ADVERSE EFEFCTS OF TOBACCO USE IN DEPLOYED MILITARY UNITS

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ABSTRACT

Although research reveals that smoking prevalence has in general stabilized or is even decreasing among military personnel, this trend does not ultimately apply. Being young, being deployed, or being a member of Army personnel, for instance, is proven to increase the risk of being or beginning to be a tobacco user. Usually there are not immediate links emphasised between tobacco habits and the serious health-related consequences during the service period because of the long time lag between tobacco use and its consequences. With some exceptions, the impact of smoking on military performance is defined rather indirectly than directly. However, findings in the Estonian military sample (n=135) indicate that an increase in smoking behaviour while on deployment not only corresponds with poorer psychological wellbeing and general health, but also with being forced to stay away from duty because of physical aches. These results can be taken as indicators that smoking behaviour decreases fitness for military operations and should be targeted by performance enhancement activities. The role of the military culture of smoking behaviour and the arguments for an effective strategy for tobacco use cessation among military personnel are discussed.

TRENDS IN TOBACCO USE

Considering the direct and indirect costs related to consequences of tobacco habits, high importance has been attributed to this behaviour in health policies. Tobacco use is known as the single largest cause of preventable death in the world today, killing a third to a half of all users. Projecting into the future, the total tobacco-attributable deaths will account for almost 10% of all deaths worldwide in 2030.[1] In the WHO European Region, smoking is blamed for about 18.6 million years of life lost.[2]

The financial costs caused by tobacco-related illnesses and medical care are remarkable. The direct and indirect costs of smoking in the EU, for instance, were estimated to range from 1.04% to 1.39% of the EU Gross Domestic Product, exceeding even 3% of it in some new member countries.[3]

Some pessimistic prognoses show that the worldwide number of smokers continues to increase[4] and that the deaths caused by tobacco will double over the next few decades[5]. However, the trends of tobacco-related habits in the Western world are constantly decreasing. According to the latest health surveys in the US and in Europe, smoking prevalence among men and women has in general stabilized or is even decreasing. For example, in the US, the past month use of tobacco products was 29.4 % in 2005, while it was 30.4% in 2002[6]; in the WHO European Region, smoking prevalence was estimated around 28.6% in 2005 but 28.8% in 2002. Falling death rates due to tobacco- related illnesses imply that trends in smoking prevalence have been curbed at least since the early eighties.[7]

Findings from Western military surveys show similar trends and indicate overall declines in smoking as well. For example, in the total military population, the prevalence of any smoking in the US declined from 51.0% in 1980 to 32.2% in 2005.[8] In the Canadian Forces, everyday smoking has decreased from 24% in 2000 to 20% in 2004; the latter figure is declared to be even lower than in the civil population.[9] However,

low smoking rates in the armed forces are not the case in every country, and cannot be generalized to all tobacco products or age groups.[9] In Estonia, for instance, we can observe the same smoking prevalence as elsewhere in Europe (i.e. 27.8%) in the general population[10] , but the prevalence is as high as 41.1% in the military population.[11] Recent findings also reveal that military personnel are more than twice as likely as civilians to use smokeless tobacco[12] and also indicate an increasing rate of tobacco use among young military members.[13]

Inside the military, tobacco use rates and initiation or cessation related aspects are widely explored, especially in relation to the extra stress or excessive boredom military personnel might have experienced on duty. Being deployed has been found to be associated with higher rates of cigarette use[14]. There are an increasing number of regular smokers (including relapse and new initiation) of approximately 10% as well as an increase in daily consumption from an average of 15 cigarettes to 21 cigarettes.[15] The main reasons for increased smoking during deployments that have been cited are: (1) stress, boredom, anxiety, and sleep deprivation; (2) lack of alternate activities and privileges; (3) the perception that dangers in the field trump the negative health impact of smoking; and (4) a permissive military culture toward tobacco use.[16] With respect to managing stress, however, the research findings indicate that tobacco use is more likely to perpetuate a stress response rather than to suppress it, and that nicotine consumers are overall less effective in dealing with combat stress.[17] Unfortunately, not much can be found about the lastingness of post-deployment changes in smoking behaviour. One survey where the persistence of this behaviour is described indicates noticeable differences among subgroups: a larger percentage of Army personnel began or increased their cigarette smoking one year after having deployed than stopped or reduced, whereas the opposite was reported for the other services.[9].

TOBACCO USE AND MILITARY FITNESS

Clinical studies have reported that cigarette use is associated with a lower functional status[18] and a lower exercise tolerance among young adult people.[19] [20] Smoking has also been found to be a consistent and strong predictor of the lack of fitness for military duty, operationalized e.g. in measures of physical health, mental health, substance abuse, and legal problems and of the occurrence of medical problems in training. It is even suggested that smoking be considered as a negative marker of readiness and be included in the services' fitness evaluations.[21,22] Considering the frequency of injury incidents in training[23] and in infantry duties[24] related to cigarette smoking, it has been cited as an independent risk factor for both men and women.[25] Similar findings about the harmful effect of cigarette smoking on physical fitness and readiness are described among U.S. Navy personnel.[26]

It is shown that cigarette smoking adversely impacts troop readiness with increasing time off from duty[27], leading to poorer visual acuity[28], and together the exposure to fine dust being possibly related with the acute eosinophilic pneumonia.[29] However, the decreased fitness during a military exercise, even in harsh environments and in combination with poor dietary habits,[30] is not clearly and explicitly identified. Study results remain controversial about the harmful effects of smokeless tobacco as well. On the one hand, there are results showing that using smokeless tobacco is an independent risk factor for injury proneness[31], that it has a detrimental effect on visuo-motor performance[32], and that it is associated with hypercholesterolemia [33] and higher blood pressure.[34] On the other hand, results indicate that even long-term use of smokeless tobacco does not significantly influence exercise capacity.[35] However, even while physical performance may remain unaffected, there is an increased risk of all kinds of oral problems for users[36,37] and a negative effect on performance caused by deprivation symptoms, such as increased reaction time, self-rated withdrawal and decreased heart rate.[38]

Military fitness is not only about physical health and hardiness. Several studies have reported the association between cigarette smoking and psychiatric illnesses. For currently enlisted personnel, smoking is found to be one of the factors predictive of hospitalization for mental health disorders.[39] Regarding psychiatric illness research, in the target group with posttraumatic stress disorder (PTSD) or major depression, there is a higher prevalence of smoking. It refers to possible self-medication caused by the alleviating effect of nicotine on some symptoms like arousal, numbness, or detachment, which are related

to these disorders.[40] The fact that poor mental health relates to failures in smoking cessation[41] indicates that for those people, quitting is even more difficult than for healthy people. It has also been shown that the overall quality of life among veterans is affected by poor health behaviours, even after controlling for the impact of co-morbid medical conditions.[42] Taking a closer look at the average level of self care among PTSD veterans, one can also observe quite low frequencies of preventive health behaviours and increased risks for non-fatal strokes and myocardial infarctions.[43]

INTERVENTION OPPORTUNITIES

Often there is more than one health risk behaviour or kind of substance in use involved simultaneously[44,45] and it is difficult to detect which of them is responsible for the given disease or harm. The fact that usually several risky behaviours are concurrently present is observable among teenagers in the civil population[46,47] as well as among the adult population in a military environment (e.g. high-risk drinkers use seatbelts less frequently, are more likely to exceed speed limits while driving and smoke more than 20 cigarettes per day). Therefore, intervention programs should be implemented for all those behaviours (safe driving habits, smoking cessation, high-risk drinking) and to be tailored to the specific needs of the group at highest risk.[48] However, when expecting a positive change, one should be aware that people do not alter several behaviours at the same time and efforts to modify one kind of unhealthy behaviour into a healthy one will not necessarily affect other risky behaviours.[49]

The struggle for a healthy lifestyle in the military is far from hopeless as tobacco interventions aimed at smoking cessation have proven to be effective among veterans[50] as well as active duty military personnel.[51] Exhausting list of evidence-based practices of tobacco-control programs and activities are described in depth[52], and clinical treatment approaches are provided. [53]Still, more needs to be done to change the military culture, which has been invoked as a kind of excuse for tobacco consumption (i.e. a means for enhancing comfort or as a morale booster) in almost every article or health report dealing with this population. It has been proven that social influence encourages tobacco use[54], and role models of smoking behaviour in the military are strongly associated with the initiation and resumption of smoking, even after adjusting for other known risk factors.[55] Consequently, intervening with empty slogans or vague efforts is ineffective. Without trying to modify the organisational culture, a persistent change in behaviour can hardly be reached.

As an additional hidden menace to the culture of the Armed Forces, military personnel form an attractive market segment for tobacco producers. Manufacturers' business interests are expressed in manipulative messages, openly directed to military members with high effectiveness.[56] This should be taken into account when trying to protect military members from (re)starting tobacco use and when elaborating the strategy for tobacco use cessation. To reduce existing perverse incentives that lead to increased tobacco consumption, an effective tobacco control policy in the Armed Forces requires explicit implementation instructions and high-level organisational support.[57] Extra attention should be paid to formulate segment-specific messages for military members that counteract effectively with industry messages.

RECENT FINDINGS

A survey[58] was conducted among two rotations of Estonian soldiers deployed into Afghanistan to figure out the change in their perceived general health and smoking behaviour during the first three months of deployment as well as to explore the relations between declared changes in behaviour and the level of psychological well-being reported. The use of other tobacco products like snuff was not explored in this research. All respondents were white males.

Soldiers (n=135) were asked if they had noticed a change in their (1) general health; (2) seeking help from a physician; (3) being forced to stay away from duty because of aches; (4) smoking behaviour; and (5) frequency of physical fitness training compared with the period before deployment. The questions of being a smoker versus non-smoker, and – if yes - the number of cigarettes smoked per day were not explicitly asked for. Nevertheless, the smokers could be distinguished from the non-smokers through item x shown

below. Participants had three choices to answer an item indicating a change: 1) negative change, 2) positive change, or 3) no changes in the health related aspect considered. Examples of items:

x. Compared with the period before deployment my smoking behaviour did …
(1) Increase;
(2) Decrease;
(3) Not change (did not start if non-smoker)

xx. Compared with the period before deployment my general health is …
(1) Worse;
(2) Better;
(3) Unchanged

To assess psychological well-being, we asked them to fill out the well-being questionnaire World Health Organization-Five Well-Being Index (WHO-5)[59]. For both rotations, a survey was administered in the middle of their deployment (being May and August 2008 respectively) on their way to Rest & Recuperation[60] in Estonia.

Most participants declared no changes in assessed health related aspects in the middle of deployment (Fig. 1). Some negative trend was found in all health related aspects but the second highest for Smoking behaviour (n=29) after frequency of Fitness training (n= 40). In terms of positive change, we observed the highest change for the General health which was evaluated more positively (better general health) at the mid deployment as compared with the period before deployment.

The odds ratios in change (positive against negative changes) are also very informative. If the number is higher than 1 than there are proportionally more positive changes than negative ones; and if the number is lower than one, then there are more negative changes as compared to the positive ones. The odds ratio for General health is 3.55; this means that there are approximately 3.5 times more positive changes than negative ones. On the contrary, the odds ratio for Smoking behaviour is .30; in other words, there are about three times more negative changes than positive ones.

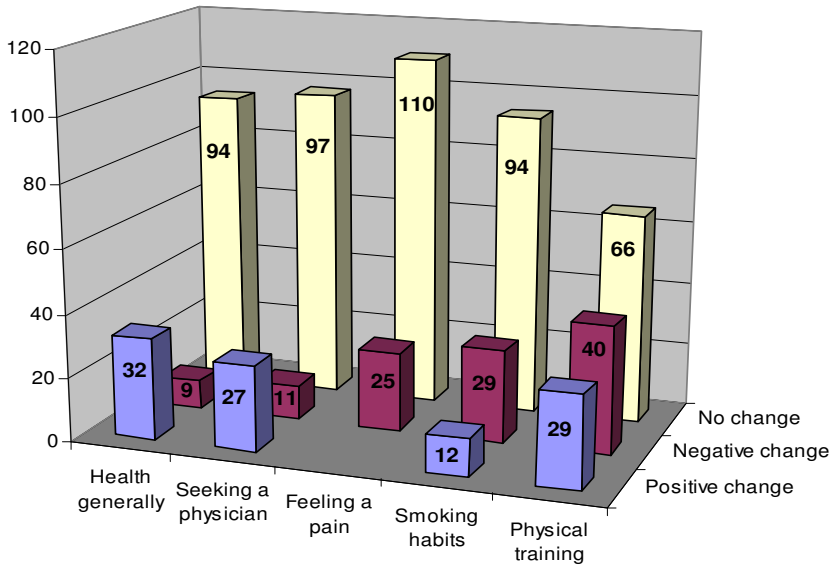

Figure 1: Dynamics of self-reported changes in health related aspects in the middle of deployment

The matrix presented in Table 1 shows correlations between health-related aspects measured among all respondents (n=135). Higher scores on the scales indicate a positive change: better psychological well-being, better general health, fewer visits to a physician, less excessive aches, decreased smoking, and more physical fitness training. Hence, higher positive correlations have a positive connotation. Results reveal that the correlations between Smoking behaviour and Psychological well-being (r=.31), General health (r=.36), and Aches (r=.28) are positive and significant ($p < .01$). Notwithstanding the fact that correlations do not allow for any causal relationship between the variables, the results show that the observed negative changes in tobacco use (thus more smoking- see Figure 1) and in general health is correlated with poorer psychological well-being during the first three months of deployment.

Table 1: Correlations between psychological well-being and health aspects

	Psy.WB	Gen.Hlth	Seek.Phy	Ex. Aches	Smoking
Psychological WB	-				
General health	.33*	-			
Seeking a physician	.11	.38*	-		
Excessive aches	.25	.31*	.14	-	
Smoking behaviour	.31*	.36*	.05	.28*	-
Fitness training	.04	.37*	.21	.14	.21

Note. Psy.WB – Psychological Wellbeing, Gen.Hlth – General Health, Seek.Phy – Seeking a physician, Ex.Aches – Excessive aches, Smoking – Smoking behaviour

** $p < .01$*

To have a clue about the causal relationships, a regression analysis was performed at first with Psychological well being as criterion and General health related aspects as predictors. The solution reveals that Psychological well- being is significantly (p= .00014) predicted in the first place by General health ($\beta = .263$) and in the second place by Smoking behaviour ($\beta = .200$) (see Table 2). The full model accounts for 18% of the total variance.

Table 2: Multiple regression results: predicting Psychological well-being

	β	t (126)	p
General health	.263	2.636	.009*
Seeking physician	.005	0.056	.955
Excessive aches	.131	1.507	.134
Smoking behaviour	.200	2.243	.027*
Fitness training	.121	-1.378	.171

**R= .422 R^2= .178 F(5.126)=5.451 p = .00014*

Another regression analysis was conducted with Smoking behaviour as criterion and Health related aspects as predictors. We found that Smoking behaviour is significantly (p= .00003) predicted by perceived state of General health ($\beta = .312$) and being forced to stay away from duty because of Excessive aches ($\beta = .212$) (see Table 3). The full model described 18% of total variance of Smoking behaviour.

Table 3: Multiple regression results: predicting Smoking behaviour

	β	t(130)	p
General health	.312	3.371	.001*
Seeking physician	-.158	-1.850	.067
Excessive aches	.212	2.564	.011*
Fitness training	.077	0.894	.373

**R= .424 R^2= .179 F(4.130)=7.108 p = .00003*

DISCUSSION

Findings from empirical part of the review concur with the line of previous research indicating that on deployments smoking behaviours is increase. Together with the perceived state of general health, smoking impacts soldiers' psychological well-being. It is shown that soldiers who experience problems with their general health and whose smoking behaviour become more frequent are more vulnerable to mental distress. On the other hand smoking behaviour itself is predicted by the state of general health and presence of aches. It seems to be a closed circle of afore mentioned self medication where one problem is cured with the other and no easy solution is available. Military personnel on deployments are relatively young. Considering the remarkable time lag between tobacco use and its consequences, we might expect the harm to become more disturbing among older soldiers and among retired military members and veterans in terms of restricting their everyday activities, impairing quality of life, and reducing life expectancy.

General decrease in smoking behaviours of Western population, however, elevated smoking in military increase during deployment. Different from alcohol consumption or risky driving, there is not such an immediate impact of tobacco habits and the harm caused by those bad habits like increased death, premature deceases, serious injury rates or severe diseases found during the active duty service period. In active duty the impact of tobacco use on general health and specifically on military performance can be defined rather more indirectly. However, this indirect impact (e.g. injury proneness, deprivation symptoms, higher blood pressure, impaired vision acuity) of tobacco related behaviour may still decrease troops' fitness for military operations and should be the target of performance enhancement activities. Based on research a recommended interventions include: (1) working out an intervention programs tailored to the specific needs of the group at highest risk; (2) elaborating the strategy to modify the military culture which encourage tobacco use; (3) developing an effective tobacco control policy in the Armed Forces with explicit implementation instructions and high-level organisational support; (4) formulating segment-specific messages for military members that are able to counteract effectively with messages from tobacco industries. Research has shown that, instead of pointing to the manipulations by the tobacco industry or to the unhealthy effects of tobacco use, there are four promising themes for tobacco control efforts in the military. Messages to this population should emphasise that: (1) smoking decreases one's ability to positively influence others; (2) smoking increases the chance that a military member will be discharged from the military prematurely; (3) smoking lowers the readiness to fight and to win wars; and (4) smokers are not as productive as other military personnel.[61]

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TUBAKATOODETE KASUTAMISE MÕJUST SÕJAVÄELISELE SOORITUSELE

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Tubakatoodete tarvitamisega kaasnevad otsesed ja kaudsed kulud on tõstnud selle küsimuse vältimatuks tervisepoliitiliseks prioriteediks. Euroopa Liidus kulutatakse veidi enam, kui 1 % siseriiklikust koguproduktist tubaka tarvitamisega seotud haiguste ravikuludeks. Mõnes uuemas liikmesriigis võib see küündida isegi 3% SKP-st. On teada, et tubakatoodete kasutamine asub kõrgeimal kohal ennetatavate surmade nimekirjas tappes kolmandiku kuni pooled selle tarvitajatest. Uurimuste kohaselt peetakse Euroopas suitsetamist vastutavaks kokku ligi 19 tuhande kaotatud eluaasta eest ning aastaks 2030 võib kõikidest maailma surmadest 10% olla seotud tubakatoodete tarvitamise tagajärgedega.

Hoolimata pessimistlikest hinnagutest, mille kohaselt järgneva paari aastakümnega suitsetajate hulk ning suitsetamisega seotud surmade määr kahekordistub, näitab statistkika tubakatoodete tarvitamise jätkuvat langustrendi. Võrreldes 2002 aastaga on 2005 aastal nii Ameerika Ühendriikides, kui Euroopas tubakatoodete kasutamine järjekindlalt langenud. Langus ei ole olnud silmatorkavalt järsk, jäädes vaid 1% piiresse, kuid trend on püsiv. Tubakaga seotud surmade statistika põhjal võib arvata, et tubakatoodete tarvitamine võib olla langustrendis juba 80-ndate esimesest poolest.

Tubakatoodete tarvitamise määr on läbi aegade olnud kõrgem militaarstruktuurides, kui tsiviilmaailmas. Siiski on tarvitamise langustrend on tuvastatav ka seal. Näiteks Kanada armees on vastavad näitajad langenud isegi madalamale, kui tsiviilpopulatsioonis. Kahjuks ei saa sellist positiivset muutust tuvastada ühtlaselt kõikides sõjaväe väeliikides, tubakatoodete kategooriates, sõjaväelaste vanusegruppides ega ka riikides. Eestis näiteks ületab tubakatoodete tarvitamine sõjaväelaste seas tsiviilpopulatsiooni umbes 13 protsendipunkti võrra. Samuti on maavägi väeliikidest, ning noorem vanusegrupp sõjaväelaste ealisest jaotusest tubakatoodete tarvitamisel (eriti suitsuvaba tubaka osas), pigem tõusu-, kui langustrendis. Tubakatoodete tarvitamise sagedus ja intensiivsus (ka uute tarvitajate tekkimine) tõuseb ka välismissioonidel. Põhjustena on välja toodud : (1) stress, igavus, unepuudus; (2) alternatiivsete tegevuste ja privileegide puudumine; (3) veendumus, et operatsioonidega seotud riskid elule ja tervisele on kõrgemad suitsetamisega seotud riskidest; (4) sõjaväelise kultuuri soosiv mõju. Suitsetamiskäitumise negatiivne muutus välismissioonil leidis kinnitust Eesti sõjaväeste seas läbiviidud uurimuses, kus lisaks sagenenud suitsemisele ilmnesid ootuspärased seosed sõduri suitsetamiskäitumise ja tema üldise tervise ning psühholoogilise enesetunde vahel (sõdurid, kes hakkasid rohkem suitsetama, hindasid enda üldise tervise ja psühholoogilise enesetunde halvemaks).

Tubakatoodete tarvitamise mõju negatiivset mõju sõdurite sõjalisele valmisolekule on uuritud põhjalikult. Näiteks esineb suitsetajatel sagedamini psühhiaatrilisi probleeme, koormusmurde, nende nägemisteravus on halvenenud ning oht haigestuda kopsuhaigustesse on kõrgem. Suitsuvaba tubaka tarvitajatel esineb sagedamini suuõõnega seotud probleeme, kolesteroleemiat ja kõrgenenud vererõhku, halvenenud on visuo-motoorne sooritus. Lisaks kahjustub nende sõjaline valmisolek nn ärajäämanähtude tagajärjel, mis väljenduvad pikenenud reaktsiooniajas, sotsiaalses eemaltõmbumises ja langenud südame löögisageduses, kui tubakatoode ei ole kättesaadav.

Sõjaväelised tegevteenitujad on suhteliselt noored ning tugeva füüsilise ettevalmistusega ning võrreldes alkoholitarvitamise või riskantse liikluskäitumisega ei ole tubatoodete tarvitamise mõju nende sõjalisele valmisolekule nii otsene (nt surmade, haigusete, vigastuste põhjustajana). Kuna periood tubakatoodete

tarvitamise ja tervislikus seisundis väljenduva tagajärje vahel on pikk, avaldab see tervisekäitumine mõju pigem vanemate (ja erru läinud) sõjaväelaste seas, madalama elukvaliteedi ja vähenenud oodatavate eluaastate näol. Siiski tuleb arvestada ka tubakatooteid tarvitavate tegevteenistujate kaudselt vähenenud sõjaliste võimekustega ning tarvitusele võtta meetmed ennetavaks tegevuseks tubakatoodete tarvitamise vähendamiseks.

Sekkumise strateegiate väljatöötamisele tubakatoodete kasutamise vähendamiseks tuleb läheneda süsteemselt ja komplekssel. Näiteks tuleb arvestada, et kuna mitmed tervistkahjustavad käitumised esinevad tavaliselt koos (tubaka- ja alkohili ülemäärane tarvitamine, riskantne liikluskäitumine). Seega peab tõhususe tagamiseks ka sekkumine olema suunatud korraga mitmele käitumisele arvesse võttes spetsiifilise riskigrupi vajadusi. Eriline roll tubaka tarvitsmisega seotud käitumistel, mida strateegiate väljatöötamisel arvestada tuleb, on sõjaväelisel kultuuril ja tubakatootjate ärihuvidel, mida peetakse õigustatult tubakatoodete tarvitamise varjatud soodustajateks sõjaväelaste seas. Et sellega konkureerida, tuleb läbi mõelda sõjaväelastele suunatud sõnum, mis peaks eelkõige rõhutama, et suitsetamine: (1) vähendab sotsiaalset mõjujõudu; (2) suurendab enneaegse teenistusest vabastamise tõenäosust; (3) langetab valmisolekut võidelda ja võita; (4) vähendab teenistusalast produktiivsust võrreldes mittetarvitajatega.

Nii veteranide, kui tegevteenistujate seas läbiviidud projekti näitavad, et tubakatoodete tarvitamise vähendamine ning tervisekäitumiste toetamine militaarstruktuurides ei ole lootusetu ettevõtmine, kuid sisutühjade loosungite ja ühekordsete projektidega tulemust saavutada ei saa. Positiivsete tagajärgedeni jõudmiseks on tarvis pikaajalist läbimõeldud tegutsemiskava koos täpsete elluviimise juhiste ja kõrgemate juhtimistasandite selgelt väljendatud toetusega.