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Relationship between low back, shoulder, and elbow pain in hazelnut workers and their harvestıng methods, physical activity status and healthy lifestyle

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Abstract

Objective: The aim of the study to evaluate the sociodemographic characteristics, hazelnut harvesting methods and duration, physical activity status, and healthy lifestyle behaviors of patients who have engaged in hazelnut harvesting and presented with complaints of low back, shoulder, and elbow pain for the first time at clinic . The goal is to assess whether these factors are influential in the emergence of disorders related to the reported complaints.

Methods: It is a cross-sectional study conducted on a total of 124 people between the ages of 20-65 years who applied to the Physical Medicine and Rehabilitation Clinic with complaints of low back, shoulder and elbow pain during the period of September - November 2020. Since the most common diagnoses were lumbar strain-sprain, subacromial impingement syndrome and lateral epicondylitis, patients with other diagnoses were excluded from the study. A total of 124 patients' data were analysed. Data were collected by a single physician through a questionnaire interview. The questionnaire consisted of 3 sections; sociodemographic characteristics, harvesting methods and additional tasks and IPAQ Short Form.

Results: Of the study participants, 63 (50.8%) presented to the clinic with low back pain and 66 (53.2%) were diagnosed with lumbar strain-sprain. This was followed by 38 (30.6%) with shoulder pain and 34 (27.4%) were diagnosed with subacromial impingement syndrome. There was no significant difference between clinical diagnosis and age and sex.

Conclusions: Although sociodemographic characteristics, hazelnut harvesting methods and duration were not statistically associated with clinical diagnoses, the most common diagnosis was lumbar strain-sprain. In order to minimize the negative impact of the hazelnut harvesting on the musculoskeletal system, education and preventive measures can be provided to individuals engaged in hazelnut harvesting.

Keywords: hazelnut; agriculture; musculoskeletal disorders

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Introduction

Agriculture is the second-largest employment sector in Turkey and globally. There are 1.1 billion agricultural workers in the world. According to the May 2018 data from the Turkish Statistical Institute [TURKSTAT], 18.8% of the total employed population (32 million 274 thousand) in Turkey works in the agricultural sector [1]. Hazelnut orchards hold significant importance among cultivated agricultural lands in Turkey. Approximately 80% of the total global hazelnut orchard area is located in our country. Approximately 60% of the hazelnut orchards in Turkey are located in the Black Sea region, of which approximately 18% is in Giresun province. Giresun province second-highest hazelnut-producing province after Ordu. Consequently, there is a intense workload for hazelnut production and harvesting throughout the province. [2].

The agricultural sector requires human labor as well as machine power, and physical processes such as harvesting, hoeing, sorting and other tasks that demand physical strength can have negative effects on the musculoskeletal system. Although there are publications supporting this issue in the literature [3-5], there are no publications on skeletal-muscular system problems that can be seen in agricultural workers who pick hazelnuts.

Conditions like subacromial impingement syndrome, lateral epicondylitis, medial epicondylitis and lumbar strain-sprain are disorders that can lead to shoulder, elbow and low back pain problems. These conditions can be diagnosed clinically and may arise from acute or repetitive traumas, such as those experienced by hazelnut workers, causing pain and loss of work capacity. These are significant conditions that can be observed in agricultural workers [6-9].

The level of physical activity in people's daily lives affects health in many ways. Restriction in physical activity leads to obesity and causes many health problems [10]. It is also known that unconscious physical activity can have negative effects on the musculoskeletal system [11]. Improving health can be achieved by individuals taking responsibility for their health, managing and controlling it and reaching their full health potential.

Indicators of this process include health responsibility, physical activity, nutrition, mental development, interpersonal relationships and stress management. Working and workplace conditions, including the physical, psychosocial and organizational environment, directly shape employee health, health behaviors and safety [12].

It can be concluded that musculoskeletal system problems, as indicated in the literature for other agricultural workers, may also develop in hazelnut workers, especially considering the method and duration of hazelnut harvesting. Unconsciously or consciously engaging in this physical activity, particularly in the context of hazelnut harvesting, may lead to repetitive or acute traumas. This could result in complaints such as shoulder pain, elbow pain, and low back pain.

In our study, we aimed to evaluate the sociodemographic characteristics, hazelnut harvesting methods and duration, physical activity status and healthy lifestyle behaviors of hazelnut harvesting patients who were admitted to Giresun University Prof. Dr. A. İlhan Özdemir Training and Research Hospital Physical Medicine and Rehabilitation Clinic for the first time with complaints of low back, shoulder and elbow pain and diagnosed with lumbar strain-sprain, subacromial impingement syndrome and lateral epicondylitis. The aim is to evaluate whether these factors are effective in the occurrence of the disorders related to the reported complaints.

Material-Method

This study is a cross-sectional study conducted in individuals between the ages of 20-65 who were hazelnut workers and applied to Physical Medicine and Rehabilitation Clinic of Giresun University Prof. Dr. A. Ilhan Ozdemir Training and Research Hospital with

low back, shoulder and elbow pain.

The study was conducted on individuals who were engaged in hazelnut harvesting between September and November 2020 and who applied to the Physical Medicine and Rehabilitation Clinic with complaints of low back, shoulder and elbow pain and agreed to participate in the study. The most common diagnoses were lumbar strain-sprain, subacromial impingement syndrome and lateral epicondylitis..Patients with other diagnoses were excluded from the study and a total of 124 individuals were included.

The data of the study were collected by a single physician through a face-to-face questionnaire interview in the Physical Medicine and Rehabilitation Clinic of Giresun University Prof. Dr. A. Ilhan Ozdemir Training and Research Hospital. The physician performed a physical examination of the patient and made a clinical diagnosis. The diagnosis of low back strain was based on pain in the lumbar region which increased especially with coughing and lumbar flexion, tenderness in the paravertebral muscles with palpation. Negative straight leg raising test, absence of neurological deficit and urinary-fecal incontinence also supported our diagnosis.

The diagnosis of subacromial impingement syndrome was made on the basis of physical examination and ultrasonography(USG). The diagnosis was made with pain in the deltoid insertion site, positive Neer and Hawkins-Kennedy tests, pain in shoulder abduction and USG findings (subacromial bursa lateral to the impingement site, bundling in the coracoacromial arch, subdeltoid bursa, swelling in the coracoacromial ligament). Bone pathologies were excluded after anterior and posterior shoulder X-rays of all patients. [13].

The diagnosis of lateral epicondylitis was made on the basis of tenderness on palpation over the lateral epicondyle, pain in the lateral elbow area, pain over the lateral epicondyle with resistance to wrist and/or middle finger extension, and a positive Cozen's test. [14].

The questionnaire form was prepared in accordance with the purpose of the study, utilizing the literature and clinical experience, and consisting of three sections as a result of preliminary interviews with hazelnut workers before starting the study and observation of harvesting methods.

In the first section of the questionnaire form, the participants' sociodemographic characteristics are included, such as age, sex, occupation, education level, income status, physician-diagnosed chronic diseases, height, weight, and income level, among others. In the second section, details about hazelnut harvesting methods, duration, and additional tasks (such as removing weeds in the orchard) are included.

The third section of the questionnaire includes the International Physical Activity Questionnaire Short Form (IPAQ Short Form). The International Physical Activity Questionnaire (IPAQ) was developed to assess the physical activity levels of participants aged 15-65 [15]. In Turkey, a validity and reliability study for IPAQ was conducted by Öztürk in 2005 among university students, and later in 2007, Karaca and Turnagöl conducted a validity and reliability study among working individuals [16].

The IPAQ Short Form provides information about the time spent on walking, moderate-intensity, and vigorous-intensity activities, as well as the time spent sitting. The calculation of the total score of the short form includes the sum of duration (minutes) and frequency (days) of walking, moderate to vigorous activity and vigorous activity. According to the numerical data obtained, three levels were defined as inactive, minimally active and very active.

The dependent variables in our study are clinical diagnosis, physical activity status, and healthy lifestyle behaviors. The independent variables include sociodemographic characteristics (age, sex, occupation, education level, income status, physician-

Table 1: Some sociodemographic characteristics of the study group

FEATURE	n	%	TOTAL
Sex			
Female	46	37.1	124
Male	78	62.9	
Age			
Under 50 years old	65	52.4	
50 years and older	59	47.6	
Body Mass Index			
Normal	41	33.1	124
Overweight	57	46.0	
1st, 2nd and 3rd degree obese	26	21.0	
Occupation			
Non-farming	63	50.8	124
Farming	61	49.2	
Physician Diagnosed Chronic Disease Status			
No	80	64.5	124
Yes	44	35.5	
Reason for Application to Clinic			
Shoulder pain	38	30.6	124
Low back pain	63	50.8	
Elbow pain	23	18.5	
Clinical Diagnosis			
Subacromial impingement syndrome	34	27.4	124
Lumbar strain-sprain	66	53.2	
Epicondylitis	24	19.4	
Hazelnut Harvesting Methods			
From the branch	11	8.9	124
From the ground	93	75.0	
Branch and ground	20	16.1	
Daily Picking Time			
8 hours or less	93	75.0	124
Over 8 hours	31	25.0	
Number of Days Hazelnut Picking			
10 days and less	45	36.3	124
Over 10 days	79	63.7	
Hazelnut Carrying Status			
Yes	89	71.8	124
No.	35	28.2	
Removing weeds in orchards			
Yes	89	71.8	124
No.	35	28.2	

Table 2: Association of clinical diagnosis with some sociodemographic characteristics

FEATURE	CLINICAL DIAGNOSIS			TOTAL	X^2	P
	Subacromial impingement syndrome n(%)	Lumbar Strain-Sprain n(%)	Epicondylitis n(%)			
Sex						
Female	15(32.6)	26(56.5)	5(10.9)	46(100.0)	3.588[a]	0.166
Male	19(24.4)	40(51.3)	19(24.4)	78(100.0)		
Age						
Under 50 years old	17(26.2)	38(58.5)	10(15.4)	65(100.0)	1.896[a]	0.388
50 years and older	17(28.8)	28(47.5)	14(23.7)	59(100.0)		
Body Mass Index						
Normal	12(29.3)	20(48.8)	9(22.0)	41(100.0)	0.697[a]	0.952
Overweight	15(26.3)	31(54.4)	11(19.3)	57(100.0)		
1st, 2nd and 3rd degree obese	7(26.9)	15(57.7)	4(15.4)	26(100.0)		
Occupation						
Non-farming	13(20.6)	39(61.9)	11(17.5)	63(100.0)	4.200[a]	0.122
Farming	21(34.4)	27(44.3)	13(21.3)	61(100.0)		
Physician Diagnosed Chronic Disease Status						
No	24(30.0)	40(50.0)	16(20.0)	80(100.0)	1.037[a]	0.595
Yes	10(22.7)	26(59.1)	8(18.2)	44(100.0)		
Reason for Application to Clinic						
Shoulder pain	34(89.5)	4(10.5)	0(0.0)	38(100.0)	221.290[a]	**<0.001**
Low back pain	0(0.0)	62(98.4)	1(1.6)	63(100.0)		
Elbow pain	0(0.0)	0(0.0)	23(100.0)	23(100.0)		
Hazelnut Harvesting Methods						
From the branch	3(27.3)	6(54.5)	2(18.2)	11(100.0)	0.823[a]	0.935
From the ground	24(25.8)	51(54.8)	18(19.4)	93(100.0)		
Branch and ground	7(35.0)	9(45.0)	4(20.0)	20(100.0)		

Daily Picking Time						
8 hours or less	24(25.8)	50(53.8)	19(20.4)	93(100.0)	0.595[a]	0.743
Over 8 hours	10(32.3)	16(51.6)	5(16.1)	31(100.0)		
Number of Days Hazelnut Picking						
10 days and less	10(22.2)	26(57.8)	9(20.0)	45(100.0)	0.986[a]	0.611
Over 10 days	24(30.4)	40(50.6)	15(19.0)	79(100.0)		
Hazelnut Carrying Status						
Yes	24(27.0)	46(51.7)	19(21.3)	89(100.0)	0.812[a]	0.666
No	10(28.6)	20(57.1)	5(14.3)	35(100.0)		
Removing weeds in orchards						
Yes	25(28.4)	46(52.3)	17(19.3)	88(100.0)	0.160[a]	0.923
No	9(25.0)	20(55.6)	7(19.4)	36(100.0)		

Table 3: Association of physical activity status with some sociodemographic characteristics

FEATURE	Physical activity status			TOTAL	X^2	P
	Inactive n(%)	Low Activity n(%)	Sufficient Active n(%)			
Sex						
Female	3(6.5)	29(63.0)	14(30.4)	46(100.0)	0.014[a]	0.993
Male	5(6.4)	50(64.1)	23(29.5)	78(100.0)		
Age						
<50 years	1(1.5)	41(63.1)	23(35.4)	65(100.0)	6.528[a]	**0.038**
≥50 years	7(11.9)	38(64.4)	14(23.7)	59(100.0)		
Body Mass Index						
Normal	2(4.9)	22(53.7)	17(41.5)	41(100.0)	5.372[a]	0. 251
Overweight	3(5.3)	39(68.4)	15(26.3)	57(100.0)		
1st, 2nd and 3rd degree obese	3(11.5)	18(69.2)	5(19.2)	26(100.0)		
Occupation						
Non-farming	7(11.1)	34(54.0)	22(34.9)	63(100.0)	7.326[a]	**0. 026**
Farming	1(1.6)	45(73.8)	15(24.6)	61(100.0)		

Physician Diagnosed Chronic Disease Status						
No	6(7.5)	47(58.8)	27(33.8)	80(100.0)	2.410[a]	0. 300
Yes	2(4.5)	32(72.7)	10(22.7)	44(100.0)		
Reason for Application to Clinic						
Shoulder pain	2(5.3)	27(71.1)	9(23.7)	38(100.0)	2.216[a]	0. 696
Low back pain	4(6.3)	40(63.5)	19(30.2)	63(100.0)		
Elbow pain	2(8.7)	12(52.2)	9(39.1)	23(100.0)		
Clinical Diagnosis						
Subacromial impingement syndrome	1(2.9)	24(70.6)	9(26.5)	34(100.0)	3.293[a]	0.510
Lumbar strain-sprain	5(7.6)	43(65.2)	18(27.3)	66(100.0)		
Epicondylitis	2(8.3)	12(50.0)	10(41.7)	24(100.0)		
Hazelnut Harvesting Methods						
From the branch	1(9.1)	7(63.6)	3(27.3)	11(100.0)	2.455[a]	0. 653
From the ground	7(7.5)	60(64.5)	26(28.0)	93(100.0)		
Branch and ground	0(0.0)	12(60.0)	8(40.0)	20(100.0)		
Daily Picking Time						
≤8 hours	7(7.5)	61(65.6)	25(26.9)	93(100.0)	1.964[a]	0. 375
>8 hours	1(3.2)	18(58.1)	12(38.7)	31(100.0)		
Number of Days Hazelnut Picking						
≤10 days	7(15.6)	24(53.3)	14(31.1)	45(100.0)	10.306[a]	**0. 006**
>10 days	1(1.3)	55(69.6)	23(29.1)	79(100.0)		
Hazelnut Carrying Status						
Yes	6(6.7)	58(65.2)	25(28.1)	89(100.0)	0.470[a]	0. 791
No.	2(5.7)	21(60.0)	12(34.3)	35(100.0)		
Removing weeds in orchards						
Yes	5(5.7)	60(68.2)	23(26.1)	88(100.0)	2.622[a]	0.269
No.	3(8.3)	19(52.8)	14(38.9)	36(100.0)		
Total	8(6.5)	79(63.7)	37(29.8)		124(100.0)	

diagnosed chronic diseases, height, weight, among others), hazelnut harvesting methods, duration, and additional tasks.

The data obtained were transferred to a computer and analyzed using the IBM SPSS software package (version 20.0). Descriptive statistics were presented as frequencies, percentages, median (min-max), and mean±standard deviation. Chi-square analysis was conducted for the univariate analysis of dependent and independent variables in categorical data.

The study protocol and design were approved by the Clinical Research Ethics Committee of Giresun University (Decision date: 4 September 2020 number KAEK-13)

Results

The mean age of the participants was 48.9±1.1 years (min=18, max=80) and 78 (62.9%) of them were male. The mean body mass index (BMI) of the research group was determined to be 26.7302±4.35 (min=16.90, max=47.75). 63 (50.8%) of the participants were not farmers. While 80 (64.2%) of the study group did not have a physician-diagnosed disease, 63 (50.8%) of the study group applied to the clinic due to low back pain and 66 (53.2%) were diagnosed with lumbar strain-sprain. During the hazelnut harvesting season, 93 (75%) of the study group worked for 8 hours or less per day, and 79 (63.7%) indicated picking hazelnuts for 10 days or more. Additionally, 89 (71.8%) of the participants reported engaging in both hazelnut carrying and removing weeds activities. The distribution of the study group's demographic characteristics is provided in Table 1.

Among the study participants, those who applied to the clinic with low back pain were diagnosed with lumbar strain-sprain (X2 : 221,290a ;p<0.001), while there was no significant difference between clinical diagnosis and other characteristics. The relationship between clinical diagnosis and some sociodemographic characteristics of the study group is given in Table 2.

In our study, those under 50 years of age were more likely to have sufficient physical activity compared to those aged 50 and above. Similarly, non-farmers were more likely to have sufficient physical activity compared to farmers. Additionally, those who picking hazelnuts for 10 days or less were not physically active compared to those who did not picking. The relationship between physical activity status and some sociodemographic characteristics of the study group is given in Table 3.

Discussion

According to the results of our study, among hazelnut workers, 50.8% presented to the clinic with the complaint of low back pain. This was followed by 30.6% with shoulder pain and 18.5% with elbow pain. The prevalence of low back pain as the primary complaint is consistent with other studies in the literature. In a study conducted by Thetkathuek et al. among Cambodian fruit farm workers, the prevalence of low back pain was 41.3%, ranking first [17]. Momeni et al. reported the most common musculoskeletal problems among Iranian farmers as low back pain (59.3%), knee pain (36.9%), back pain (36.6%), neck pain (36.5%), and shoulder pain (36.2%) [18]. In a study by Min et al. evaluating the prevalence of musculoskeletal pain in Korean farmers, low back pain (63.8%) ranked first, followed by leg/foot pain (43.3%) and shoulder pain (42.9%) [19]. Taking our study and other research into account, it is evident that in hazelnut harvesting, as in all agricultural activities, risk factors such as repetitive movements, heavy lifting, and working in incorrect postures facilitate the emergence of musculoskeletal symptoms.

Of the patients included in the study, 53.2% were diagnosed with lumbar strain-sprain, 27.4% with subacromial impingement syndrome and 24% with epicondylitis. The most common diagnosis was lumbar strain-sprain in both sexes and in individuals under and over 50 years of age. There was no significant difference between clinical diagnosis and age and sex. Osborne et al. did not find a relationship between age and the high prevalence of musculoskeletal disorders [20]. Similarly, Min et al. did not find a significant difference in musculoskeletal pain between those under 65 and those over 65, except for leg/foot pain, but they reported a significant association between female sex and musculoskeletal pain [5]. In contrast, a study by Jain et al. found an association between age (>25), sex (male), and the frequency of musculoskeletal symptoms [20].

In our study, no significant difference was found between body mass index (BMI) and clinical diagnosis. Kee et al. did not find a consistent relationship between body weight and the prevalence of musculoskeletal disorders. However, they observed lower rates of musculoskeletal symptoms in individuals weighing ≥70 kg compared to other groups, interpreting this as an advantage due to having more muscle strength in lifting and carrying heavy loads [21].

In another study, BMI was reported as a significant risk factor for the use of sick leave due to low back disorders. The authors explained this finding by suggesting that obese individuals with low back problems may experience difficulty in maintaining work continuity [22].

Momeni et al. identified body weight as a significant factor for musculoskeletal symptoms in some body regions such as the back, low back, and knees. It was shown that musculoskeletal symptoms were more common in individuals with a body weight >70 kg [18].

In our study, the most common diagnosis was lumbar strain-sprain in those with a daily working time of 8 hours or less and those with a daily working time of more than 8 hours. The second most common diagnosis was subacromial impingement syndrome and the third most common diagnosis was lateral epicondylitis. Similar rankings of clinical diagnoses were observed between those working 10 days or less and those working more than 10 days. There was no significant difference in clinical diagnoses based on daily working hours and the number of days of hazelnut picking.

Osborne et al. found a statistically higher prevalence of musculoskeletal disorders in farmers with longer daily working hours [5]. Similarly, Fethke et al. observed a statistically significant relationship between the weekly average hours spent on several agricultural activities and musculoskeletal pain. The weekly average hours spent milking animals were associated with both neck/shoulder pain and elbow/wrist/hand pain. In addition, the weekly average hours spent on maintenance and repair of equipment was associated with low back pain [9]. In contrast, Kaewdok et al. did not find a statistically significant relationship between working hours and musculoskeletal disorders [23].

The National Institute for Occupational Safety and Health reported that repetitive work, overexertion and incorrect working postures cumulatively affect musculoskeletal symptoms in the arm/wrist/hand region. They also reported that the neck/shoulder region is affected by incorrect working postures and the lumbar region is affected by lifting, heavy physical work or systemic vibrations [24]. In a review by Kumaraveloo et al. examining agriculture and musculoskeletal disorders, incorrect working posture was reported as the most common physical risk factor [25].

When removing weeds, hazelnut picking and hazelnut carrying were evaluated, the most common clinical diagnosis was lumbar strain-sprain in those who did and those who did not do these jobs. There was no statistically significant difference between the two groups. Removing weeds, hazelnut picking, and hazelnut carrying in sloping terrain involve challenging agricultural activities that require leaning forward, kneeling, and repetitive upper extremity and trunk movements. In a study by Kee and Haslam, the prevalence of musculoskeletal disorders in the shoulder, knee and lumbar regions was associated with frequent use of these regions. This relationship was explained by three reasons: less machinery use compared to developed countries, prolonged working in a bent posture during harvesting, and poor working posture such as squatting/kneeling during activities such as removing weeds and picking fruits from the ground [21]. Kang et al. reported that approximately 60% of farmers perform repetitive hand or wrist movements (>30/day) and that bending or turning the trunk and squatting or kneeling are common ergonomic risk factors [26].

In our study, patients under the age of 50 had sufficient physical activity compared to those over 50. Aging is associated with negative effects on various physiological systems, such as loss of muscle mass, decreased balance ability, and reduced muscle strength and endurance. Additionally, there is an increase in the frequency of non-communicable chronic diseases. All these factors lead to physical inactivity in elderly individuals [27]. We think that the difference between the two groups in our study is due to these reasons.

In our study, the most common diagnosis in farmers and non-farmers was lumbar strain-sprain. Studies in the literature have reported a higher prevalence of neck and shoulder pain in farmers compared to non-farmers [5]. In our study, non-farmers had more adequate physical activity than farmers. In Giresun province, non-farmers usually do hazelnut picking as an additional job in addition to their main occupation. While farmers increase their activity levels only during the hazelnut harvesting season, non-farmers have a certain level of physical activity even before the hazelnut harvesting season. This situation could be a reason explaining the difference observed between the two groups.

This study has several limitations. First, this study did not include the occupational groups of non-farmers. It could not be evaluated whether these occupations cause low back, shoulder and elbow pain. Second, It could not be determined how long the patients' complaints lasted before they applied to the clinic. However, it can be estimated that the longest period was 3 months based on the date of hazelnut harvest. And, since the most common diagnoses were lumbar strain-sprain, subacromial impingement syndrome and lateral epicondylitis, patients with other diagnoses were not included in the study and could not be analyzed.

In conclusion, although sociodemographic characteristics, methods and duration of hazelnut harvesting were not statistically related to clinical diagnoses, the most common diagnosis was lumbar strain-sprain. The hazelnut harvesting process involves working in a sloped terrain, requiring poor posture, repetitive activities, and lifting and carrying heavy loads. To minimize the impact of these conditions on the musculoskeletal system, individuals engaged in hazelnut harvesting could be provided with education and preventive measures.

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