sleep. Sleep Med. 2011;12:7–11.
24. Davila DG, Hurt RD, Offord KP, Harris CD, Shepard JW Jr. Acute effects of transdermal nicotine on sleep architecture, snoring, and sleep-disordered breathing in nonsmokers. Am J Respir Crit Care Med. 1994;150:469–74.
25. Franklin KR, Rehnqvist N, Axelsson S. Obstructive sleep apnoea syndrome – a systematic literature review. Statens beredning för medicinsk utvärdering; Swedish Agency for Health Technology Assessment and Assessment of Social Services. http://www.sbu.se/upload/Publikationer/Content0/1/somnapne_fulltext.pdf. 2007. Accessed 12/06/2015.
26. Babson KA, Del Re AC, Bonn-Miller MO, Woodward SH. The comorbidity of sleep apnea and mood, anxiety, and substance use disorders among obese military veterans within the Veterans Health Administration. J Clin Sleep Med. 2013;9:1253–8.
27. Okpala N, Walker R, Hosni A. Prevalence of snoring and sleep-disordered breathing among military personnel. Mil Med. 2011;176:561–4.