A Study on The Health Problems of Forest Nursery Workers

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Abstract

High levels of health problems among forest workers naturally have a negative impact on productivity. Musculoskeletal system issues are among the primary health issues among the public.

The aim of this study was to determine the working conditions of the forest nursery workers in Bayburt and Hendek as well as their demographic properties, issues related with the musculoskeletal system disorders and the affecting factors. Extended Nordic Musculoskeletal Questionnaire was used for evaluation. A figure indicating the nine anatomical regions of the human body was used for the questionnaire. The study was carried out with the participation of 104 individuals. Of the participants, 85% were female and 15% were male. The age average of the participants was 42± 11.30 years. The ratio of workers who experienced at least one musculoskeletal issue in any part of their body during the past twelve months was 76% and the same ratio for the last one week was determined as 53%. It was put forth that nursery workers with musculoskeletal pain complaints in the last 12 months had the highest complaints for the lower back region (58.17%) followed respectively by the Upper back (44,82%), neck (41.07%) and shoulder (36,22%). A statistically significant relationship was determined between the regions of the body with pain and age groups, years of experience and ergonomics information. According to the acquired results, these complaints have an adverse impact on productivity. The level of these impacts may be reduced by taking steps to improve workers' health.

Keywords: Forest, nursery workers, musculoskeletal symptoms, occupational health, Nordic questionnaire.

Orman Fidanlığında Çalışan İşçilerin Sağlık Sorunları Üzerine Bir Araştırma

Öz

Orman fidanlık işçilerinin sağlık sorunlarının çok yüksek düzeyde oluşu, iş verimini de olumsuz etkilemektedir. Sağlık sorunlarından, kas iskelet sistemi sorunları çalışan insanların en başta gelen sağlık problemlerinden biridir. Bu çalışmanın amacı, Bayburt ve Hendek orman fidanlıklarındaki işçilerin çalışma koşulları, demografik özellikleri, kas iskelet sistemi rahatsızlıkları ile ilgili sorunları ve etkileyen faktörlerin belirlenmesi araştırılmıştır. Genişletilmiş ''Nordic Kas-iskelet Sistemi anketi" kullanılarak değerlendirilmiştir. Anket için vücudun dokuz anatomik bölgesini gösteren bir şekil kullanılmıştır. Bu araştırma, 104 kişinin katılımı ile gerçekleştirilmiştir. Katılımcıların %85'i bayan ve %15'i erkek'tir. Araştırmaya katılanların yaş ortalaması 42± 11.30 yıldır. Son on iki ay içinde vücudun herhangi bir bölümünde en az bir kas iskelet sorunu yaşayan çalışanların sıklığı %76 ve son bir hafta içinde ise %53 olduğu belirlenmiştir. Fidanlık işçilerinin son 12 ayda kas-iskelet sistemi ağrı şikâyetlerinin sahip olanların en fazla bel bölgesinde (%58.17) yakınması olduğu, daha sonra sırasıyla sırt bölgesinde (%44,82), boyun bölgesinde (%41.07) ve omuz bölgesinde(%36,22) ağrı şikâyetlerinin olduğu belirlenmiştir. Fidanlıklarda çalışan işçilerin ağrılı vücut bölgeleri ile yaş grupları, çalışma yılları ve ergonomi bilgisi arasında istatistiksel olarak anlamlı ilişki bulunmuştur. Elde edilen bu sonuçlar göre, bu rahatsızlıklar iş verimini olumsuz yönde etkilemektedir. Bu etkilerin derecesi işçi sağlığının olumlu yönde iyileştirilmesi yönünde atılacak adımlarla azaltılabilir.

Anahtar Kelimeler: Orman, fidanlık işçileri, işçi sağlığı, kas-iskelet sistemi, Nordic anketi.

1. Introduction

Large amounts of saplings with high quality are required in order to successfully carry out the regeneration and afforestation studies in our country. For this purpose, the adaptation of the nursery workers to the job and the suitability of the tools, vehicles and machinery used are of significant importance (Alkan and Gülcü, 2000; Eroğlu et al., 2008). The saplings necessary for afforestation activities in our country are provided by a total of 128 forests covering an area of 3.371 ha with a capacity of 511 million units/year established as part of the State Forest Nurseries within the body of the General Directorate of Forestry (OGM, 2018).

Majority of the forest related works in Turkey is carried out by uneducated workers from the local public. Qualities such as education, experience, body type, being a healthy individual are not taken into consideration when selecting these workers. Tools and machinery suited to the worker are required for providing healthy, safe and productive working conditions. For this purpose, it is necessary to determine the standards for the tools, machinery and hardware used frequently in forests and nurseries in an ergonomic manner.

The anthropometric features of the workers in works that require static or dynamic muscle strength, working positions and the suitability of the tools or machines they use with the work being carried out have significant impact on increasing nursery yield (Acar and Eroğlu, 2001; Koca et al., 2001).

Acar and Şentürk (1999) carried out a study on the health of forest workers as a result of which it was determined that backaches and rheumatism pains were ranked highest among forest workers. Acar et al. (2002) performed measurements, surveys and observations with union member and permanent staff forest nursery workers for examining their physical labor capacities and the working conditions subject to the tools they use. For this purpose, examinations were carried out on 50 forest nursery workers for evaluating their anthropometric characteristics, body mass indexes, pulse rates and the tools they use while working. Acar and Ünver (2008) performed a study including a 20 question survey for the improvement of the working conditions of forest and nursery workers and to determine their health related problems. It was presented as a result of the study that rheumatism, back aches, neck and shoulder pains, arm and leg pains were on average 26,7% for nursery workers, while the same ratio was determined as 59,5% on average for production workers. Koç (2016) indicated as a result of the study entitled as the evaluation of musculoskeletal system disorders in furniture production that the employees complained mostly of leg, waist, arm, back, neck and wrist pains. Improper stance while working may increase the risks of occupational diseases while also decreasing productivity. Akay et al. (2003) carried out a study in which it was emphasized that improper stance of the worker while working resulted in stress, fatigue and musculoskeletal disorders. Improper work design, postural disorders, repeated movements, high work load, difficult carrying works, lots of bending and stretching are among the activities that forest workers face (Saraji et al 2004; Enez 2008; Kalınkara 2013; Enez et al 2014; Melemez et al 2016; Unver-Okan et al 2017: Enez et al 2019). Occupational musculoskeletal system disorders(MSD) have started to be observed frequently in society (Melemez et al., 2012) Musculoskeletal disorders are among the most frequent occupational health problems. About 25% of the workpeople in European Union (EU) countries complain of back ache and 23% of muscle pains (EU-OSHA 2007). It has been reported as a result of many Scandinavian studies carried out among forest production workers that lower back pain is a significant issue in addition to high pain frequencies shoulders, neck and arms (Sairanen et al., 1981, Harstela, 1990)

Questionnaire is a systematic method for acquiring data. The data are acquired by directing a series of questions to previously selected individuals. Standardized Nordic questionnaire (Kuorinka et al. 1987) has been used in various studies for the analysis of MSD (Johansson, 1994; Newell and Kumar, 2004; Glover et al., 2005; Lei et al., 2005). High levels of health issues among forest workers naturally have an adverse impact on productivity as well. Productivity of a worker with a health issue decreased by about 20-30% in comparison with a healthy worker subject to the type and intensity of the problem (Erdaş et. al., 1995). MSD problems are one of the leading health problems of the working society.

The aim of this study was to determine the health problems (prevalence of musculoskeletal disorders-MSD) and associated risk factors among forest nursery workers. The research was conducted Bayburt State Nursery and Hendek State Nursery with different climate types located in Turkey.

2. Material and Method

Forest nurseries located in different geographical regions of our country were selected as the study area with studies carried out on Bayburt forest nursery part of the Trabzon Forest Nursery Directorate and Hendek forest nursery part of the Sakarya Forest Nursery Directorate. Our study carried out at the Bayburt and Hendek forest nurseries took place during April-June 2017. The workers included in the study were comprised of the seasonal workers and the permanent nursery workers. The duties of the workers were weeding, seedbed arrangement, filling of empty pots for potted planting, pot planting, emptying of pots, spraying, loading of the saplings to the vehicles, rooting of tall saplings and the loading of the saplings to the vehicle for transportation.

Extended Nordic Musculoskeletal Questionnaire (NMQ) used frequently in many international studies as well as studies in Turkey was applied in this study for determining the frequency of musculoskeletal system symptoms based on the verbal expressions of the individual. This questionnaire (NMQ) was developed in 1987 by Kuorinka et al. (Kuorinka et al., 1987). It was later extended by Dawson et al. and became known as the Extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E) (Dawson, 2009).

The first section of the questionnaire includes questions on demographic characteristics such as age, weight, weekly working hours and years of experience. The second section was performed using a figure showing the nine different anatomical regions of the body (neck, shoulder, upper back, elbows, hands/wrist, lower back, thighs, knees and foot/ankle) for determining whether there was any pain during the last one week and one year in addition to determining if the pain has an impact on work/home life or not.

This questionnaire was applied on 104 workers during a face-to-face interview. All responses to the questionnaire categories were entered into an Excel database and were numerically coded. Averages and standard deviations were used for identifying the demographic characteristics.

All statistical analyses were performed using the SPSS version 18.0. Chi Square test was used to compare demographic variables between workers with and without musculoskeletal disorders.

3. Result and Discussion

Of the 104 nursery workers subject to the questionnaire in this study, 89 (85%) were female and 14 (15%) were male. Demographic and employment characteristics of forest nursery workers are summarized in Table 1.
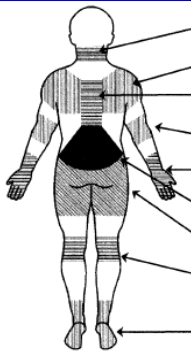
Table 1. Demographic and employment characteristics of workers (n= 104;89 Female, 15 Male).

Variable	Mean (standard deviation)	Range	Distribution (percent)
Age (years)	42 (11.30)	20-70	20-30: (18.5) 31-40:(25) 41-50:(30.5) >50:(26)
Height (cm)	1.63(0.07)	1.40-1.80	1.40-1.50:(18.5) 1.51-1.60:(43.5) 1.61-170:(31.5) >1.70:(6.5)
Weight (kg)	76.94(14.93)	40-110	40-50:(2) 51-60:(12) 61-70:(36) 71-80:(27) >81:(23)
BMI (kg/m^2)	28.89(5.86)	15.43-45.17	15,4-24.9:(28) 25-29.9:(45) 30-34.9:(17) 35-39.9:(7.5) >40:(2.5)
Work per day (h)	7(1.80)	5-10	<5:(16) 6-8:(82) >8:(2)
Forest work experience (years)	4(1.20)	1-12	<1:(17) 2-5:(70) 6-10:(10) >10:(3)

The averages of the forest nursery workers was (42± 11.30) for age, (163.5 ±0.07) cm for height and (76.94± 14.93) kg for body weight. Body mass index (BMI) was calculated using the formula of body weight (kg) / height (m²). Body mass index was calculated as 28.89± 5.86 kg/ m². The average experience of working in the forest nursery sector was (4± 1.20) years.

The participants were asked whether they experienced any pain during the last 12 months and the last week. It was determined that 58.17% of the forest nursery workers had complaints of pain in the lower back, 44.82% in the upper back, 41.07% in the neck, 38.05% in the shoulder and 36.22% in the Wrists/Hands. It was also determined that 38.83% experienced pain in their lower back in the past week, 30.28% in the neck, 29.52% in the Upper back and 25.38% in the shoulder. Table 2 presents the findings on the regions of the body where they feel pain at any time.

Table 2. The frequency of MSS among participants.

	Body region	Any symptoms last 12 months	Symptoms last 7 days
	Neck	41.07	30.28
	Shoulders	38.05	25.38
	Upper back	44.82	29,52
	Elbows	23.58	20.28
	Wrists/Hands	36.22	19.84
	Lower back	58.17	38.83
	Hips/Thighs	17.03	8.2
	Kness	28.04	14.3
	Ankles/Feet	21.2	11.0

Based on the questionnaire results, 24% of the forest nursery workers indicated that they did not feel any pain, ache or discomfort during the last twelve months, whereas 76% stated that they experienced various health issues such as discomfort, numbness throughout the year. Moreover, it was also determined that 47 % of the workers did not experience any health issue during the last one week, while 53 % experienced various health issues.

It was identified that 10% of the nursery workers with lower back problems hurt their lower backs during an accident and that 90% did not hurt their lower back during an accident. Of the workers with lower back pain, 26% indicated slight pain, 48 % moderate pain and 26 % severe pain in their lower backs. While 15 % of those with lower back pain indicated that their physical activities decreased, 85% indicated that the lower back pain does not affect their lives and it was determined that 64 % of the workers went to a doctor with this complaint while 36% did not.

The nursery workers with upper back complaints indicated that they did not hurt their upper back as a result of an accident. Of the workers with upper back complaints, 37% indicated slight pain, 37% moderate pain and 26 % severe pain in their upper backs. While 38 % of those with upper back pain indicated that their physical activities decreased, 62% indicated that the lower back pain does not affect their lives and it was determined that 42 % of the workers went to a doctor with this complaint while 58 % did not. Of the nursery workers with neck complaints, 14% indicated that they hurt their necks as a result of an accident, whereas 86% stated that they did not hurt their necks as a result of an accident. It was determined that of the workers with neck pain complaints, 17% indicated slight pain, 66% moderate pain and 17% severe pain in their necks. While 30 % of those with neck pain indicated that their physical activities decreased, 70% indicated that the neck pain does not affect their lives and it was determined that 45 % of the workers went to a doctor with this complaint while 55 % did not. Of the nursery workers with shoulder complaints, 13 % indicated that they hurt their shoulder as a result of an accident, whereas 77% stated that they did not hurt their shoulder as a result of an accident. It was determined that of the workers with shoulder pain complaints, 57 % indicated slight pain, 33% moderate pain and 10 % severe pain in their shoulder. While 12 % of those with shoulder pain indicated that their physical activities decreased, 78 % indicated that the shoulder pain does not affect their lives and it was determined that 56 % of the workers went to a doctor with this complaint while 44 % did not.

Activities in nurseries such as tilling, digging, weeding require manual work carried out in either a crouching or kneeling posture. These types of works lead to lower back pains, upper back pains, shoulder and joint injuries.

The statistical relationship between the physical parts of the nursery workers where they feel pain and their age groups, years of experience and their knowledge on ergonomics. It was examined whether there is any statistically significant relationship between the parts of the bodies of workers with pain and their age. The evaluation results put forth a statistically significant relationship between the lower back, Upper back and neck regions (p=0,000; p=0,000; p=0,001 respectively). The pain complaints in these regions increase distinctively with increasing age.

It was examined whether there is any statistically significant relationship between the parts of the bodies of workers with pain and their years of experience. The evaluation results put forth a statistically significant relationship between the total years of experience and lower back, Upper back, neck and shoulder regions (p=0,002; p=0,000; p=0,005; p=0,000; p=0,000 respectively). The pain complaints in lower back, upper back, neck and shoulder regions increase distinctively with increasing age.

The relationship between the knowledge of the workers on OHSI (Occupational Health and Safety Information) and ergonomics information as a result of which it was observed that the workers with no knowledge on OHSI also do not have any knowledge of ergonomic manners of working. Table 3 presents a statistically significant relationship between OHSI and ergonomic information (p=0,000). It can be seen that the ergonomics information of the workers increases with increasing knowledge on OHSI. Moreover, pain complaints are observed more frequently in workers with less knowledge on OHSI and ergonomics.

Table 3. The relationship between OHS and ergonomics

OHSI		Ergonomics information		
		Yes	**No**	**Total**
dont know	n	-	10	10
	%	-	100	100
know partially	n	14	72	86
	%	16.3	83.7	100
know	n	5	3	8
	%	62.5	37.5	100
P		0,000		

Personal factors such as age, height, weight, drinking and smoking habits do not have a direct impact on the development of the musculoskeletal system symptoms (Malchaire et al. 2001). It is reported in studies carried out that psycho-social risk factors are more effective than mechanical impacts with regard to the increase in pain and the advancement of the symptoms and that psycho-social factors result in increasing of musculoskeletal system complaints. This was determined to be of significant importance in the development of neck and upper extremity symptoms and diseases. Giving short rest intervals while working may reduce the strain on the muscles (Eltayeb et. al.,2007; Torngvist et. al., 2009; Macfarlane et. al., 2009). However, the nursery workers who participated in our study indicated that their personal relationships are mostly good, that they have enough breaks and that their superiors provide sufficient support.

The relationships between psycho-social factors and the musculoskeletal system have been examined by many different researchers (Skov et al., 1996; Buckle, 1997). Theorell et al. (1991) identified that the psychological demands are related at a statistically significant level with shoulder, neck and upper back complaints among those from different professions after adjusting to physical stress. The back are affected from the position of the body and the static load that is generated when using a chainsaw. Back pain in forestry related works that require the use of a chainsaw may be related with the long periods of time spent by the nursery worker in a knelt down posture (Sairanen et al. 1981; Gaskin, 1990). Lifting, bending, static or repeating works, vibration and disturbing postures increase the risks of shoulder, lower back and neck pain (Anderson, 1981; Linton, 1990; Pope et al., 1997).

Gallis (2006) carried out a questionnaire study with 78 workers working on forest industry production at a mountainous region of Greece as a result of which it was determined that the symptom ratios were significantly higher for all body parts. Some authors reported that there is a relationship between musculoskeletal system symptoms(MSS) and age (Hildebrandt, 1995; Malchaire et al., 2001; Naidoo et al., 2009; Heiden et al., 2013; Grzywinski et al, 2016). In general, strain builds up with increasing age and years of experience and thus it is indicated that musculoskeletal system symptoms are observed more frequently among elderly workers (Zwart et al., 1997; Nordin et al., 2007; (Amin et al., 2008; Bernard et al., 2010; Vrezas et al., 2010). A similar relationship was also determined in our study. Kaya (2016) put forth that 39,4 % of the female nursery workers feel pain in different parts of their body 1-2 times per week. The parts of the body where females feel the most pain were; legs and feet (26,5%), neck (25,4%), lower back (16,6%), head (11,9%) and arm-wrist (11,6%). The fact that majority of the nursery workers complain of lower back, upper back and shoulder pains may be related with their unbalanced working posture, excessive weight, disproportional body mass indexes as well as the use of tools and equipment that are not suited to their anthropometric structure. High BMI values of forest nursery workers may be related with their high weights and the fact that they generally work while sitting down.

4. Conclusion

In this study, the working conditions of forest nursery workers at Bayburt and Hendek nurseries, their demographic characteristics, issues related with musculoskeletal system disorders and the affecting factors were examined. A questionnaire including the Extended Nordic Musculoskeletal System Questionnaire was used. Of the 104 nursery workers subject to the questionnaire, 89 (85%) were female, 14 (15%) were male. It was determined that 76% of the workers who participated in the study experienced pain in the last twelve months and that 58.17% of the nursery workers complained of lower back pain, 44.82% of Upper back pain, 41.07% of neck pain,38.05% of shoulder pain and 36.22% of pain in wrists/hands. It was concluded that 38.83% had pain complaints in their lower back in the past week, 30.28% complained of neck pain, 29.52% complained of Upper back pain and 25.38% experienced pain in the shoulder regions.

The number of workers indicating pain complaints in different parts of their bodies increases with increasing age. In addition, a statistically significant relationship was observed between the pain complaints in the lower back, Upper back and neck regions and the ages of the workers. Moreover, a statistically significant relationship was also observed between the total number of working years and pain complaints in the lower back, Upper back, neck and shoulder regions of the body. It was observed that the knowledge of workers on ergonomics increased with increasing knowledge on OHSI.

It is considered that annual health controls will enable the forest nursery workers to stay healthier while also increasing productivity and that certain protective measures (working in a seated position, frequent breaks, regular exercises etc.) will reduce musculoskeletal system related issues. In addition, the workers should also receive an ergonomics training including the proper posture as well as the working styles and safe behavior techniques for works involving the carrying of objects.

Acknowledgement

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