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RESEARCH ARTICLE

A PERSPECTIVE FROM AN OCCUPATIONAL MEDICINE CLINIC IN TURKEY: WHICH WORK-RELATED DISEASES DO OLDER WORKERS MOST FREQUENTLY SUFFER FROM?

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ABSTRACT

Purpose: This study aims to investigate the overall health status and work-related diseases of older workers, utilizing data collected from an occupational medicine outpatient clinic in a university hospital in Turkey.
Material and Methods: In this descriptive study, data from 526 workers, aged 45-64, who visited the occupational medicine clinic between 2015-2020 were analysed.
Results: The median age of the workers was 48 (45-64). Among the patients, 48.1% were smokers, and 73.4% had a BMI of 25 or higher. A significant majority of the workers (79.3%) were employed within the industry sector, with none working in agriculture. Out of the total patients, 291 individuals (55.3%) were found to have at least one chronic disease. A total of 328 (62.4%) of the workers were diagnosed with at least one work-related disease.
Conclusion: The high rates of smoking and obesity identified in this study highlight the need for health promotion initiatives in the workplace. Integrating regular chronic disease follow-ups into workplace health surveillance is crucial for the early detection and effective management of medical conditions. The absence of referrals from the agricultural sector underscores the need to enhance access to occupational health services for older workers in this sector. A comprehensive review of workplace measures related to work-related diseases is essential to protect the health of older workers.

Keywords: Older worker, occupational disease, work-related disease, aging workforce, workplace health promotion

INTRODUCTION

The aging of the population stands as one of the most significant demographic trends on a global scale. In 2021, the rate of the older population was 17.3% in the USA, 28.8% in Japan, 13.1% in China, 6.9% in India, and 9.7% in Turkey. The proportion of the older population is expected to be 16.3% in Turkey in 2040 (1).

The increasing share of older individuals in society means a corresponding rise in older workers in working life. There is no consensus on the definition of an "older worker." Various agencies and organizations employ a wide range of age brackets, ranging from 40 to 65 years, to define the "older workers" category (2). The ILO stated that Recommendation 162 for Older Workers applies to

"all workers who are liable to encounter difficulties in employment and occupation because of advancement in age" (3).

The process of aging presents a combination of advantages and disadvantages in working life. While older workers may experience declines in physical capacity, perception speed, and reflexes, they also exhibit heightened levels of experience, independent working skills, and a strong sense of responsibility (4). Staying in working life has various health and social advantages for older workers. Runge et al. found that older workers (50-64 years) who experienced a transition from employment to unemployment had a higher incidence of metabolic syndrome compared to the control group of individuals who remained employed (5). Early retirement was found to have a negative impact on the cognitive ability of workers in their early 60s (6).

The notion of "active aging", developed by the WHO, refers to the process of optimizing opportunities for health, participation, and security to enhance the quality of life as individuals age (7). Active aging emphasizes the importance of remaining engaged, productive, and socially connected throughout the aging process. This perspective recognizes that continued participation in the workforce contributes to the principles of active aging. In 2020, Turkey registered a labor force participation rate of 49.3% among individuals aged 15-64. However, the labor force participation rate for the older population (65+) stood at 10.0% (16.8% for older males and 4.6% for older females) (8).

Despite the existence of numerous scientific studies examining the health status of the older population in Turkey, research focusing specifically on older workers remains scarce. Therefore, our study, which aims to provide insights into the overall health status and work-related diseases among older workers through data obtained from an occupational medicine outpatient clinic in a university hospital, is anticipated to make a significant contribution to the existing literature in this field.

MATERIALS AND METHODS

This descriptive study was conducted at an occupational medicine outpatient clinic of a university hospital in Izmir, Turkey. The study included individuals aged 45-64 who were referred to the clinic between 2015-2020. The data were obtained from the medical records. No sample size was calculated, rather all eligible cases were included in the study.

All the workers included in the study were referred to the clinic for further assessment either by their workplaces or the Social Security Institute due to suspected work-related medical conditions. Following workers' visits to the occupational health clinic, all disease diagnoses were either established or confirmed by the relevant specialist physicians at the university hospital. Then, the causal relationship between the confirmed diagnoses and workplace conditions was evaluated by occupational medicine specialists (MD) in the Occupational Medicine Department Council. Two distinct definitions were employed to characterize the relationship between diseases and work: "occupational disease" and "work-aggravated disease".

Occupational disease: Temporary or permanent illness, physical or mental disability experienced by insured individuals due to the repetitive nature of their work or the specific working conditions (9).

Work-aggravated disease: This term represents the situation in which the prognosis of the pre-existing disease is adversely affected by working conditions.

Work-related disease: In the study, this term refers to a comprehensive concept that covers both occupational diseases and work-aggravated diseases.

The data were analyzed using the SPSS statistics program. In descriptive analyses, frequency data were presented as numbers (n) and percentages (%), and non-normally distributed numerical data were reported using the median (minimum-maximum) values. The Kolmogorov-Smirnov test was used to determine whether the variables were normally distributed. For normally distributed numerical data, independent groups t-test was employed, while the Mann-Whitney U test was used for non-normally distributed numerical data. Fisher's Exact test and chi-square test were applied for the analysis of categorical variables.

This study was approved by the Ethics Committee of Dokuz Eylül University (Date: 18.01.2021, Decision No.2021/02-36).

RESULTS

Between the years 2015 and 2020, 526 workers aged 45-64 were referred to the university's occupational medicine outpatient clinic. Evaluated on an annual basis, the proportions of patients in the 45-64 age group among all patients assessed at the clinic

Table 1. Older workers' sociodemographic characteristics and overall health status

Gender (n=526)	Female	58 (11.0%)			
	Male	468 (89.0%)			
Age Group (n=526)	45-49	320 (60.8%)			
	49-54	138 (26.2%)			
	55-59	46 (8.7%)			
	60-64	22 (4.2%)			
		Total	**Female**	**Male**	**p**
Education (n=464)	Illiterate	6 (1.3%)	2 (4.0%)	4 (1.0%)	
	Literate	5 (1.1%)	0 (0.0%)	5 (1.2%)	
	Primary school graduate	272 (58.6%)	34 (68.0%)	238 (57.5%)	
	Secondary school graduate	59 (12.7%)	2 (4.0%)	57 (13.8%)	
	High school graduate	92 (19.8%)	5 (10.0%)	87 (21.0%)	
	Higher education	30 (6.5%)	7 (14.0%)	23 (5.6%)	
Smoking (n=526) (n, %)	Non-smoker	114 (21.7%)	35 (60.3%)	79 (16.9%)	<0.001
	Smoker	253 (48.1%)	17 (29.3%)	236 (50.4%)	
	Ex-smoker	159 (30.2%)	6 (10.3%)	153 (32.7%)	
Body Mass Index (n=435)	<18.5, underweight	2 (0.5%)	2 (4.2%)	0 (0.0%)	
	18.5-24.9, normal	114 (26.2%)	13 (27.1%)	101 (26.1%)	
	25-29.9, pre-obesity	199 (45.7%)	18 (37.5%)	181 (46.8%)	
	30-34.9, obesity class 1	99 (22.8%)	12 (25.0%)	87 (22.5%)	
	35-39.9, obesity class 2	19 (4.4%)	3 (6.3%)	16 (4.1%)	
	40 and above, obesity class 3	2 (0.5%)	0 (0.0%)	2 (0.5%)	
Body Mass Index (mean± SD)		27.7±4.1	27.4±4.9	27.7±4.0	>0.05
Chronic Diseases (n=526)	None	235 (44.7%)	9 (15.5%)	226 (48.3%)	
	1 chronic disease	144 (27.4%)	16 (27.6%)	128 (27.4%)	
	2 chronic diseases	96 (18.3%)	17 (29.3%)	79 (16.9%)	
	3 or more chronic diseases	51 (9.7%)	16 (27.6%)	35 (7.5%)	
Most Common Chronic Diseases	Hypertension	80 (15.2%)	14 (24.1%)	66 (14.1%)	
	Diabetes Mellitus	45 (8.6%)	6 (10.3%)	39 (8.3%)	
	Lumbar Disc Herniation	45 (8.6%)	8 (13.8%)	37 (7.9%)	
	Asthma	35 (6.7%)	11 (19.0%)	24 (5.1%)	
	Cervical Disc Herniation	31 (5.9%)	10 (17.2%)	21 (4.5%)	
	Peptic Ulcus	26 (4.9%)	5 (8.6%)	21 (4.5%)	
	COPD	23 (4.4%)	2 (3.4%)	21 (4.5%)	
	Meniscopathy	18 (3.4%)	4 (6.9%)	14 (3.0%)	
	Psychiatric Diseases	18 (3.4%)	8 (13.8%)	10 (2.1%)	
	Coronary Artery Disease	18 (3.4%)	3 (5.2%)	18 (3.4%)	
Chronic Diseases (median, min-max)		1 (0-6)	2 (0-4)	1 (0-7)	<0.001
Regular Drug Use (n=526)	None	307 (58.4%)	15 (25.9%)	292 (62.4%)	
	1 drug	79 (15.0%)	9 (15.5%)	70 (15.0%)	
	2 drugs	55 (10.5%)	11 (19.0%)	44 (9.4%)	
	3 or more drugs	85 (16.2%)	23 (39.7%)	62 (13.2%)	
Drugs Used Regularly (median, min-max)		0 (0-9)	2 (0-9)	0 (0-9)	<0.001

Table 2. Comparison of the sectors in which female and male older workers work

		Total	Male	Female	p
Sector	Ceramic manufacture	97 (18.4%)	97 (20.7%)	0 (0.0%)	<0.001
	Mining	83 (15.8%)	83 (17.7%)	0 (0.0%)	<0.001
	Metal manufacture	62 (11.8%)	61 (13.0%)	1 (1.7%)	0.008
	Concrete-cement-brick manufacture	52 (9.9%)	51 (10.9%)	1 (1.7%)	0.020
	Dental prosthesis laboratory	34 (6.5%)	31 (6.6%)	3 (5.2%)	>0.05
	Food production	29 (5.5%)	18 (3.8%)	11 (19.0%)	<0.001
	Textile	22 (4.2%)	13 (2.8%)	9 (15.5%)	<0.001
	Plastic manufacture	16 (3.0%)	10 (2.1%)	6 (10.3%)	0.005
	Construction	14 (2.7%)	14 (3.0%)	0 (0.0%)	>0.05
	Health services	13 (2.5%)	5 (1.1%)	8 (13.8%)	<0.001
	Electronic manufacture-automotive	11 (2.1%)	10 (2.1%)	1 (1.7%)	>0.05
	Chemistry	10 (1.9%)	9 (1.9%)	1 (1.7%)	>0.05
	Shipyard	10 (1.9%)	10 (2.1%)	0 (0.0%)	>0.05
	Transportation	9 (1.7%)	9 (1.9%)	0 (0.0%)	>0.05
	Wood manufacture	8 (1.5%)	8 (1.7%)	0 (0.0%)	>0.05
	Others	56 (10.6%)	39 (8.3%)	17 (29.3%)	

Table 3. Older workers' occupational diseases and work-aggravated diseases

Occupational Diseases (n= 372)*	**Total** (n=526)	**Male** (n=468)	**Female** (n=58)	**p**
Pneumoconiosis	131 (24.9%)	131 (28.0%)	0 (0.0%)	<0.001
Hearing loss	114 (21.7%)	113 (24.1%)	1 (1.7%)	<0.001
Upper extremity entrapment neuropathies	19 (3.6%)	12 (2.6%)	7 (12.1%)	0.002
Lumbar disc herniation	17 (3.2%)	16 (3.4%)	1 (1.7%)	>0.05
Upper extremity tendinitis	17 (3.2%)	12 (2.6%)	5 (8.6%)	0.030
Airway diseases (asthma, COPD)	17 (3.2%)	11 (2.4%)	6 (10.3%)	0.007
Cervical disc herniation	16 (3.0%)	10 (2.1%)	6 (10.3%)	0.005
Dermatitis	12 (2.3%)	8 (1.7%)	4 (6.9%)	0.034
Heavy metal intoxication	10 (1.9%)	10 (2.1%)	0 (0.0%)	>0.05
Other	19 (3.6%)	15 (3.2%)	4 (6.9%)	
Work-Aggravated Diseases (n=90)*	**Total**	**Male** (n=468)	**Female** (n=58)	**p**
Lumbar disc herniation	30 (5.7%)	22 (4.7%)	8 (13.8%)	0.011
Cervical disc herniation	15 (2.9%)	6 (1.3%)	9 (15.5%)	<0.001
Airway diseases (asthma, COPD)	14 (2.7%)	8 (1.7%)	6 (10.3%)	0.002
Allergic rhinitis	5 (1.0%)	1 (0.2%)	4 (6.9%)	0.001
Meniscopathy	5 (1.0%)	5 (1.1%)	0 (%0.0)	>0.05
Other	21 (4.0%)	13 (2.8%)	8 (13.8%)	

** Some of the patients were diagnosed with more than one work-related disease.*

in 2016, 21.8% in 2017, 24.8% in 2018, 17.3% in 2019, and 33.5% in 2020. The sociodemographic characteristics and overall health status data of the older workers are presented in Table 1. A total of 89.0% (468) of the patients were male. The median age of the patients was 48 years.

Among the 526 patients, 48.1% were identified as smokers, and 30.2% as ex-smokers. The prevalence

Table 4. Characteristics of the older workers diagnosed with certain work-related diseases

Work-Related Diseases	Sectors (n, %)	Age Group (n, %)	BMI (median, min-max)	Smoking Status (n, %)
Pneumoconiosis (131)	Mining (33, 25.2%), Ceramic manufacture (24, 18.3%), Metal manufacture (24, 18.3%), Dental prosthesis laboratory (15, 11.5%), Concrete-cement-brick manufacture (15, 11.5%)	45-49: 84 (64.1%) 50-54: 36 (27.5%) 55-59: 5 (3.8%) 55-64: 6 (4.6%)	26.8 (19.1-41.2)	Non-smoker: 14 (10.7%) Smoker: 72 (55.0%) Ex-smoker: 45 (34.4%)
Hearing loss (115)	Ceramic manufacture (40, 34.8%), Mining (20, 17.4%), Metal manufacture (19, 16.5%), Concrete-cement-brick manufacture (11, 9.6%), Shipyard (4, 3.5%), Dental prosthesis laboratory (3, 2.6%), Construction (3, 2.6%)	45-49: 72 (62.6%) 50-54: 33 (28.7%) 55-59: 8 (7.0%) 55-64: 2 (1.7%)	27.7 (19.8-39.5)	Non-smoker: 22 (19.1%) Smoker: 60 (52.2%) Ex-smoker: 33 (28.7%)
Lumbar disc herniation (47)	Food production (9, 19.1%), Ceramic manufacture (7, 6.1%), Health services (5, 10.6%), Metal manufacture (5, 10.6%), Construction (4, 8.5%), Textile (3, 6.4%), Concrete-cement-brick manufacture (3, 6.4%)	45-49: 35 (74.5%) 50-54: 10 (21.3%) 55-59: 1 (2.1%) 55-64: 1 (2.1%)	27.6 (21.2-37.4)	Non-smoker: 14 (29.8%) Smoker: 21 (44.7%) Ex-smoker: 12 (25.5%)
Cervical disc herniation (31)	Food production (5, 16.1%), Health services (3, 9.7%), Ceramic manufacture (3, 9.7%), Metal manufacture (3, Non-smoker: Smoker: Ex-smoker: 9.7%), Concrete-cement-brick manufacture (2, 6.5%)	45-49: 23 (74.2%) 50-54: 7 (22.6%) 55-59: 1 (3.2%) 55-64: 0 (0.0%)	25.5 (18.4-39.8)	Non-smoker: 9 (29.0%) Smoker: 18 (58.1%) Ex-smoker: 4 (12.9%)
Airway diseases (asthma, COPD) (31)	Textile (6, 19.4%), Food production (6, 19.4%), Metal manuacture (4, 12.9%), Plastic manufacture (4, 12.9%), Wood manufacture (3, 9.7%)	45-49: 22 (71.0%) 50-54: 5 (16.1%) 55-59: 2 (6.5%) 55-64: 2 (6.5%)	27.7 (18.4-37.0)	Non-smoker: 17 (54.8%) Smoker: 7 (22.6%) Ex-smoker: 7 (22.6%)
Upper extremity entrapment neuropathies (22)	Metal manufacture (4, 18.2%), Food production (3, 13.6%), Health services (2, 9.1%), Electronic manufacture - automotive (2, 9.1%)	45-49: 10 (45.5%) 50-54: 10 (45.5%) 55-59: 1 (4.5%) 55-64: 1 (4.5%)	27.1 (19.5-39.8)	Non-smoker: 4 (18.2%) Smoker: 13 (59.1%) Ex-smoker: 5 (22.7%)
Upper extremity tendinitis (19)	Health services (4, 21.1%), Textile (3, 15.8%), Ceramic manufacture (3, 15.8%), Metal manufacture (2, 10.5%)	45-49: 15 (78.9%) 50-54: 3 (15.8%) 55-59: 1 (5.3%) 55-64: 0 (0.0%)	27.4 (23.6-33.1)	Non-smoker: 6 (31.6%) Smoker: 8 (42.1%) Ex-smoker: 5 (26.3%)
Dermatitis (13)	Mining (2, 15.4%), Transportation (2, 15.4%)	45-49: 11 (84.6%) 50-54: 2 (15.4%) 55-59: 0 (0.0%) 55-64: 0 (0.0%)	25.5 (21.4-31.6)	Non-smoker: 2 (15.4%) Smoker: 8 (61.5%) Ex-smoker: 3 (23.1%)
Heavy metal intoxication (10)	Metal manufacture (5, 50.0%), Electronic manufacture-automotive (3, 30.0%)	45-49: 7 (70.0%) 50-54: 3 (30.0%) 55-59: 0 (0.0%) 55-64: 0 (0.0%)	26.8 (24.2-39.5)	Non-smoker: 1 (10.0%) Smoker: 8 (80.0%) Ex-smoker: 1 (10.0%)

of never-smokers was significantly higher among women compared to men ($p<0.001$). Out of the 435 individuals with available height and weight data, 73.4% had a body mass index (BMI) equal to or exceeding 25. No statistically significant difference was observed in the BMIs between female and male older workers ($p>0.05$) (Table 1).

Based on the self-reported medical histories, 55.3% of older workers reported having at least one chronic disease. Among those with chronic diseases, the median number of diseases was 2 (range: 1-7). Furthermore, 41.8% of the older workers regularly took at least one medication, with a median number of 2 drugs (range: 1-9). Female older workers exhibited a significantly higher number of chronic diseases and regularly used medications compared to their male counterparts ($p<0.001$ for both). The prevalent chronic diseases reported by the participants included hypertension (15.2%), diabetes mellitus (8.6%), lumbar disc herniation (8.6%), asthma (6.7%), and cervical disc herniation (5.9%) (Table 1).

When evaluated based on their present or most recent job, 79.3% of the workers were involved in the industrial sector, and 20.7% worked in the service sector. In the case of patients referred from the industrial sector, the majority (92.6%) were male workers, whereas in applications from the service

sector, the male proportion was 75.2%. The most common sectors of employment were ceramic manufacture (18.4%), mining (15.8%), and metal manufacture (11.8%). Moreover, a significant gender disparity was observed, with male older workers showing a higher frequency of employment in the ceramic manufacture, mining, metal manufacture, and cement-brick manufacture sectors, while female older workers had a higher frequency in the food production, textile, plastic, and healthcare sectors (Table 2).

In the occupational medicine clinic, 328 (62.4%) out of 526 older workers were diagnosed with work-related diseases through council evaluations. A total of 372 occupational diseases (90.9% male, 9.1% female) and 90 work-aggravated diseases (61.1% male, 38.9% female) were diagnosed among these 328 workers. A certain number of the patients were diagnosed with more than one work-related disease. Pneumoconiosis (131, 24.9%), hearing loss (114, 21.7%), and upper-extremity entrapment neuropathies (19, 3.6%) were the most prevalent occupational diseases. Additionally, lumbar disc herniation (30, 5.7%), cervical disc herniation (15, 2.9%), and airway diseases (13 asthma, 1 COPD, 2.7%) were the most common work-aggravated diseases (Table 3).

Among occupational diseases, the diagnoses of pneumoconiosis and hearing loss were found to be significantly more common in male older workers ($p<0.001$), while upper extremity entrapment neuropathies, upper extremity tendinitis, CDH and dermatitis were diagnosed more frequently in female older workers ($p<0.05$). In terms of work-aggravated diseases, cervical disc herniation ($p<0.001$), lumbar disc herniation, airway diseases, and rhinitis ($p<0.05$) were found to be significantly more common among women (Table 3).

Table 4 presents the sectors in which work-related diseases were most prevalent among older workers. In our study, it was determined that the sectors with the highest prevalence of pneumoconiosis and occupational hearing loss diagnoses were mining and ceramic manufacture. Additionally, metal manufacture and food production were the sectors where occupational upper-extremity entrapment neuropathies were most frequently diagnosed.

DISCUSSION

The majority of the older workers in the study worked in the industrial sector (79.3%). In Turkey, 64.2% of the employed population over the age of 65 years worked in agriculture, 27.7% in services, 6.1% in industry, and 2.0% in construction in 2020 (8). Although older workers work intensively in the agricultural sector in Turkey, there were no applications from the agricultural sector to the occupational medicine clinic. This situation may be explained by the fact that agricultural activities in Turkey are predominantly carried out in the form of family businesses, and self-employed workers are outside the scope of Occupational Health and Safety Law No. 6331, one of the main regulations in the field of occupational health and safety (10).

Tobacco smoking and obesity are among the major modifiable risk factors for chronic diseases, and are responsible for nearly one in five and one in ten deaths in US adults, respectively (11). High rates of obesity and smoking observed among the participants of the study indicate the necessity for the implementation of health-promoting policies for older workers, both on a national and workplace scale. Furthermore, the significance of fostering healthy lifestyle practices within the workplace has been increasingly recognized, not only for protecting the well-being of older workers but also for enhancing overall productivity by reducing absenteeism and presenteeism (2). Although studies addressing workplace health promotion actions for older workers were found to be few and generally of poor quality (12), there are also effective interventions that have been shown to improve the efficiency of older workers (13, 14).

More than half of the older workers in our study have at least one chronic disease. The most common chronic diseases were hypertension, diabetes mellitus, and lumbar disc herniation. Our results regarding chronic diseases are compatible with the overall health status of the older population in our country. In a study conducted in Turkey, the rate of having any chronic disease lasting more than six months was 38.4% in the 45-64 age group. The most common chronic diseases in the 45-64 age group were lumbar musculoskeletal disorders (16.6%), hypertension (16.3%), gastric ulcer (12.2%), rheumatic joint diseases (10.2%), osteoarthritis (10.1%), diabetes (8.2%) and cervical musculoskeletal disorders (7.1%) (15). According to the 2012 US National Institute of Occupational Health and Safety data, the most common chronic diseases in older workers were hypertension (58%), hyperlipidemia (45%), heart diseases (31%), arthritis

(29%) and diabetes (28%) (16). Chronic health conditions are a major economic burden for society owing to increased healthcare costs, decreased productivity, and absenteeism. Consequently, the significance of prevention, early detection, and ongoing monitoring of chronic diseases within the workplace has intensified, particularly as the population of older workers continues to grow.

In our study, respiratory system diseases, musculoskeletal diseases, and hearing loss were found to be the most common work-related diseases among older workers, and the distribution pattern was similar to that of general occupational diseases in Turkey (17). Occupational diseases, which are common in each sector, should be a guide in terms of the precautions to be taken in these areas. Due to the lack of referrals from the agricultural sector, data on the occupational diseases of older workers employed in this sector could not be obtained. Some of the most frequent hazards in agriculture are hazardous chemicals such as pesticides, carcinogenic agents such as UV radiation, zoonotic diseases, confined spaces such as silos, ergonomic hazards and extreme temperatures due to weather conditions (18). The inability of agricultural workers to access occupational health services may fail to identify health problems stemming from these risk factors and the inability to take preventive measures for these risk factors. This lack of access among agricultural workers may also create a void in data impeding the development of evidence-based occupational health policies.

Concerning the diagnosis of occupational diseases, stakeholders have various responsibilities concerning prevention, early detection, and post-diagnosis regulation. These responsibilities encompass identifying risk factors and implementing necessary preventive measures through workplace risk assessments, facilitating timely diagnoses through periodic health examinations and referrals to occupational medicine specialists, and effective management of workers diagnosed with occupational diseases within the workplace. Aging is often accompanied by a decline in physical and mental functions, as well as reduced adaptability to challenging external conditions. Consequently, these physiological effects of aging on individuals should be taken into account during workplace risk assessments. It is crucial to accommodate older workers in the workplace to retain their participation in the workforce. Older workers also provide financial benefits to the workplace in terms of lower staff turnover rates, lower recruitment costs, and greater benefits from training interventions (19). There are examples of successful interventions to support older workers in the workplace on health checks and counseling for workers at the individual level, interventions grounded on screening results, and enhancements to the work environment or organizational structure (20). Qualitative research from the Netherlands reveals barriers to supporting workers with chronic conditions to stay at work. Some of the identified barriers are negative organizational attitudes towards employees with chronic conditions, employees' hesitancy in engaging with employers to deal with work-related problems, lack of skills and knowledge of how to support employees with chronic conditions, and occupational physicians' lack of time and capacity for prevention (21).

Nine out of every ten older workers who applied to the occupational medicine clinic were male. The labor participation rate for women aged 15 and over is considerably lower than that for men in Turkey (32.8% and 70.3%, respectively) (22), and many women work in the informal economy (23). In our study, 90.9% of occupational diseases and 61.1% of work-aggravated diseases were identified in male older workers. The distribution of occupational diseases by sex was in line with the sex distribution of the applicants. In 2020, the majority of reported occupational diseases in Turkey, accounting for 79.7% of the total 908 cases, were observed among male individuals (17). According to Netherlands 2017 statistics, occupational diseases were reported most frequently in the 41-60 age group. Of a total of 4619 reported occupational diseases, approximately 20% were detected in men aged 51-60 years and approximately 15% in women aged 51-60 years. In all age groups, the proportions of men and women in occupational disease diagnoses were similar (24). An evident disparity was observed in gender distribution in clinic applications, occupational disease diagnoses in our study, and nationwide data on occupational diseases in Turkey. The fact that women mostly work in family businesses, in the agricultural sector, and in the informal economy prevents them from benefiting from occupational health and safety services and also creates a barrier to being diagnosed with work-related diseases. The negative impact of this situation may be greater in the older female workers group, in which chronic health problems are more common.

The male older workers in our study were more likely to work in the ceramics, mining, metal, and cement-brick sectors, which are known to have high rates of occupational hazards such as exposure to dust, chemicals, and noise. This may explain why pneumoconiosis and hearing loss were more frequently diagnosed in male workers. Conversely, female workers were more likely to work in the food, textile, plastic, and healthcare sectors. These sectors have different types of hazards such as repetitive movements and exposure to chemicals which explains why upper neuropathy, upper tendinitis, CDH, and dermatitis were found to be more common among female workers.

The data of the study were collected from a single source, an occupational health outpatient clinic in Turkey, thus our results may not be generalizable to all older workers in Turkey. Another constraint in terms of generalization is linked to the study's exclusive examination of older workers who were referred to the clinic for further assessment either by their workplaces or the Social Security Institute due to suspected work-related medical conditions. Therefore, our findings may not be representative of the broader population of older workers. The median age is observed to be 48 in the study, which may mean a limited representation of older worker groups with a more diverse age distribution. One of the strengths of our study lies in the fact that the data were obtained from one of the most experienced and longest-serving occupational disease clinics in Turkey. Additionally, considering the limited number of studies on occupational diseases among elderly workers in Turkey, our results are anticipated to provide insights into work-related diseases observed in older workers in Turkey.

CONCLUSION

The high rates of smoking and obesity observed in this study highlight the need for health promotion activities in the workplace. The result that over half of the older workers had at least one chronic disease reveals the importance of regular chronic disease follow-ups in the workplace. The absence of referrals from the agricultural sector underscores the need to enhance access to occupational health services for older workers engaged in this sector. The most frequently diagnosed work-related diseases were pneumoconiosis and hearing loss in male older workers, while musculoskeletal disorders were diagnosed more frequently in female older workers. Appropriate occupational health and safety measures should be taken in workplaces regarding common occupational diseases and associated risk factors in certain sectors.

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REFERENCES

1. Republic of Turkey Ministry of Family and Social Services, General Directorate of Services for Persons with Disabilities and the Elderly. Bulletin of disabled and elderly statistics. Ankara, Turkey, 2022 [Internet]. Available from: https://www.aile.gov.tr/media/115108/eyhgm_istatistik_bulteni_temmuz2022.pdf (in Turkish).
2. CDC National Center for Chronic Disease Prevention and Health Promotion. Older employees in the workplace. 2012. Issue Brief No. 1 [Internet]. Available from: https://www.cdc.gov/workplacehealthpromotion/tools-resources/pdfs/issue-brief-no-1-older-employees-in-workplace-07122012.pdf
3. International Labour Office. ILO Recommendation R162 – Older Workers Recommendation (1980) [Internet]. Available from: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:R162
4. Brun E, Milczarek M. European risk observation report 5: expert forecast on emerging psychosocial risks related to occupational safety and health. European Agency for Safety and Health at Work [Internet]. Available from: https://osha.europa.eu/en/publications/report-expert-forecast-emerging-psychosocial-risks-related-occupational-safety-and
5. Runge K, van Zon SKR, Bültmann U, Henkens K. Transitioning out of work and metabolic syndrome incidence: a longitudinal study among 13 303 older workers from the lifelines cohort

study and biobank. J Epidemiol Community Health 2022;76(9):779-785.
6. Rohwedder S, Willis RJ. Mental retirement. J Econ Perspect 2010;24(1):119-138.
7. Republic of Turkey Ministry of European Union. Factsheet on 2012 European year for active aging and ıntergenerational solidarity. Ankara, Turkey, 2011 [Internet]. Available from: https://www.ab.gov.tr/files/SBYPB/Sosyal%20Politika%20ve%20%C4%B0stihdam/aktif_yaslanma_bilgi_notu.pdf (in Turkish).
8. Turkish Statistical Institute. Elderly statistics 2020 [Internet]. Available from: https://biruni.tuik.gov.tr/yayin/views/visitorPages/index.zul (in Turkish).
9. Social Insurance and General Health Insurance Law (2006) [Internet]. Available from: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.5510-20120101.pdf (in Turkish).
10. Occupational Health and Safety Law (2012) [Internet]. Available from: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf (in Turkish).
11. Danaei G, Ding EL, Mozaffarian D, et al. The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors. PLoS Med 2009;6(4):e1000058.
12. Pitt-Catsouphes M, James JB, Matz-Costa C. Workplace-based health and wellness programs: the intersection of aging, work, and health. The Gerontologist 2015;55(2):262-270.
13. Centers for Disease Control and Prevention. Worksite health 101: making the case for worksite health [Internet]. Available from: https://www.cdc.gov/workplacehealthpromotion/tools-resources/pdfs/nhwp-wh101-making-the-case-07172012.pdf
14. Hughes SL, Seymour RB, Campbell RT, et al. Comparison of two health-promotion programs for older workers. Am J Public Health 2011;101(5):883-890.
15. Çağlayan Ç, Etiler N. Advanced analysis of 2010 health survey the health of older workers [Internet]. Available from: https://www.academia.edu/27698111/T%C3%9CRK%C4%B0YEDE_YA%C5%9ELI_C4%B0%C5%9E%C3%87%C4%B0LER%C4%B0N_SA%C4%9ELI%C4%9EI (in Turkish).
16. White MS, Burns C, Conlon HA. The impact of an aging population in the workplace. Workplace Health Saf 2018;66(10):493-498.
17. Turkish Statistical Institute. Turkish Statistical Institute Statistics of 2020 [Internet]. Available from: https://www.sgk.gov.tr/Istatistik/Yillik/fcd5e59b-6af9-4d90-a451-ee7500eb1cb4/ (in Turkish).
18. International Labour Office. Safety and health in agriculture. Geneva, Switzerland. 2000 [Internet]. Available from: https://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/publication/wcms_110193.pdf
19. Goodall H, Evans J. Older worker. In: Palmer KT, Brown I, Hobson J, editors. Fitness for Work the Medical Aspects, 5th ed. United Kingdom: Oxford University Press; 2013.p.525-551.
20. Söderbacka T, Nyholm L, Fagerström L. Workplace interventions that support older employees' health and work ability - a scoping review. BMC Health Serv Res 2020;20(1):472.
21. Bosma AR, Boot CRL, Snippen NC, et al. Supporting employees with chronic conditions to stay at work: perspectives of occupational health professionals and organizational representatives. BMC Public Health 2021;21(1):592.
22. Turkish Statistical Institute. Labor force statistics 2021 [Internet]. Available from: https://data.tuik.gov.tr/Bulten/Index?p=%C4%B0%C5%9Fg%C3%BCc%C3%BC-%C4%B0statistikleri-2021-45645&dil=1#:~:text=%C4%B0%C5%9Fg%C3%BCc%C3%BC%202021%20y%C4%B1l%C4%B1nda%20bir%20%C3%B6nceki,ise%20%32%2C8%20oldu (in Turkish).
23. International Labour Office Ankara. Promoting gender equality in the world of work [Internet]. Available from: https://www.ilo.org/ankara/projects/gender-equality/lang--en/index.htm#:~:text=Women%20constitute%20almost%20half%20of,Turkish%20Statistical%20Institute%20(TU%C4%B0K
24. Occupational diseases in 2017 (poster) [Internet]. [Accessed date: 8 October 2022]. Available from: https://www.occupationaldiseases.nl/sites/default/files/documents/Statistics-on-Occupational-Diseases-2018_infographic.pdf