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Blue-Collar Workers' Accidents and Close Call Situations Connected to the Use of Cell Phones among Finns Aged 18–65

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***Abstract*—**There has been discussion if the use of mobile phones causes accidents. We studied workers' accidents and near accidents related to the use of phones. This study is part of a large cross-sectional study that was carried out on 15,000 working-age Finns. We noticed that there were 4–5 times more close call situations than accidents connected to mobile phones and also work related accidents were fewer than leisure related. There are confusing parameters like the use of mobile phones at work, differences in work content between women and men.

***Keywords*—**Blue-collar workers, accident, cell phone, close call situation.

I. Introduction

THE use of cell phones is part of everyday life; for example, 90% of Americans own a cell phone [1]-[3]. Saltos et al. [2] studied cell-phone related injuries in the United States from January 2000 to December 2012 using The National Electronic Injury Surveillance (NEISS) database. They found 515 records of Emergency Department (ED) visits related to the use of cell phones. For examples, in 62% of the cases, the patients were women, and in 55% of cases, patients were under 40 years old. Most injuries were minor, (11% of patients required hospitalization) and 48% of injuries occurred in the home. [2]

According to Eurostat, (the Statistical Office of the European Communities) EU countries reported a total of 4.5 million occupational accidents from 2009–2010 that required an absence from work for more than three days [4], [5]. Recently, serious work accidents and their causes have been studied by analyzing the data from Eurostat [6]. The database includes comparable statistics on accidents at work by economic activity and severity for the EU27 countries from this period and in Norway. [5].

According to [6], accidents associated with more complex event sequences are related to major hazards. For example, electrical problems, explosions, or fires caused only a small proportion of the accidents (11%). Minor hazards realized through simpler accidental event sequences dominated as follows: 21.5% to loss of control of machines and tools; 42% attributable to body movements; 23% to slips, trips, and falls. The incidence of fatalities was 12 %.

At the Tampere University of Technology (TUT), we have studied the health effects of new technical equipment using a questionnaire. We carried out a cross-sectional study by posting a questionnaire to 15,000 working-age Finns. We got 6,121 responses. Our questionnaire included questions on the familiarity and use of new technical devices, prevalence of different symptoms, accidents and close call situations associated with mobile phone use, and an open-ended question on health and new technology [7]. In an earlier article [8], we analyzed all responses' data and how the accidents/close call situations are connected to background information, age, gender, and symptoms. Altogether, 13.7% of persons had close call situations, and 2.4% had accidents at leisure, in which a cell phone had a partial effect; at work, the amounts were 4.5% and 0.4% respectively, during the last 12 months.

The aim of this paper is to investigate blue-collar workers' accidents and close call situations connected to the use of cell phones amongst Finns aged 18-65.

II. Methods

A. Study Population

We focused our study on the working-age population and sent the questionnaire to 15,000 people (aged 18 to 65). We got the names and addresses of the participants as a random sample from the Finnish Population Register Centre. The study design was approved by the Ethical Committee of Pirkanmaa Health District, Finland (decision R02099).

This paper concentrates on blue-collar workers and their answers to questions on sections that contained questions about the importance and use of a cell phone as well as accidents and close call situations while on a cell phone [7], [8].

B. Statistical Analyses

We performed statistical analyses using IBM SPSS Statistics version 23 software. To compare differences between female and male blue-collar workers, we used the independent samples Mann-Whitney U-test analyses. First, we analyzed persons who answered that they are blue-collar workers. This is Group 1. Second, we chose only persons who also answered that they are working. Group 2 included employed blue-collar workers.

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We conducted the following analyses with Group 1:

(1) Comparison of all female (Group 1A) and male (Group 1B) persons' answers to Question 18: "During the last 12 months, have you had one or more accidents at leisure while on a cell phone?" (Analysis I);
(2) Comparison of all female (Group 1A) and male (Group 1B) persons' answers to Question 19: "During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?" (Analysis II);

We carried out the following analyses with Group 2:

(1) Comparison of female (Group 2A) and male (Group 2B) blue-collar workers' answers to Question 20: "During the last 12 months, have you had one or more accidents at work while on a cell phone?" (Analysis III);
(2) Comparison of female (Group 2A) and male (Group 2B) blue-collar workers' answers to Question 21: "During the last 12 months, have you had one or more close call situation at work while on a cell phone?" (Analysis IV).

III. Results

A. All Blue-Collar Workers (Group 1)

From all respondents, 34.7% (2122) were blue-collar workers (52.9% women and 47.1% men), and their average age was 40. In addition, 74.7% of them were working. Some of the respondents were retired, but they cited their old occupation on the questionnaire.

Figs. 1 and 2 show all of the blue-collar workers' answers to the question, "How important is a cell phone at work?" and "How often do you use a cell phone at work?" Figures did not include missing values (27%).

Table I shows the all persons' (Group 1) answers to Question (1), "During the last 12 months, have you had one or more accidents at leisure while on a cell phone?" and to Question (2), "During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?" In addition, Table I shows the blue-collar workers' (Group 2) answers to Question (3), "During the last 12 months, have you had more or more accidents at work while on a cell phone?" and to Question (4), "During the last 12 months, have you had one or more close call situations at work while on a cell phone?"

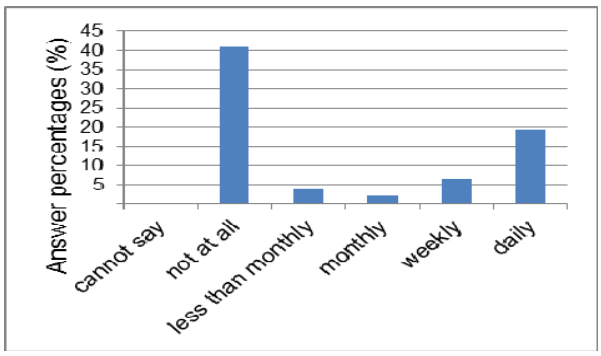

Fig. 1 The persons' (Group 1) answers to the question, "How often do you use a cell phone at work?"

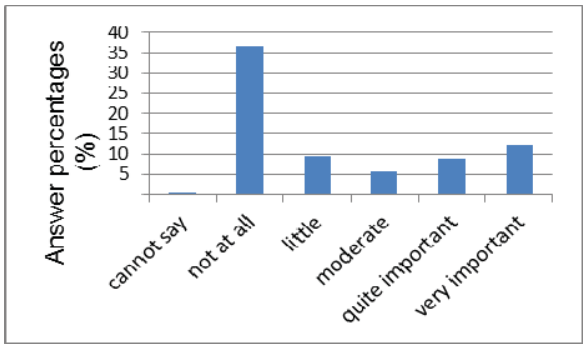

Fig. 2 The persons' (Group1) answers to the question, "How important is a cell phone at work?"

TABLE I
BLUE-COLLAR WORKERS' (GROUPS 1 AND 2) ANSWERS TO QUESTIONS ABOUT ACCIDENTS AND CLOSE CALL SITUATIONS

	Yes (%)	No (%)	Missing (%)
All persons (Group 1)			
Question 1	2.6	94.0	3.4
Question 2	11.7	84.4	3.9
Blue-collar workers (Group2)			
Question 3	0.5	96.8	2.6
Question 4	2.9	94.1	3.0

B. Female Blue-Collar Workers (Group 1A)

Figs. 3 and 4 show all the females' answers to the question 'how important is a cell phone at work' and 'how often do you use a cell phone at work'. Figures did not include missing values (27%).

Table II shows (a) all the females' answers to Question (1), "During the last 12 months, have you had one or more accidents at leisure while on a cell phone?" and to Question (2), "During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?". Table II also shows the (b) female blue-collar workers' answers to Question (3), "During the last 12 months, have you had one or more accidents at work while on a cell phone?" and to Question (4), "During the last 12 months, have you had one or more close call situations at work while on a cell phone?"

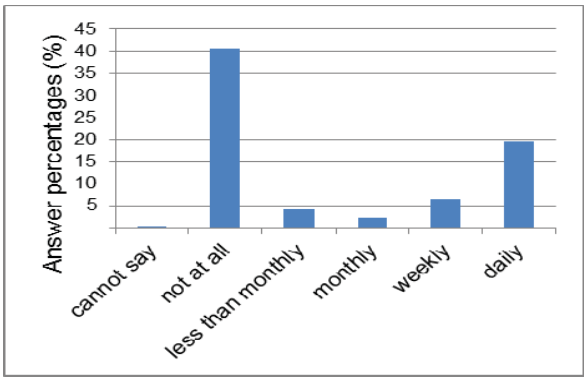

Fig. 3 Females' (Group 1A) answers to the question, "How often do you use a cell phone at work?"

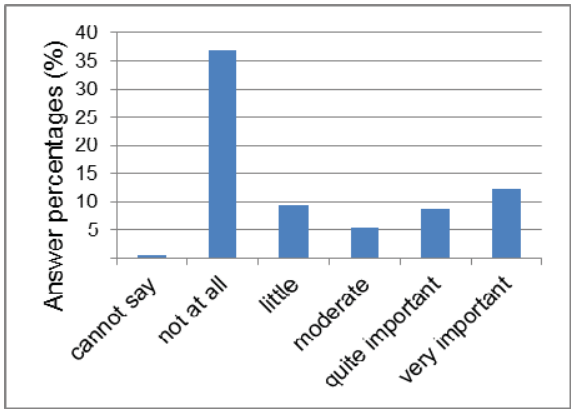

Fig. 4 Females' (Group 1A) answers to the question, "How important is a cell phone at work?"

TABLE II
FEMALE BLUE-COLLAR WORKERS' (GROUP 1A AND 2A) ANSWERS TO QUESTIONS ABOUT ACCIDENTS AND CLOSE CALL SITUATIONS

	Yes (%)	No (%)	Missing (%)
All females (Group 1A)			
Question 1	2.4	94.5	3.1
Question 2	11.9	84.4	3.7
Female blue-collar workers (Group 2A)			
Question 3	0.2	97.4	2.4
Question 4	1.5	95.9	2.6

C. Male Blue-Collar Workers (Group 1B)

Figs. 5 and 6 show all the males' (Group 1B) answers to the question, "How important is a cell phone at work?" and "How often do you use a cell phone at work?" Figures did not include missing values (24%). Table III shows (a) all the males' (Group 1B) answers to Question (1), "During the last 12 months, have you had one or more accidents at leisure while on a cell phone?" and to Question (2), "During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?"

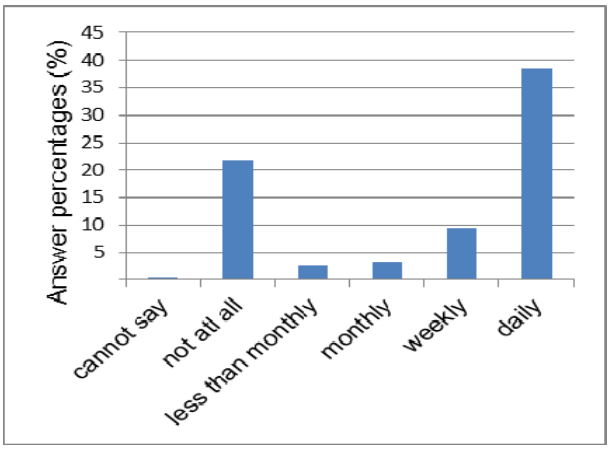

Fig. 5 Males' (Group 1B) answers to the question "how often do you use a cell phone at work?"

Table III also shows the male blue-collar workers' (Group 2B) answers to Questions (3), "During the last 12 months, have you had one or more accidents at work while on a cell phone?" and to Question (4), "During the last 12 months, have you had one or more close call situations at work while on a cell phone?"

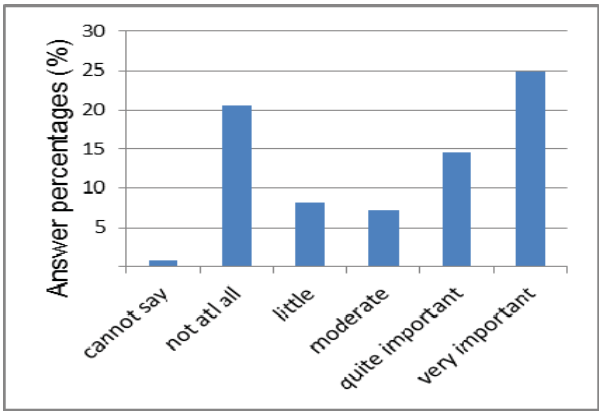

Fig. 6 Males' (Group 1B) answers to the question, "How important is a cell phone at work?"

TABLE III
MALE BLUE-COLLAR WORKERS' (GROUP 1B AND GROUP 2B) ANSWERS TO QUESTIONS ABOUT ACCIDENTS AND CLOSE CALL SITUATIONS

	Yes (%)	No (%)	Missing (%)
All males (Group 1B)			
Question 1	2.7	93.6	3.7
Question 2	11.3	84.8	3.9
Male blue-collar workers (Group 2B)			
Question 3	0.8	96.5	2.7
Question 4	4.5	92.3	3.3

D. Comparison of Females and Males (Group 1)

Table IV shows the results of Analysis (Group 1) I and II (comparison between all females and males) using the answers to Questions 18, "During the last 12 months, have you had one or more accidents at leisure while on a cell phone?" and 19, "During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?" (with independent samples Mann-Whitney U-test analyses).

TABLE IV
RESULTS OF ANALYSIS I AND ANALYSIS II

Question	Asymp. Sig.(2-tailed)
18. During the last 12 months, have you had one or more accidents at leisure while on a cell phone?	0.643
19. During the last 12 months, have you had one or more close call situations at leisure while on a cell phone?	0.678

E. Comparison Female / Male Blue-Collar Workers (Group 2)

Table V shows the results of Analysis (Group 2) III and IV (comparison between female and male blue-collar-workers) using the answers to Question 20, "During the last 12 months, have you had one or more accidents at work while on a cell phone?" and 21, "During the last 12 months, have you had one or more close call situations at work while on a cell phone?" (with independent samples Mann-Whitney U-test analyses).

The statistical analyses show that there was a significant difference in the answers between female and male blue-collar

workers (Group 2) on Question 21 (close call situations at work).

TABLE V
RESULTS OF ANALYSIS I AND ANALYSIS II

Question	Asymp. Sig.(2-tailed)
20. During the last 12 months, have you had one or more accidents at work while on a cell phone?"	0.120
21. During the last 12 months, have you had one or more close call situations at work while on a cell phone?"	<0.001*

* significant at $p < 0.05$

IV. DISCUSSION

In [8], we analyzed how the accidents/close call situations are connected to background information, in particular age, gender and self-reported symptoms using the logistic regression models. Essentially, we found the following: (1) men tend to have more close call situations and accidents while on a cell phone; (2) younger people tend to have more accidents and close call situations while on a cell phone, but the discrepancy does not appear to be large enough to warrant intervention; (3) employed people tend to have accidents/close call situations; and (4) there was a slight increase in mobile-phone-related accidents/close call situations if the respondent also reported sleep disturbances and minor aches and pains [8].

When comparing yes answers in Table I, it can be seen that there are 4–5 times more close call situations than accidents connected to mobile phones. Likewise, there are much fewer accidents or close call situations at work than at leisure time, and the difference is also 4–5 fold.

When comparing male and female responses in Tables II and III, it can be seen that at leisure time, the yes answers are alike, but at work, females answered yes much less than males, and the difference was 3-4 times less. The reason for this is not clear because there are confusing parameters like the use of mobile phone at work, differences in work content between women and men, or if women are more accurate than men in general. Statistical analyses in Tables IV and V confirm these conclusions between women and men.

When comparing answers here and our earlier article [8], we can see that at leisure time, men did not have more accidents or close call risk at leisure time than women—only at work.

In Figs. 3–6, it can be seen that men use cell phones more, and they consider cell phones to be more important than women do.

V. CONCLUSION

Men utilize cell phones more and consider cell phones to be more important than for women. There were 4-5 times more close call situations than accidents connected to cell phones. There were much fewer accidents or close call situations at work than at leisure time.

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