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A research on health problems of working in forest fire workers

Orman yangınlarında çalışan işçilerin sağlık sorunları üzerine bir araştırma

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Abstract

Turkey is geographically located in a region susceptible to wildfires. To ensure the long-way sustainability of our forests, protective measures should be taken initially, and fires that start despite precautions should be extinguished as soon and effectively as possible. The mental-physical health of fire workers was investigated in this study by examining the recent state of occupational safety and health for forest fire workers employed by the İzmir Regional Directorate of Forestry and assessing the psychological condition of the workers. The research sampled 246 fire workers assigned to the İzmir Regional Directorate of Forestry. Data collection was accomplished through the questionnaire method. Frequency weights and chi-square methods were used to analyze the acquired data. According to the study, 117 of the questionnaire respondents had at least one accident throughout their careers as fire workers. And 101 participants have been involved in an accident in the previous year. 70% of those with a high score on the General Health Questionnaire and 35.8% of those with a low score had an occupational accident. Psychologically, 24% of field workers felt shyness, 13.8% felt, and 2.8% felt dread. 59.4% stated that they felt nothing. As a result, it was detected that fire workers should get the required occupational safety and health training, the risks listed with accidents should be minimized, and improvements aiming for their psychosocial status should be addressed.

Özet

Ülkemiz yangına hassas alanların bulunduğu bir coğrafyada yer almaktadır. Ormanlarımızın sürdürülebilirliğinin sağlanabilmesi için öncelikle koruyucu tedbirler alınmalı buna rağmen çıkan yangınlara en kısa zamanda ve en etkili şekilde müdahale edilmelidir. Bu çalışma ülkemizin İzmir Orman Bölge Müdürlüğüne bağlı çalışan orman yangın işçilerinin iş sağlığı ve güvenliği konusunda son yıllardaki durumun ortaya konulması ve işçilerin psikososyal durumlarının değerlendirilmesi yapılarak yangın işçilerinin ruhsal-bedensel sağlığı araştırılmıştır. Çalışma İzmir Orman Bölge Müdürlüğü idari sınırları içinde faaliyet gösteren 246 adet yangın işçisi üzerinde yapılmıştır. Veri toplamasında anket yöntemi uygulanmıştır. Bu veriler, frekans ağırlıkları ve ki-kare yöntemleri ile değerlendirilmiştir. Çalışmaya göre ankete katılan yangın işçilerinin 117'si meslek hayatı boyunca en az bir kez kaza geçirmiştir. Son bir yılda kaza geçiren kişi sayısı ise 101'dir. Genel Sağlık Anketi'nden yüksek puan alanların %70'i, düşük puan alanların %35.8'i iş kazası geçirmiştir. Çalışma alanındaki işçilerin psikolojik açıdan %24'ü sıkılganlık, %13.8'i yalnızlık, %2.8'i korku hissettiğini söylemiştir. %59.4'ü ise herhangi bir şey hissetmediğini söylemiştir. Sonuç olarak yangın işçilerinin, iş sağlığı ve güvenliği konularında gerekli eğitimlerden geçirilmesi, etki düzeyine göre sıralanan kaza risklerinin en aza indirilmesi ve psikososyal durumlarına yönelik iyileştirmelerin yapılması gerektiği belirlenmiştir.

1. INTRODUCTION

Turkey is geographically located in a region susceptible to wildfires. To ensure the long-way sustainability of our forests, protective measures should be taken initially, and fires that start despite precautions should be extinguished as soon and effectively as possible. All work performed during the period from the starting of the wildfire through its extinguishment is called to as fire work, and the individuals who perform this work are called to as fire workers. Forest fire workers battling fires bear a significant amount of responsibility in this regard. Forest fire workers are exposed to a variety of injuries and smoke during fire response, and they also feel constantly under psychological pressure. Forest fire workers, who are involved in the fight against forest fires, fulfill a very important and dangerous task in order to bring the fires under control in a short time.

Forest fire workers are not only responsible for fire but also do all kinds of forestry work. In addition, during the fire season, the fire workers are divided into various

groups as temporary workers who observe the fire, inform and deliver and finally intervene (Acar 1999).

The environment and working conditions in the field of fire (tough terrain conditions, extreme heat, dense pall of smoke and dust, etc.) are leading among the most challenging and dangerous work environments in forestry (Acar 1999, Akay and Yenilmez 2007, Ünver-Okan and Acar 2017). Working conditions have a harmful impact on worker health, safety, and labor productivity (Hayta 2007). Inadequate social status of employees and the resulting loss of morale and motivation are also significant variables affecting productivity (Tunay et al. 2006). Additionally, the absence of work breaks and being on standby constantly cause employees to feel uneasy and stressed, which increases the risk of workplace accidents (Hayta 2007).

According to Camkurt (2007), unsafe acts (such as deactivating protectors, using defective materials, unsecure loading, cleaning machinery and equipment nonstop, making practical jokes, and not wearing personal protective equipment) and situations (such as a lack of personal protectors and machine protectors, slippery floors) are the leading causes of workplace accidents. Östberg (1980) stated that OSH training and motivation programs will significantly reduce occupational accidents. According to Poschen (1993), occupational accidents in forestry operations pose a risk of disability and death. Moreover, he noted that one of the issues that should be emphasized in forestry studies is undetected health problems. In a study conducted by Gümüş and Türk (2011), they have investigated working conditions of forest fire workers, and primary OSH problems were determined by a questionnaire.

Engur (2001) conducted a study stating that forest workers do not want to use clothes that interfere with or disturb their work, and that they complain of discomfort such as headaches and eczema, especially in hot and humid areas.

The high rate of health problems among forest fire workers inevitably has a detrimental effect on their labor productivity. Labor productivity of a worker with a health problem is decreased by 20% to 30% in comparison to a healthy worker, depending on the type and severity of the problem (Erdaş et al. 1995).

Within the territory of the İzmir Regional Directorate of Forestry, a total of 264 wildfires broke out in 2018 (OGM 2018).

Therefore, it is critical to reveal the current situation using scientific data and procedures in order to improve job safety conditions and fight forest fires efficiently. While there are few scientific studies on the working conditions and risk factors encountered by forest fire workers, there are insufficient studies on their psychosocial health.

The purpose of this study is to document the situation of occupational safety and health of forest fire workers working under the İzmir Regional Directorate of Forestry in recent years and to investigate the fire workers' mental and physical health by analyzing their psychosocial status.

2. MATERIAL AND METHODS

In the study, the research area is limited to İzmir Regional Directorate of Forestry, which is a first-degree fire-sensitive area that is exposed to several fires throughout each wildfire season. This delimitation includes the forest management directorates of Akhisar, Bayındır, Bergama, Demirci, Gaziemir, Gördes, İzmir, Manisa, and Salihli, which are affiliated with the İzmir Forest Regional Directorate. Forest fire workers were not intervened throughout the study; their participation was entirely voluntary.

Wildfire season is a term that varies by region and refers to a time period or times of the year when flames start, spread, and cause significant damage to fire protection and organization. In this regard, the study examines fire extinguishing operations performed between April and October.

The survey groups for this study of fire workers engaged in wildfire management were determined based on their socio demographic characteristics. To ascertain the causes of occupational accidents, a face-to-face questionnaire was applied to employees. By analyzing previous similar research, the questionnaire formats

were developed for the study. The questionnaire consists of four parts. The first part includes questions concerning socio demographic characteristics, which is one of the independent variables of the study. It involves an examination of one's personal characteristics, work experience, and daily work hours. The second part investigated the workers' general health information and personal habits, as well as their mental health status using the 12-Item General Health Questionnaire (GHQ-12). The third part is the safety and security section, which includes an analysis of the tools and machines used, the work accidents and damage cases encountered thus far, the clothes and personal protective equipment used, the OSH law, and the training situations about occupational safety and health. The fourth part includes the analysis of their socio-psychological conditions.

The field has been approached with the questionnaires prepared according to the purpose of the study, and the aim of the study has been explained to the workers to emphasize the significance of their answers. This questionnaire was administered face-to-face to 246 workers. All answers to the questionnaire in all categories were entered into an Excel database and coded with number values. Demographic characteristics were described using means and standard deviations. In these questionnaire; the effects of parameters such as age, gender, education, and socioeconomic status on motivation in firefighting, occupational accidents, knowledge and education levels regarding fire were analyzed in the SPSS software using Cross Tabulation, commonly known as the Chi-Square Independence Test a (Özdamar 2002). The following hypotheses were used while performing the chi-square test: H0: There is no relationship between the two parameters whose relationship is queried (Independent) H1: There is a relationship between the two parameters whose relationship is queried (Dependent).

3. RESULTS AND DISCUSSION

The study examined the socio demographic characteristics of forest fire workers working within the administrative boundaries of the İzmir Regional Directorate of Forestry, and the findings obtained are summarized in Table 1. The average age of the employees is 46.5 and 92.3% of them are married. Although 50.8% of participants are elementary school graduates, 10.2% are high schools. Despite their employment in wildfires, 9.8% of them have a secondary source of income. 21.1% of fire workers in the field have changed their jobs. The rationale for such a high rate of job changes is because workers perform seasonal labor. Seasonal work makes it difficult for them to remain committed to and embrace their jobs, preventing them from growing in the fire extinguishing business by gravitating to other business lines.

Take into consideration the relationships between accident situations and the socio demographic characteristics of the fire workers in the study field, 3 (42.9%) people in the first age group, 10 (10.2%) people in the second age group, 16 (18.2%) people in the third age group, and 27 (50.9%) people in the fourth age group were exposed to an accident; in total, 56 (50.9%) people were exposed to an accident. As can be understood, those above the age of 50, in other words elderly, are more likely to have an accident. The age-related difference in accident occurrence is statistically significant (Chi-square = 35.388; sd = 3; P<.001).

95.9% of fire workers reported receiving vocational training in firefighting. When we evaluate accident instances according to the educational knowledge of the fire workers in the study field, we discover that the difference in education is not an important factor on likelihood of having an accident (Chi-square= 9.421; sd = 6, P=0.151). In other words, there is no statistically significant relationship between the difference in education levels and the situation of encountering an accident.

Table 1. Frequency values of the demographic characteristics of workers

Demographic Characteristics		Number	Frequency %
Age	18>…	0	0
	18-30	7	2.9
	31-40	98	39.8
	41-50	88	35.8
	50<…	53	21.5
Marital status			
	Married	227	92.3
	Single	12	4.9
	Divorced	6	2.4
	Widow	1	0.4
Weight	65 and below	24	9.8
	66-75	57	23.2
	76-90	117	47.6
		48	19.5
Height	151-165	43	17.8
	166-175	141	57.3
	176 and above	62	25.2
Education	Primary School	125	50.8
	Middle School	44	17.9
	High School	52	21.1
	Other	25	10.2
Work Experience(years)	1-5	13	5.3
	6-10	90	36.6
	11-20	43	17.5
	21 and above	100	40.7
Salary (monthly) TL	2 -3thousand	7	2.8
	3-4thousand	124	50.4
	4-5thousand	82	33.3
	5thousand and above	7	2.8
		26	10.6
Another Source of Income	Yes	23	9.3
	No	223	90.7
Job change	Yes	52	21.1
	No	194	78.9
Daily Working Hours	4-6	0	0
	6-8	5	2
	8-10	51	20.7
	10h and above	190	77.2

We can list the findings of forest fire workers disorders that have been diagnosed by a doctor and require treatment as follows: While 32.5% of them stated having a diagnosis that required treatment, 67.5% stated that they were not diagnosed. With a rate of 8.1%, bronchitis-cold is the most common, followed by eczema-itch at 7.3%.

We examined the circumstances that result in movement limitation and pain in the body. As an outcome, the most common complaint was neck pain, which occurred at a rate of 17.1%. Neck pain is followed by headache (16.3%) and leg and ankle pain (6.1%).

The questions concerning the discomforts experienced while fighting wildfires were answered with scratches and crack the most accounting for 87.4% of physical ailments and headache accounting for 45% of psychological disorders.

The 12-Item General Health Questionnaire was administered to workers in the study field, and participants were asked to indicate how frequently they encounter the 12 situations described in the questionnaire by selecting the appropriate response from the options "better than usual / same as usual / less than usual / much less than usual" for each question. The four-item response choice was used as a two-item scale, with the first two items scored negatively and the latter two items scored positively, following Goldberg's "GHQ type scoring" method (Goldberg et al. 1997). (Özbek et al. 2016) conducted a reliability and validity study on the Turkish version of the test. The scores of the participants on 12 items are classified as low, medium, or high. (Table 2).

Table 2. General Health Questionnaire (GHQ-12) Average Score

GHQ-12 Average Scores	Standard deviation	Min.	Max.
2.04	± 1.79	0	8

As seen in Table 2; The mean GHQ-12 score of the fire workers was found to be 2.04±1.79. A score of 2 is accepted as the cut-off point, and a score of 2-3 indicates there is a possibility of a moderate mental disorder. According to the results of the questionnaire, it is seen that the mental health of the workers in the study is moderately disturbed.

When the risk distribution of the workers in the study field was examined according to the GHQ-12 scale, 50% of them were found to be at low risk, and 20.3% of them to be at high risk level in terms of general health (Table 3).

Table 3. Risk distribution according to GHQ-12 scale

Level of risk distribution	Number	Percent %
Low risk	123	50.0
Middle risk	73	29.7
High risk	50	20.3

When the ages of the participants in the study and their general health levels were compared, a statistical significance was found between age and general health mean score; It is observed that the risk of mental illness increases with age (Chi-square = 17.672; sd = 6, P=0.007).

It has been determined that GHQ scores change when age is increased, and that mental illnesses occur more frequently at older ages in some other studies in the literature as well.

When the status of having an occupational accident of the participants and their general health levels were compared; a statistical significance was found between having a work accident and general health levels. It was discovered that those with high general health questionnaire scores experienced more occupational accidents than those with low scores. 70% of those with a high score in the General Health Questionnaire and 35.8% of those with a low score had an occupational accident. There was a statistically significant correlation between state of mental health and having a work accident. (Chi-square = 17.539; sd = 2, P<.001).

Table 4. Distribution of GHQ-12 scores according to individuals' socio-demographic characteristics and accident status

Demographic Characteristics		n	GHQ-12 Mean Scores ±standard deviation
Age	18-30	7	1±1.8
	31-40	98	1.9 ±1.6
	41-50	88	2.2±1.9
	50<	53	2.3±1.9
Education	PrimarySchool	125	1.9±1.7
	MiddleSchool	44	1.7±1.7
	High School	52	2.1±1.7
	Other	25	3.1±2.1
Occupational accident	Yes	117	2.2±1.9
	No	129	1.9±1.7

By examining the tools and machines used by forest fire workers in the research field, it was possible to determine

which tools and machines were responsible for leading occupational accidents the most. The highest accident rate was 8.1% during the use of sprinkler.

47.6% who work in firefighting in forestry reported having been involved in an accident at least once throughout their career. The accident statuses of the employees are shown in Table 5. According to this, 41.1% reported having been involved in an accident in the previous year.

Table 5. Accident cases of fire workers in the work area

Accident period	Accident status	Number	Percent
Occupational accident during professional life	involved	117	47.6
	not involved	129	52.4
Work accident in the last year	involved	101	41.1
	not involved	145	58.9

When asked what type of accidents the fire workers in forestry encounter, the answers were that they were most affected by smoke with a rate of 21.5%. It is followed by fall and slip which accounted for 8.1%, injury, cut and vehicle accidents with 6.1%, sprain and crush with 4.9%, respectively.

Personal protective equipment, which is indispensable for occupational safety and health, is required in every field of industry to prevent workplace accidents. When forest fire workers protective clothes and equipment are evaluated, it is discovered that the vast majority of them use personal protective equipment. Fire workers wear uniforms at an average rate of 81.7% while on the job. They utilize gloves the most frequently (89%) of all personal protective equipment. Each year, forest fire workers are provided with a shirt, pants, fire boots, cap, t-shirt, and belt to wear while on the job. Additionally, masks and gloves are supplied to each fire workers, although they do not provide protection against flames and do not prevent the inhalation of carbon monoxide gas. The masks are surgical masks, which only provide protection against dust and are easily combustible. Forest fire workers are vulnerable to great dangers based on the functionalities of their equipment.

Numerous psychosocial conditions that influence employees, including all health changes during their careers, stress and other factors that may cause stress, mental health status, general sleepiness, job security, and job satisfaction have an impact on the employee (Östberg 1980). As a consequence, field workers were questioned about their job satisfaction, their relationships with coworkers and managers, how they use their free time, and whether they suffer from a psychological disorder etc. 89% of workers in the field reported they work seven hours or more every day, and 40% stated they were not getting enough rest. The daily working time of forest fire workers is 11 hours (OGM 2019). Additionally, 22% of them stated that they prioritize rest over social events outside of work hours due to their excessive workload.

While 32.1% of workers in the work area admitted having a psychological disorder, 13% reported not knowing if they had any ailments. Only 7.7% of individuals who reported being psychologically disordered admitted receiving psychological support. Psychologically, 24% of the workers in the work field stated that they felt shyness, 13.8% felt loneliness, 2.8% felt fear. As 59.4% said that they did not feel anything.

The socio-demographic characteristics of fire workers are similar to previous studies (Şentürk and Acar 1997, Acar and Şentürk 1999, Çolak 1998, Acar and Eroğlu 2001, Gandaseca et al. 2001, Tunay and Melemez 2006). The average age of the workers in the research field was determined to be 46.5 years. This situation demonstrates that fire workers are not a physically dynamic or young target group, but rather an experienced one. Despite their job in wildfires, 9.8% of them have a secondary source of income. 21.1% of fire workers working in the field have changed careers. This finding implies that a portion of the participants contacted via questionnaires did not choose wild land firefighting as a vocation.

Vatansever (2014), emphasized that factors such as increased workload, working hours and working tempo cause many negative effects on employees, especially

stress; and that these negative effects also reduce their commitment to the workplace and increase absenteeism (Vatansever 2014). Increased working hours bring stress, fatigue, mistakes and accidents on workers in this study as well.

In the study conducted by Gümüş and Türk (2011) it were determined that 14.9% of the workers had health problems, and it was determined that a large proportion of the problems was fatigue and weakness. Akay and Yenilmez (2007) observed a rate of 15% absent-mindedness, 81% anxiousness, 55% headache, and 10% sleeplessness among forest fire workers. According to the workers, the reasons of these disorders include mainly stress due to the fire and being away from family.

In a study published by OSHA on occupational safety and health in European forests identified trees falling, problems related with vehicles, and work equipment as the primary factors of fatal occupational accidents (ILO 1998). Falling branches, slipping-falling-tripping and again work equipment are among the factors that cause non-fatal injuries. Crushing, sprains, cuts, fractures, cracks and animal attacks such as ticks and bug bites are the most common sorts of injuries. As for this study, the most common type of injury was scratches and cracks accounting for 87.4%, followed by burns, wounds and crushes.

4. CONCLUSION

In this study, the mental and physical health of fire workers were investigated by revealing the situation in recent years on the occupational health and safety of forest fire workers employed by the İzmir Regional Directorate of Forestry and evaluating the psychosocial status of the workers.

In the study field, 246 temporary forest fire workers of various ages were interviewed. The average age of the employees is 46.5 and 92.3% of them are married. Although 50.8% of participants are elementary school graduates, 10.2% are high schools. Despite their employment in wildfires, 9.8% of them have a secondary source of income.

While 95.9% of fire workers stated that they have received vocational training, it was concluded that 41.4% received occupational safety and health training fire workers wear uniforms at an average rate of 81.7% when on the job. They utilize gloves the most commonly (89%) of all personal protective equipment. 47.6% of those employed in firefighting in forestry reported having been involved in an accident at least once throughout their careers, with 41.1% reported having an accident during the past year. As general pain complaints, workers complain of neck pain at a rate of 17.1%. Neck pain is followed by headache (16.3%) and leg and ankle pain (6.1%).

It was concluded that the most common physical ailments were scratches and cracks with a maximum rate of 87.4%, and the psychological disturbances were headaches with a maximum rate of 8.9%. Psychologically, 24% of the workers in the field stated that they felt shyness, 13.8% felt loneliness, 2.8% felt dread. 59.4% said that they did not feel anything.

Face-to-face interviews revealed that forest fire workers frequently expressed dissatisfaction with their working conditions and economic status. They complain about having to perform their already difficult and dangerous work during certain periods of the year, leaving them jobless during other periods, and about their economic wages being insufficient. Therefore, it is essential to take measures to address problems of fire workers and make them regard themselves as a part of the system. Wages of fire workers fire worker salaries should be increased and outstanding workers should be rewarded.

The factors that contribute to occupational diseases and work-related accidents during wildfires should be investigated, and necessary technological measures should be taken.

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