SHORT REPORT

Smoking, BMI and psychological strain and fitness in the Naval Service

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Introduction

In common with many large employers in the UK, the Naval Service (NS) is concerned about the lifestyle of its personnel and the implications for fitness for work. Obesity is increasing in the general UK population with 16% of 2–15 year olds being obese [1]. The prevalence of obesity has risen [2] and if current trends continue, one-third of UK adults will be obese by 2010 [3].

Smoking affects the performance and health of military personnel—young, fit trainees on the Royal Marines training course who smoke are almost twice as likely to suffer an injury than their non-smoking counterparts [4]. Approximately 18% of NS personnel smoke and >50% are either overweight or obese [5]. Together, obesity and smoking contribute to chronic conditions that can lead to occupational disability [6].

A total of 0.5–1% of the NS workforce retire early on medical grounds each year, representing a loss to the Service and a cost to the taxpayer. Prior to medical retirement or rehabilitation, unfit personnel are classified ‘medically unfit’ for a time and are provided with medical treatment and access to rehabilitation services.

Although the distinction ‘fit/unfit’ is somewhat artificial, it is relevant because it determines the deployability of NS personnel and therefore influences NS operational capability. Fit personnel (‘P2’ category) are deployable anywhere in the world. Unfit personnel (‘not P2’) are only deployable with restrictions, if at all.

Better understanding of health and lifestyle factors associated with a lack of fitness will support early interventions to maximize employability. The purpose of this short report is to present an analysis of medical fitness using data from Phase I of the NS cohort study of psychological strain.

Methods

Data were extracted from the 2007 cohort study database [7] with prior ethical approval from the Ministry of Defence Research Ethics Committee. Medical grade was dichotomized into ‘fit’ and ‘unfit’ (P2 versus not P2). Pregnant females were excluded. Information was extracted on age, body mass index (BMI), years served, alcohol consumption (units per week), smoking, sex, exercise participation frequency, physically demanding occupation, health complaints, psychological strain [General Health Questionnaire (GHQ)-12] and psychosocial factors (described elsewhere [7]).
The data were analysed using Mann–Whitney U-tests to identify differences between the fit and unfit groups. Variables differing significantly were entered into a forward stepwise logistic regression analysis. Relative risk was calculated to determine effect sizes.

Results

A total of 2596 returns were analysed. A total of 90% of the sample was fully fit (P2) compared with 89% for the general service as a whole.

Stepwise logistic regression analysis found statistically significant effects due to smoking, BMI, GHQ-12 score and work–family conflict \((P < 0.001)\) with the model accounting for 5.6% of the variance in medical grade, 3% of which was due to smoking.

The relative risk of being medically unfit was 1.6 (95% CI 1.1–2.2) for smokers and 1.4 (95% CI 1.1–1.9) for BMI \(> 25\). The relative risk of being medically unfit for GHQ-12 strain cases was 1.08 (95% CI 1.05–1.1). The percentage of non-smokers who were medically unfit was significantly lower than that of smokers (chi-square = 15.0, df = 1, \(P < 0.001\)). A total of 64% of medically unfit personnel had a BMI \(\geq 25\) as opposed to 53% of fit personnel.

Table 1 summarizes the prevalence rates of the main self-reported medical conditions.

The mean age of all respondents was 35 years (SD 8). Smokers were significantly younger than non-smokers: 33 versus 35 years, respectively \((t = -3.9, df = 1998, P < 0.001)\).

Discussion

Statistically significant associations were found between smoking, BMI and fitness. The effect sizes were small, but that due to smoking (3%) was of a similar magnitude to the effect size of smoking in a study of injury in Royal Marine recruits (4%) [4].

The reliability and validity of the fitness classification process are unknown. However, the sample size was large and the proportion unfit was similar to that for the service as a whole, indicating no response bias due to fitness. Furthermore, the data in Table 1 agree with medical retirement data—musculoskeletal disorders including back and knee disorders are the single largest cause of medical retirement.

Although these data are from a cross-sectional study, it is unlikely that reverse causality explains the associations that were found. Although unfit personnel might take up smoking or put on weight when medically downgraded, there was no difference in self-reported participation in exercise between fit and unfit subjects. Furthermore, fitness is a requirement for promotion and personnel have an incentive to get better.

Smoking was more strongly associated with medical downgrading than being overweight, despite the fact that 16.5% of males were nominally obese.

Table 1. Summary of self-reported health complaints in medically fit and unfit personnel

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Prevalence rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fit (%)</td>
</tr>
<tr>
<td>Back problems</td>
<td>16</td>
</tr>
<tr>
<td>Knee problems</td>
<td>16</td>
</tr>
<tr>
<td>Musculoskeletal disorders</td>
<td>4</td>
</tr>
<tr>
<td>Stress</td>
<td>8</td>
</tr>
<tr>
<td>Depression</td>
<td>4</td>
</tr>
<tr>
<td>Hypertension</td>
<td>4</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0</td>
</tr>
</tbody>
</table>

In agreement with previous research in otherwise young and healthy employees [4], the paper presents evidence that, in physically demanding occupations, smoking degrades fitness for work independently of factors such as obesity and stress.

Key point

- Smoking is a risk factor for medical unfitness in a relatively young population of employees. The effect is independent of psychological strain and body mass index.

Conflicts of interest

None declared.

References