



SLEEP DISORDERS AND FATIGUE AMONG EMERGENCY HEALTHCARE WORKERS

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ABSTRACT

Background: Fatigue and sleepiness during shift work pose a safety risk for emergency healthcare workers. These are factors which can compromise the effectiveness of these workers and as a result, can have detrimental consequences on the workers' health and overall well-being. A large share of emergency healthcare personnel reports high levels of work-related fatigue and poor sleep.

Objectives: Investigation of sleep disorders and mental and physical fatigue among emergency healthcare workers.

Material and Methods: The study was conducted among 468 workers in 2 emergency healthcare centres. The male participants were 58.3%, and 41.7% were female. The distribution by position was nurses - 35.8%, followed by drivers - 26.1%, doctors - 18.1%, paramedics - 14.2%, and sanitation workers - 5.8%. Statistical methods used included descriptive statistics and Chi-square test.

Results: The results showed that the biggest share was that of participants who have sleep disorders at age over 55 years - 41%, while by position, that of the physicians - 46.4%. The levels of physical fatigue were higher among participants from the age up to 35 years - 53.1%, and among paramedics - 59.1%, followed by physicians - 58.3%. Mental fatigue was higher among women - 52.7%. The share of mental fatigue at the end of the working day among doctors was higher - 64.3%.

Conclusion: Sleep disorders and fatigue are common among emergency healthcare workers. The levels of sleep disorders and physical and mental fatigue are high and unhealthy.

Keywords: Emergency healthcare workers, Sleep disorders, Mental fatigue, Physical fatigue,

INTRODUCTION:

Good sleep is critical for good health. Epidemiological, clinical, and treatment studies provide strong support for this proposition. For instance, short sleep duration is associated with increased mortality risk and other important health outcomes [1, 2]. Fatigue is 'a subjective, unpleasant symptom, which incorporates total body feelings

ranging from tiredness to exhaustion creating an unrelenting overall condition which interferes with individual's ability to function to their normal capacity' [3]. It is generally agreed that a directional association exists between sleep loss and fatigue, whereby the former predicts the latter. Fatigue can be linked to inadequate or disturbed sleep and is a common problem among workers in industries that provide 24-hour/day services, including healthcare [4]. There is compelling evidence linking sleep, fatigue, and shiftwork to negative safety outcomes [5].

A small number of studies have specifically investigated fatigue in ambulance workers [6]. Emergency medical services (EMS) clinicians are a group of workers where extended shifts, inconsistent shift patterns, poor sleep, and fatigue are common [7, 8]. Fatigue in the EMS workplace may be related to high patient care loads, demanding work schedules, and associated stress [9]. A high proportion of EMS personnel report high levels of work-related fatigue and poor sleep [10]. Half of EMS workers sleep less than six hours per sleep period and many report poor sleep quality [8]. One-third of EMS workers report excessive daytime sleepiness [11] and half report not getting the recovery they need between shifts [12]. High workload combined with limited or poor sleep contributes to half of all EMS workers reporting excessive mental and physical fatigue while at work [8]. Emergency Medical Services (EMS) personnel report high levels of mental and physical fatigue while at work [13,8]. Extended shifts and excessive amounts of overtime work increase the likelihood of negative safety outcomes and pose a challenge for EMS fatigue-risk management [14]. Carrying stretchers with patients has been studied as a factor that produces high levels of fatigue in ambulance workers [15].

Our aim is to study whether emergency healthcare workers have sleep disorders, and the subjective feeling of the workers for the quality of their sleep. Our other aim is to study fatigue among respondents, separating mental and physical fatigue.

MATERIALS AND METHODS:

A study was conducted among 468 workers in emergency healthcare centres in Bulgaria. Surveys were distrib-

uted in 2 district centres, Pazardzhik District and Sofia District, in the period from December 2017 to April 2018. The respondents from the Sofia region were 58.97% and the Pazardzhik District - 41.03%. The male participants were 58.3%, and 41.7% were female. The average age of participants was 50,65 +/- 9,45 years. The largest was the partition of the surveyed nurses - 35.8%, followed by drivers - 26.1% , doctors - 18.1%, paramedics - 14.2%, and sanitation workers - 5.8%. The total length of service was over 10 years for 88% of participants, and 63.6% have been employed in the present position for more than 10 years.

A questionnaire was designed to check the number of answers to the questions related to sleep disorders and with the presence of physical and mental fatigue at the end of the working day. The results of the study were represented by descriptive statistics - absolute (n) and relative (%) frequencies, mean values (Mean) and standard deviations (SD). The relationship between the statements and the demographic characteristics was examined by Chi-square test. Results with significance level $p < 0.05$ were considered statistically significant. Statistical data processing uses SPSS (Statistical Package for Social Sciences), version 16.

RESULTS:

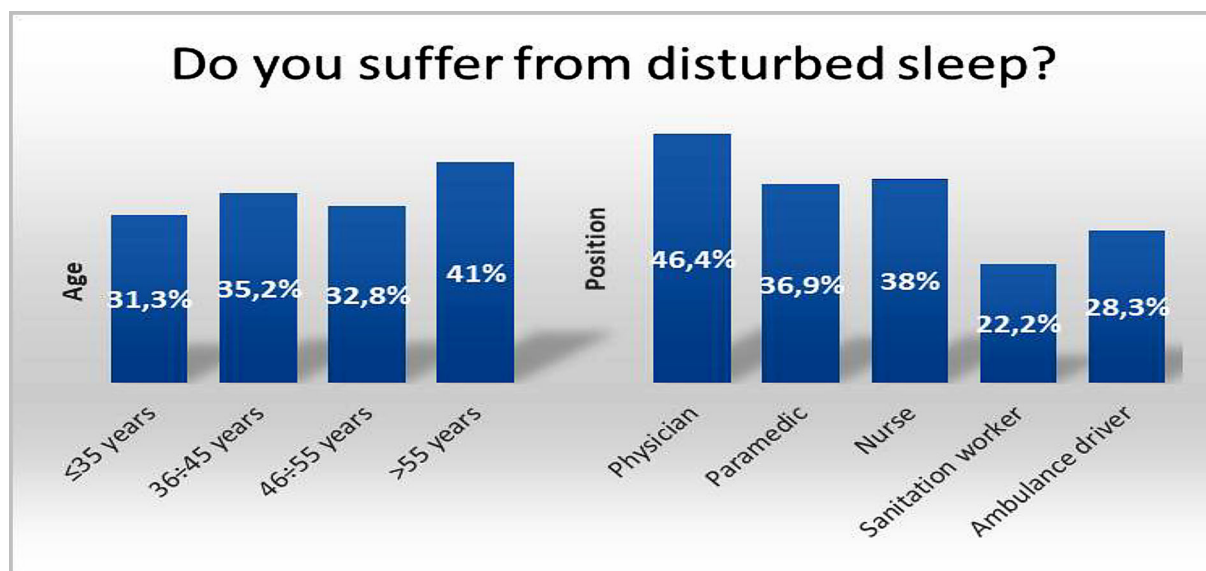
Sleep disturbances were present in 31.3% of respondents aged up to 35 years, 35.2% in the 36-45 age

group, 32.8% aged 46-55 years and in 41% of those over 55 years old. A negative answer to the question was given by 21.9% of respondents aged up to 35 years, 31.8% of the aged 36-45 years, 40% in the 46-55 age group and 28.8% over 55 years. In analyzing the relationship between the respondents' age group and the answers to the sleep problem, we found a statistical dependence $p = 0.112$ (Figure 1).

The relationship between suffering from disturbed sleep and both areas which we found was statistically significant [$X^2 (4) = 12.612, p = 0.013$]. Almost the same as the share of respondents, whether a positive response from both areas - 36.3% for the Pazardzhik region and 36.4% for the Sofia region. Negative response was given by 35.8% of the respondents from Pazardzhik region and 31.6% from the Sofia region.

When distributing answers to the question, it is very impressive that 46.4% of physicians suffer from impaired sleep, followed by nurses with 38%, paramedics with 36.9%, ambulance drivers with 28.3% and sanitation workers with 22.2%. A negative response was given by 45.8% of drivers and 19% of doctors. In the analysis of the relationship between the position of the workers and the disturbed sleep, we found statistical dependence [$X^2 (16) = 28.851, p = 0.025$] (Figure 1).

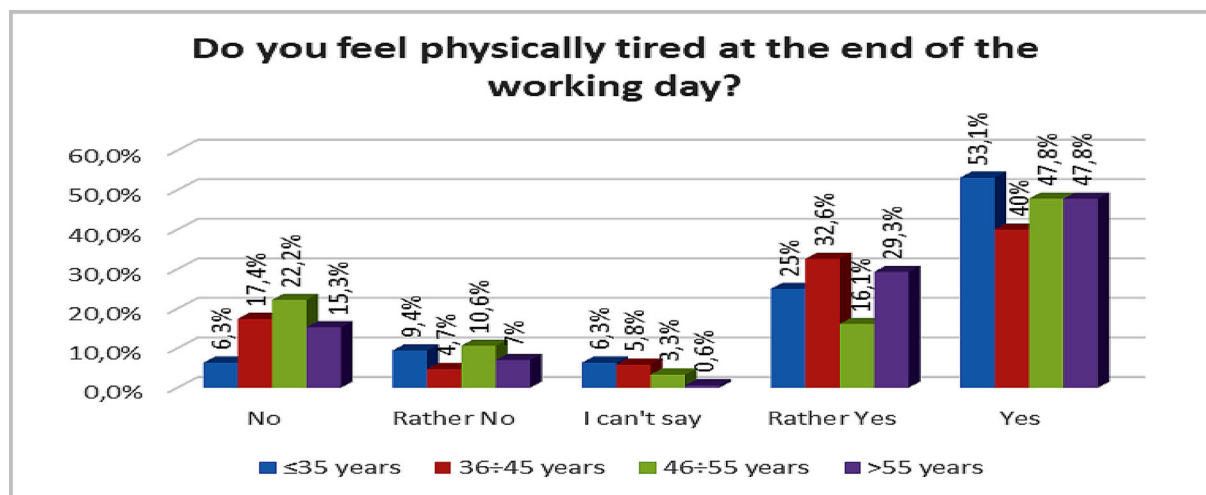
Fig. 1. Respondents suffering from disturbed sleep – distribution by age group and by position



It makes a strong impression that the highest share of respondents who feel physically tired at the end of the working day was in the age group up to 35 years - 53.1%. A negative answer to this question was given by 6.3% of the respondents in this group. In the 36-45-year-old group, the positive responses were 39.5% and negative 17.4%. In

the age groups 46-55 and over 55, the positive response rate was 47.8%, while negative was 22.2% in the 46-55 age group and 15.3% over 55 years. In analyzing the relationship between the respondents' age and the distribution of answers to this question, we found a statistical dependence [$X^2 (12) = 24.321, p = 0.018$] (Figure 2).

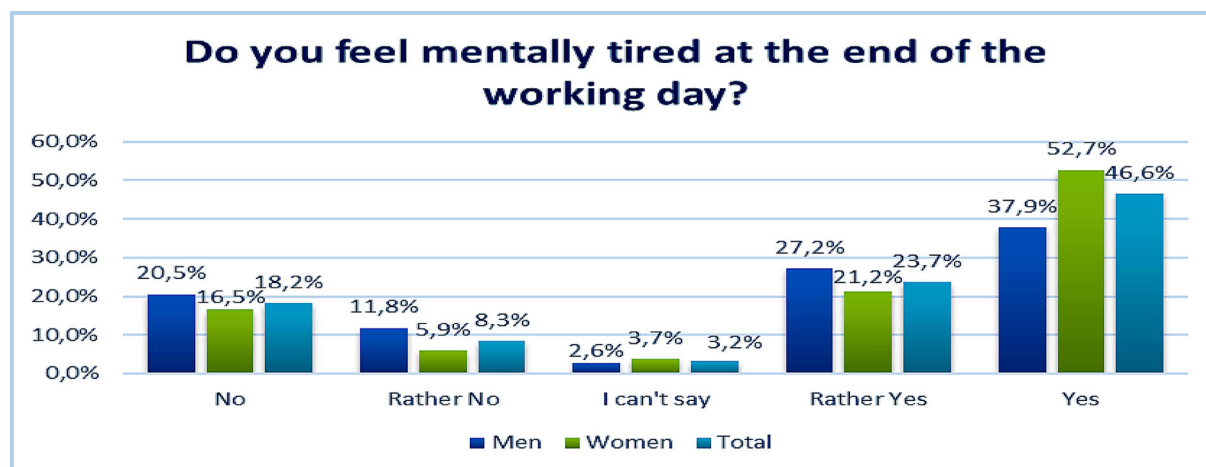
Fig. 2. Do you feel physically tired at the end of the working day? - distribution by age



At the end of the working hours, 59.1% of the paramedics, 58.3% of the doctors, 47.6% of the nurses, 33.3% of the sanitation workers and 31.9% of the drivers feel physically tired. Only 6% of paramedics, 9.1% of physicians, 18.9% of nurses, 25.2% of drivers and 37% of sanitation workers gave a negative answer. We analyzed the relationship between the position of the workers and the workload of the physical fatigue at the end of the working day and found statistical correlation $p < 0.001$ (Figure 4).

Respondents' responses to mental fatigue at the end of the workday were similar to physical responses. Positive response was given by 46.6%, 23.7% responded with "rather yes", 18.2% of responses were negative. In the analysis of the relationship between mental fatigue at the end of the working day and the gender, we found a statistical dependence [$X^2(4) = 13,29, p = 0,010$]. It is noteworthy that the proportion of women who feel mentally tired at the end of the working day was significantly higher (52.7% vs. 37.9% of men) (Figure 3).

Fig. 3. Do you feel mentally tired at the end of the working day? - distribution by sex

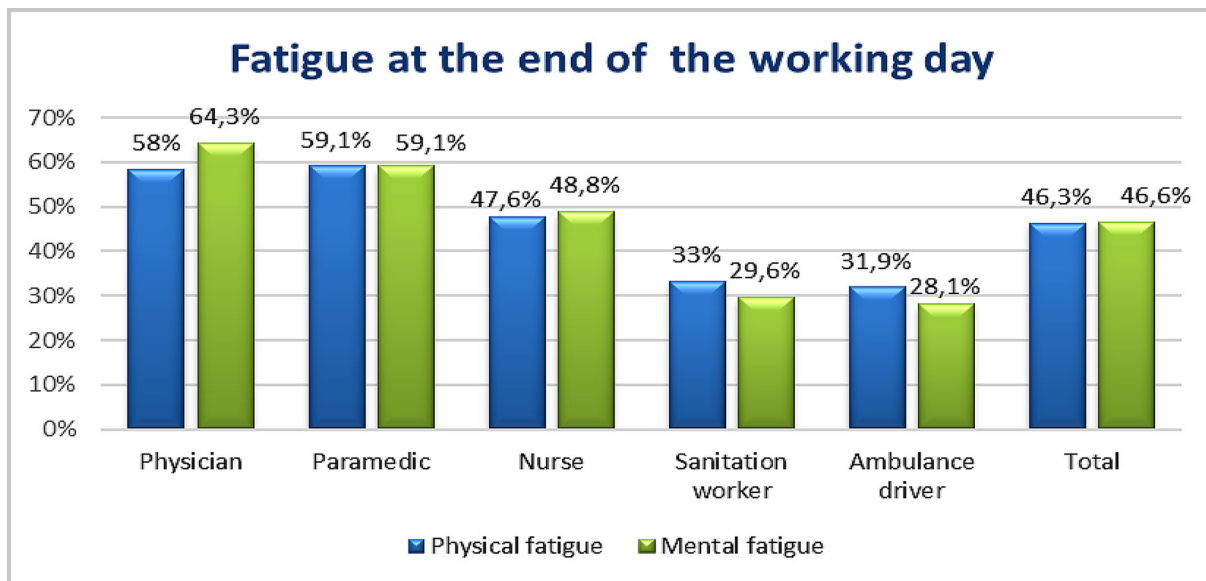


Concerning the psychological fatigue at the end of the working day and the relationship of the question with the two administrative areas, we found statistical dependence [$X^2(4) = 16.089, p = 0.003$]. A positive response was given by almost the same number of respondents - 44.8% from Pazardzhik region and 47.8% from the Sofia region. „Rather yes” was the answer of 9.2% of respondents from Sofia district and of 30.2% from Pazardzhik region. Negative response was given by 17.4% of Sofia respondents and

by 19.4% of those from Pazardzhik.

Mental fatigue at the end of the working day was reported by 64.3% of doctors, 59.1% of paramedics, 48.8% of nurses, 29.6% of sanitarians, and 28.1% of drivers. Only 2.4% of doctors gave a negative answer to the question. In the analysis of the relationship between mental fatigue at the end of the working day and position, we found a statistically significant correlation $p < 0.001$ (Figure 4).

Fig. 4. Fatigue at the end of the working day - distribution by position.



DISCUSSION:

Measurement of sleep, fatigue, and alertness behaviour among emergency healthcare workers is challenging. The main purpose of this study was to examine the levels of sleep disorders and work-related fatigue (physical and mental) among emergency healthcare workers. The biggest share of respondents who have sleep disorders is in the age group over 55; also the levels of sleep disorders are higher among physicians. For disturbed sleep, the significant predictors are female gender, age above 49 years, present illness, hectic work, physically strenuous work, and shift work [16]. Sleep deprivation can affect short-term memory and performance speed; studies of neuropsychiatric function in shift workers or night shift workers have shown that attention and cognitive speed decrease in these subjects [17]. Both sleep disorders, which correlates with high work demands and inability to stop thinking about work [18], and the need for recovery are stronger predictors of mental health than workload.

For fatigue, the significant predictors became female gender, age below 49 years, high socioeconomic status, present illness, hectic work, overtime work, and physically strenuous work [16]. It makes a strong impression that in our survey, the highest share of respondents who feel physically tired at the end of the working day is in the age group up to 35 years. Perhaps the reason for this is the inexperience of the workers.

Our study shows that the levels of mental fatigue

are higher among women than men and among physicians. In the Netherlands for example, as in several other countries, fatigue complaints are reported more often by women than by men and even more frequently by young, well-educated people. For women, the analyses show that fatigue is related to problems of contraception, menstruation, and pregnancy, all of which do not affect men by definition [19].

Taking into account the nature of the work of the employees in the emergency healthcare centres, the physical and mental fatigue of the workers at the end of working hours is also expected. Work-related fatigue has a strong prognostic value on subjective health complaints in terms of psychosomatic complaints, emotional exhaustion, and sleep problems [20]. Persistent fatigue and inefficient recovery are the main causes of critical incidents at work [17].

CONCLUSION:

The results from this study suggest that the sleep quality and fatigue status of emergency healthcare workers are at unhealthy levels. The health and safety of the emergency healthcare workers should be considered taking these results into account. The Department of Occupational Medicine at the Faculty of Public Health at the Medical University - Sofia prepares preventive measures to limit sleep disorders and fatigue among the employees in emergency healthcare centres in Bulgaria.

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