Fatal Road Accidents among Finnish Military Conscripts: Fatigue-Impaired Driving

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The aims of the present study were to determine the current prevalence of personal car usage for holiday trips among Finnish conscripts and to analyze conscripts' fatal road accidents. The data included questionnaire data collected from 259 young conscripts at a garrison in southeastern Finland and data on 46 fatal road accidents caused by conscripts during the years 1991–2004, extracted from the national database of fatal road accidents studied in depth. The questionnaire data showed that one-third (35.9%) of young Finnish conscripts had used personal cars to travel to or from the garrison in the preceding 2 months. More than one-half of them reported driving while fatigued (a majority reported several occasions of such driving). In addition to those driving themselves, 41.6% of the conscripts rode at least occasionally as a passenger in a car driven by a fellow conscript. Analysis of the fatality data showed that one-half of the conscripts' fatal accidents occurred on the way to or from the garrison or while on duty. Falling asleep was the main cause of all conscripts' accidents (34.8%), with the largest proportion occurring when departing for leave (42.9%). Haste (including speeding) was the second greatest factor contributing to accidents occurring on the way to or from the garrison (26.1%), whereas drunk driving (22.7%) and suspected suicides (18.2%) were typical of accidents occurring on leave.

Introduction

More than 80% of men in Finland complete compulsory military service; therefore, injuries during military service are recognized as a public health issue.1 Although only 5.5% of the hospitalizations for injuries among Finnish conscripts in 1990–1999 were caused by traffic accidents,1 leisure-time traffic accidents were the leading cause of conscripts' deaths.2 Similarly, in Sweden, a considerable number of conscripts die in traffic accidents every year, with more than one half of the deaths occurring off duty.3 Although conscription is not currently being practiced in the United States and it may be questioned whether results from a professional army are applicable to a conscript army,1 it seems that motor vehicle accidents represent a major problem for both types of armies. Motor vehicle accidents are the leading cause of deaths among active personnel in the U.S. armed forces;4 moreover, they are the leading cause of hospitalizations for treatment of injuries, especially in the U.S. Army.5 Most of the accidents happen off duty.5 Finnish conscripts enjoy certain travel benefits while traveling to and from the garrisons. During their usual 6 months of service, the conscripts have 12 paid round-trip journeys to be used when traveling to or from the garrison on leave.6 The free travel applies to the collective transport organized by military authorities or public transport. For additional trips above the free quota, conscripts can obtain major discounts on public transportation. Unlike in some other countries with conscription (e.g., Croatia), Finnish conscripts are allowed to use personal vehicles to travel to and from the garrisons; however, gasoline refunds are not available.

Previous research showed that falling asleep was the greatest individual causal factor (36%) in 25 fatal accidents caused by conscripts during the years 1980–1988.7 In most cases, service-related fatigue contributed to falling asleep behind the wheel.7 This is not surprising, because a survey of 2,537 conscripts in the late 1970s showed that 53.8% of the conscripts complained of having an insufficient amount of sleep while in the army and 39.2% felt tired often or always.8 In a more recent ethnographic study, conscripts reported that having to stay awake during night maneuvers was the most difficult part of training.9 In addition to irregular working hours, including night work, the training includes hard physical exercise that can produce fatigue. Young men are also one of the groups of drivers at highest risk for sleep-related accidents.10,11 Besides their being the most prevalent group of road users at times with the greatest sleep propensity (during the night hours),12 several other risk factors are typical for young adults. They are more susceptible to acute sleep loss than are adults more advanced in age.13 Because of their driving inexperience, young drivers can overestimate their capabilities and fall asleep without realizing the risks.14 In addition, so-called extra motives (e.g., peer pressure) typical for young people15 can push such drivers to continue driving despite increased sleepiness. Conscripts may indeed be at high risk of fatigue-related accidents while driving fatigued from the garrison to home or driving and partying while on leave (usually on weekends), instead of using that time to recover from their tiring military duties.

In recent years, some attention in the Finnish Parliament has been given to this issue of conscripts' fatigue-related road accidents. A group of members of parliament raised the question of conscripts' fatigue following an accident caused by a conscript who fell asleep while driving home after a difficult training week.16 In response, the Minister of Defense claimed that, according to military records, not a single road fatality from 1999 to 2003 had been caused by service-related fatigue. The minister also emphasized that measures had been introduced to improve the traffic safety education of conscripts. For example, a nongovernmental organization (the Finnish Health Association, i.e., Terveys ry) organized a few educational courses for the
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Finnish military forces in 2005. Among others, the topics included drunk driving, fatigue, and speeding. Additionally, following the recommendations of the Conscripts’ Traffic Safety Work Group,17 commanders should recommend that conscripts use public transportation. In a more recent address in Parliament, the minister announced the further improvement of collective transport.18

The purpose of this study was two-fold. The first aim was to determine the prevalence of personal car usage for holiday trips among conscripts, with a special focus on possible fatigue/sleepiness problems while driving. The second aim was to analyze the fatal road accidents involving conscripts and to determine whether there was a difference in the causal factors of accidents occurring while conscripts were on leave, on duty, or traveling to or from the garrison.

Methods

This study used two data sources. First, we used a survey performed at one garrison, in southeastern Finland, of 259 young male conscripts (mean age, 19.52 years; SD, 1.1 years; range, 18–29 years) holding a valid driver’s license. This sample of conscripts represents the Finnish population of 19- and 20-year-old men very well. At the time of testing in October 2005, the conscripts had served ~4 months. The data collection was performed by a research assistant in a lecture room but was also supervised by army personnel, who guaranteed the conscripts’ attendance. Therefore, the conscripts’ participation might not be seen as completely voluntary, although it was anonymous. The questionnaire included a wide range of questions (e.g., driving behavior, lifestyle and personality scales, alcohol consumption, and driving exposure). Here we report only the responses to four open-ended questions regarding the use of a personal vehicle for holiday trips. We asked the conscripts how many times they had driven their cars between home and the garrison in the preceding 2 months and in how many instances they had been fatigued. In addition, we asked them whether they had traveled as a passenger in a vehicle driven by a fellow conscript. Finally, the conscripts were asked to estimate the distance between their homes and the garrison.

Second, we used the Finnish, in-depth, road accident investigation system data of the Traffic Safety Committee of Insurance Companies (VALT). All fatal accidents involving at least one death are studied in depth by 14 multidisciplinary experts, vehicles, the traffic situation, and road and weather conditions (among other factors) are imported into the VALT computerized database. More details on this method and the work of investigation teams can be found elsewhere.19

Using the computerized VALT database, we identified all accidents involving conscripts. We studied the original investigation folders only for accidents caused by conscripts. According to the purpose of the trip, the accidents were classified as army related (driving on duty or to or from the garrison) or army unrelated (on-leave driving). It should be noted that army related, in this context, does not imply that the accident is service related or that the army is responsible for the accident.

Results

Questionnaire Data

The conscripts’ response rate was 99.6%; however, because of missing data, 14 of 259 respondents were excluded from the analysis. Of the remaining sample, 88 conscripts (35.9%) had driven a personal vehicle from or to home in the preceding 2 months. The driving distance between the conscripts’ homes and the garrison was shorter (t test, \( t = 3.198, df = 242, \ p < 0.01 \)) for those who used a personal vehicle (mean, 140.9 km; SD, 78.4 km) than for those who did not use one (mean, 173.1 km; SD, 73.7 km). In addition to those who drove themselves, 102 conscripts traveled at least sometimes as a passenger in a car driven by a fellow conscript, which leaves only 55 conscripts (22.4%) who were not exposed to such a traffic accident risk. Of the 88 conscripts who drove their personal vehicles, 47 (53.4%) reported driving fatigued within the preceding 2 months (30 conscripts reported two or more instances of such driving). There was no statistically significant difference in driving distance (from home to the garrison) between those who reported driving while fatigued and those who did not report such problems.

Fatal Road Accident Database (VALT Database)

During 1991–2004, 137 conscripts were involved in 58 different fatal accidents. A conscript was the first (guilty) participant in 46 accidents (in one accident, both participants were conscripts), a conscript was the second participant (nonguilty) in 11 accidents, and the conscript was not an active participant (he died as a passenger) in only one accident. A total of 60 conscripts died and 13 were seriously injured during the 14-year period.

Although conscripts were responsible for 79.3% of the accidents, 95% of all conscripts’ fatalities occurred in such accidents. In addition to the 57 dead conscripts (Fig. 1), 12 civilians died, increasing to 69 the overall number of fatalities in accidents caused by conscripts. More than one-half of the conscripts (31 of 60 conscripts) died in army-related accidents, with
one-third (20 of 60 conscripts) being killed while traveling from the garrisons. Detailed data are presented in Table I.

Falling asleep was a major cause of the conscripts’ accidents, regardless of whether the driving was army related (34.8%) or occurred on leave (36.4%). Haste, which is typically accompanied by speeding, was the second greatest factor in army-related accidents (26.1%), whereas drunk driving (22.7%) and suicides (18.2%) were typical of accidents that occurred on leave. The conscripts were most likely to fall asleep when traveling home from the garrison (42.9%). According to the investigation teams, in three cases drivers’ army-related fatigue contributed to causing an accident although the accidents actually occurred while the conscripts were on leave.

Most of the on-leave accidents occurred over the weekends (81.8%), whereas 42.9% of the accidents that occurred on the way from the garrison happened on Fridays (Fig. 2). On-leave accidents in which the conscript fell asleep occurred mostly (62.5%) between midnight and 6:00 a.m. However, while driving from the garrison in the afternoon, the conscripts fell asleep quite often (Fig. 3). The accidents caused by falling asleep were either head-on or single-car accidents (Fig. 4).

**TABLE I**

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<tr>
<th>CONSEQUENCES OF ROAD ACCIDENTS ACCORDING TO THE PURPOSE OF THE TRIP</th>
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<tr>
<td><strong>No. (%)</strong></td>
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<td>---------------------</td>
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<tr>
<td>All fatal accidents</td>
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<tr>
<td>Guilty-conscript accidents (% of all fatal accidents)</td>
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<tr>
<td>Army-related accidents (% of guilty-conscript accidents)</td>
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<td>To garrison (% of army-related accidents)</td>
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<td>On duty (% of army-related accidents)</td>
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<td>From garrison (% of army-related accidents)</td>
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<sup>a</sup> In one accident, both participants were conscripts.

<sup>b</sup> In one special case, the conscript left the garrison without permission.
Fig. 2. Number of fatal road accidents caused by conscripts during 1991–2004 (n = 46) according to day of the week and purpose of the trip.

Fig. 3. Number of fatal accidents caused by conscripts during 1991–2004 (n = 46) according to time of day and purpose of the trip.
Only two fatal accidents happened while the conscripts were on duty. In one of the accidents, the conscript had the flu. He was taking antibiotics but still had been driving an army vehicle for >10 hours and had been awake for ~24 hours. His accident happened in the early morning hours.

Discussion

The present study shows that a considerable number (35.9%) of young Finnish conscripts use personal vehicles to travel to and from the garrisons. Although they are encouraged by their commanders to use public transportation, these conscripts still exercise their legal right to use their personal vehicles. Additionally, 41.6% of the conscripts sometimes travel as passengers in cars driven by their colleagues. This means that less than one-fourth of the conscripts are not exposing themselves to the risks associated with traveling in the conscripts’ own cars. Given that fatigue is a major contributor to accident causation, the large proportion of conscripts driving while fatigued is a reason for serious concern. Indeed, our analysis of the conscripts’ fatal accidents showed that the conscripts fell asleep in 42.9% of the accidents that happened on the way from the garrison to home. In some of those cases, the conscripts had been sleeping in a tent in a forest camp for several days before the accident. It should be noted that forest camps are an important part of training in the Finnish defense forces. The deputies who raised the question in the Finnish parliament specifically pointed out that conscripts should not be allowed to go home immediately after forest camp or intensive training; instead, they should rest for 1 day before leaving for home.

Although military authorities can reduce the risks of sleep-related accidents by restricting too-fatigued conscripts from driving home from the garrison, they cannot control how the conscripts use their free time. This might be difficult to achieve even in a professional military, with stricter regulations and discipline. Unfortunately, some conscripts do not use their free days to recover from sometimes difficult army duties; instead, they try to compensate for the time spent in the military by engaging in many different activities, maximizing the usage of their available free time. Therefore, an insufficient amount of sleep while on leave, together with residual army-related fatigue, might put the young conscripts at considerable risk of sleep-related accidents. In one-third of on-leave fatal accidents, the conscript fell asleep; in three of eight cases, the investigation teams explicitly noted that residual army-related fatigue was a contributing factor.

Drinking and driving while on leave was another significant cause of the conscripts’ accidents. In one-half of the 22 on-leave accidents, the conscript was under the influence of alcohol (above the legal blood alcohol concentration limit of 0.05%). Of these 11 cases, five were purely drunk driving, four were suspected suicides while intoxicated, and in two the drunk driver fell asleep. These findings are similar to those of a Swedish study in which 41% of conscripts’ on-leave accidents were related to alcohol. Driving while intoxicated is a typical practice of young male drivers and, in that sense, conscripts might not differ much from their civilian peers. However, the combination of the residual army-related fatigue and the sedative effects of alcohol is another possible risk factor for sleep-related accidents among conscripts.

In our sample, according to the investigation team’s documentation and conclusions, two conscripts committed suicide and two others were driving in a suicidal manner (engaging in extremely risky driving before the accident). One conscript’s...
romantic relationship had recently ended, another conscript had a newborn child, and the third conscript was suffering from mental problems and obviously had not received adequate help in time. This background information supports the conclusion of Marttunen et al.,24 that is, “Conscription seems to be a remarkable psychosocial stressor, but it is seldom the only one preceding conscript suicide.”

Six cases were attributable to haste (and speeding) in traveling to or from the garrison, probably reflecting the conscripts’ desire to enjoy their free time as much as possible. In one case, the conscript was heavily drunk (blood alcohol concentration, 0.2%) and hurrying back after a free afternoon. In two other cases, while hurrying (and speeding) back to the garrison in the late evening, the conscript’s car hit a moose. Accidents involving moose or white-tailed deer are very common in Finland and typically happen after sunset, with a peak at 1 hour after sunset.25

Although the number of trips taken to and from the garrison should be equal, indicating similar exposure to risk (at least in terms of kilometers driven), it seems that accident risks are not. Twice as many accidents occurred while conscripts were traveling from garrisons, compared with driving to garrisons. This implies that the type of task might be different. First, conscripts usually drive home from the garrison in the afternoon (on Friday) and drive back to the garrison during the evening (on Sunday), to comply with the midnight deadline for arrival. Traffic flow is significantly greater on Friday afternoon, compared with Sunday evening, and the consequent risk of accidents might be greater when conscripts are driving home. The greater the traffic density, the greater the exposure to and number of multiple car crashes, including sleep-related (and inattention-related) crashes with oncoming vehicles.26,27 Moreover, the secondary peak of sleep-related accidents is during the midafternoon hours, corresponding to a period of decreased alertness in humans. This suggests that interaction between army-related fatigue and normally decreased alertness significantly impairs conscripts’ fitness to drive home from the garrison during the afternoon hours.

Although only two fatal accidents occurred while the conscripts were on duty, the case of the conscript who had driven for many hours in an extreme state of fatigue attracted significant publicity and debate over the military’s responsibility for the accident. Nevertheless, the number of conscript fatalities occurring during on-duty driving seems lower than in Sweden, where 12.3% of all vehicle-related conscript fatalities occurred while they were driving on duty.3

Conclusions

The present study suggests that, despite the safety precautions taken by army authorities, young conscripts still expose themselves and their traveling companions to a high risk of road accidents. Public concern especially arose with two accidents in 2004 that were caused by conscripts falling asleep while departing for leave. There is no doubt that the collective transport organized by army authorities and public transportation are the safest modes of transport for the conscripts. Recommendations and encouragement for using public transportation should continue. It might be a good course of action to establish stricter rules for using personal vehicles. One possibility might be restrictions on driving back to the garrison during the late evening hours, similar to night-time restrictions for young drivers.20 During the night, humans experience the greatest need for sleep, visibility is lower, and there is a greater risk of crashes with animals on the road. For young, mostly inexperienced drivers, these risks might be too large to handle. One issue is quite clear to us; for safety reasons, conscripts should not be allowed to leave the garrison and start driving in a state of increased fatigue/sleepiness, which is typical after the forest camps.

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References


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