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RESEARCH

NEUROMUSCULOSKELETAL CAUSES OF SEVERE DISABILITY IN A TERTIARY HOSPITAL IN TURKEY

Abstract

Introduction: Aging of the population leads to an increasing number of older people with a severe disability, in need of long-term care, which is a major public health problem. Herein, we attempted to find out the main pathologies that cause severe disability, including neuromusculoskeletal disability, in elderly and young adults.

Materials and Method: In this descriptive observational study, we retrospectively reviewed the medical records of 20,790 subjects admitted to the Health Council of the İzmir Atatürk Training and Research Hospital over the last two years. Subjects identified as severely disabled and >18 years old were in§cluded. Age- (19–64 or 65+ years) and gender-specific causes of severe disability were identified.

Results: Overall, 1,117 (631 female, 486 male) subjects were severely disabled. Mean age was 65.9±18.1 years; 60% were >65 years old. Main pathologies leading to severe disability were nervous system (61%), eye (11%), mental and behavioral (9.3%), musculoskeletal (8.4%), neoplasms (2.8%), respiratory (2.7%) and other diseases. Distribution of the pathologies were statistically different between age subgroups ($p<0.001$), but not between gender subgroups ($p>0.05$). Dementia and stroke were the most frequent neurological conditions. Knee osteoarthritis was the leading musculoskeletal cause of severe disability.

Conclusion: This study may provide a baseline indication of pathologies commonly causing severe disability. Most severely disabled subjects were female and of older age. Neurological diseases were the most frequent causes of severe disability. Preventive and rehabilitative health service planning should be undertaken to decrease the disability caused by these conditions.

Keywords: Disability; Aged; Adult; Turkey

ARAŞTIRMA

TÜRKİYE'DE BİR ÜÇÜNCÜ BASAMAK BİR HASTANEDE AĞIR YETİ YİTİMİNİN NÖROMUSKULOSKELETAL SEBEPLERİ

Öz

Giriş: Nüfusun yaşlanması, artan sayıda, ağır yeti yitimi olan, uzun süreli bakım gerektiren ileri yaştaki populasyona neden olur ve büyük bir halk sağlığı problemidir. Bu çalışmada yaşlı ve genç erişkin popülasyonda ağır yeti yitimine neden olan genel ve nöromusküler ana patolojileri belirlemek amaçlanmıştır.

Gereç ve Yöntem: Bu tanımlayıcı gözlemsel çalışmada son iki yılda İzmir Atatürk Eğitim ve Araştırma Hastanesi sağlık kuruluna başvuran 20,790 hastanın tıbbi kayıtları retrospektif olarak incelenmiştir. Ağır yeti yitimi olarak tanımlanan 18 yaş üzeri vakalar çalışmaya dahil edilmiştir. Yaş (19-64 yaş ve 65 yaş ve üzeri) ve cins spesifik ağır yeti yitimi sebepleri belirlenmiştir.

Bulgular: Toplamda 1,117 (631 kadın, 486 erkek) ağır yeti yitimi olan hasta saptanmıştır. Ortalama yaş 65.9±18.1 yıl idi. Vakaların %60'ı 65 yaş ve üzeri idi. Ağır yeti yitimine sebep olan ana patolojiler sinir sistemi (%61), göz (%11), ruhsal ve davranışsal (%9.3), kas iskelet (%8.4), neoplazmlar(%2.8), solunum (%2.7) ve diğer daha seyrek görülen hastalıklar idi. Patolojilerin dağılımı yaş grupları arasında farklılık gösterirken($p<0.001$) cinsiyet açısından farklılık saptanmamıştır. Demans ve strok ağır yeti yitimine en sık sebep olan nörolojik hastalıklardı. Diz osteoartriti ağır yeti yitimine en sık neden olan kas iskelet patolojisi idi.

Sonuç: Bu araştırma yaşlı ve genç erişkinlerde ağır yeti yitimine neden olan en sık patolojiler konusunda bir temel oluşturabilir. Ağır yeti yitimi olanların çoğu kadınlar ve ileri yaşlı popülasyondu. Ağır yeti yitiminin en sık sebepleri nörolojik hastalıklar özellikle demans ve strok idi. Bu hastalıklara bağlı yeti yitimini azaltmaya yönelik önleyici ve rehabilitatif sağlık planlamaları yapılmalıdır.

Anahtar sözcükler: Yeti yitimi; Yaşlı; Erişkin; Türkiye

INTRODUCTION

Population aging, accompanied by both increased longevity and increasing disability, is an issue of concern in Turkey and internationally. However, there are few studies that have analyzed the potential determinants of disability. Disability presents according to varying severity levels. Hospitalization rates, home care visits, admission to nursing homes, and death all increase with increasing disability severity level, and result in higher overall disability costs, health-related expenditure, and assistance with daily care and transportation costs (1). To establish strategies to reduce disability, it is essential to define the diseases that cause severe disability.

The World Health Survey estimates that 110 million people (2.2% of the global population) have significant difficulties in functioning. The Global Burden of Disease Study estimates that 190 million people (3.8% of the global population) have "severe disability." The severe disability rate increases to 10.2% in patients aged ≥60 years (2). A stable prevalence of severe (2–3%) disability was observed in the Belgian population between years 1997 and 2008 (3).

Turkey can be classified as an upper/middle income country, although the socioeconomic, geographic, and ethnic characteristics of its regions vary. The Turkish Statistical Institute declared the prevalence of total disability in 2002 to be 12.29% (4). Few studies have been performed with the Turkish population regarding the causes of various levels of disability (5,6). Izmir is the third most populated city of Turkey, located in the south-west part of the country (7).

This study aimed to define the neuromusculoskeletal causes of severe disability, according to age and gender, in a tertiary hospital in Izmir, Turkey.

MATERIALS AND METHOD

Subjects

In this descriptive observational study, the medical records of 20,790 subjects admitted to the Izmir Atatürk Training and Research Hospital Health Council to obtain a health certificate over the last two years, were reviewed retrospectively. Subjects were included in the study using a consecutive sampling method. We did not obtain informed consent in this retrospective chart review because all data analysed were collected as part of routine diagnosis and treatment and the sample size was too large to contact all individuals. The study protocol was approved by the Ethics Committee of the Izmir Atatürk Training and Research Hospital.

Reasons for application to the Health Council were to obtain a health report for candidacy for several academies and professions, move to elderly care centers, obtain a driving license, receive disability benefits like tax discounts, nursing services at home, financial support, and be included in the disabled people employment quota. Of those, the records of only subjects who applied to receive disability benefits like tax discounts, nursing services at home, and financial support, and inclusion in the disabled people employment quota, were then reviewed. Patients>18 years old, who were labeled as severely disabled, and who had complete medical records were included in the analysis. Of the 20,790 medical records, 1,168 subjects were labeled severely disabled and considered eligible for inclusion in the study. Twenty-five subjects were excluded because of their incomplete medical records. Twenty-six cases who were ≤18 years old were excluded. In total, 1,117 subjects were included in the analysis.

Definition of severe disability

Total body disability rating and disability severity were determined by a health board that included physicians in a tertiary center specializing in internal medicine, ophthalmology, ear-nose-throat, general surgery or orthopedics, neurology and psychiatry, physical medicine, and rehabilitation. The Balthazar formula was used to identify a given subject's total body disability rating. The International Classification of Functioning, Disability and Health developed by the World Health Organization has

been used as a classification system in studies of disabled individuals (8).

Severe disabilities were defined using the Council of Ministers' "Regulation on disability criteria, classification and medical commission reports given to disabled people," published on December 16, 2010 in the Official Gazette of the Republic of Turkey, issue number 27787.

Subjects with a disability rating over 50%, who were not able to care for themselves (feeding, dressing, bathing, etc.) and were not able to move and/or communicate without help were defined as "severely disabled" (9).

Data analysis

Severely disabled subjects were divided into two groups: 19–64 years old (Group 1) and ≥65 years old (Group 2). The condition with the highest disability rating was assumed to be the subject's main pathology that caused their severe disability, and was categorized according to ICD-10 codes (10). The pathologies leading to neuromusculoskeletal disability were considered diseases of the nervous system (ICD-10 codes G00-G99) and musculoskeletal and connective tissue system (ICD codes M00–M99). Age (19–64 or 65+ years) and gender-specific causes of severe disability were identified.

Statistical analysis

Descriptive analyses of the data were performed using Statistical Package for the Social Sciences (SPSS) for Windows Version 15. All data were reported in the form of mean±standard deviation. For the quantitative data, we used t-tests to compare groups with normally distributed parameters. Pearson's chi-square test was performed to compare the qualitative data. Statistical significance was set at $p<0.05$. Gender was tested as a confounder variable. No statistically significant differences were observed in the distribution of main pathologies according to gender. As such, gender was not thought to be a confounder variable, and no adjustments were made.

RESULTS

One thousand one hundred-seventeen subjects (631 female, 486 male), were classified as severely disabled. The mean age was 65.9±18.1 years. The mean total disability rating was 88.7±9.

Severely disabled subjects were more commonly female (56.5% of the sample) and elderly (60% of the sample). The female to male ratio differed between age groups ($p<0.001$). Among severely disabled elderly, the rate of females (%67.4) was higher than males (%32.6). In the 19–64 years age group, the rate of severely disabled males (%59.8) was higher than females (%40.2).

The distribution of common pathologies was found to be statistically different between the 19–64 and 65+ years age subgroups ($p<0.001$), but not between the gender subgroups ($p>0.05$). The distribution of pathologies causing severe disability in the age and gender subgroups is displayed in Table 1 and Figure 1.

Neurological diseases were the leading cause of severe disability. In 681 (283 males, 398 females) subjects with diseases of the nervous system, 67.1% were ≥65 years old. Neurological conditions were dementia (n=332), stroke (n=235), spinal cord injury (n=72), Parkinson's disease (n=44), aphasia (n=39), epilepsy (n=28), cerebral palsy (n=13), polio (n=13), multiple sclerosis (n=10), traumatic brain injury (n=7) and others.

Ninety-four subjects (9.3% of the total sample; 27 males, 67 females) had musculoskeletal system and connective tissue diseases that cause severe disability. Seventy subjects (74.5% of the total sample) were ≥65 years old. The mean age of the patients was 73.95±14.82 years. Musculoskeletal system and connective tissue diseases were knee osteoarthritis (n=42), arthroplasty (n=15), inflammatory joint diseases including Rheumatoid arthritis, Ankylosing Spondylitis and Behcet's disease (n=13), hip fracture (n=13), amputation (n=12), hip osteoarthritis (n=7),

lower back problems (n=6) and other less frequent diseases. The first three most frequent causes of neurological and musculoskeletal and connective tissue diseases are shown in Table 2.

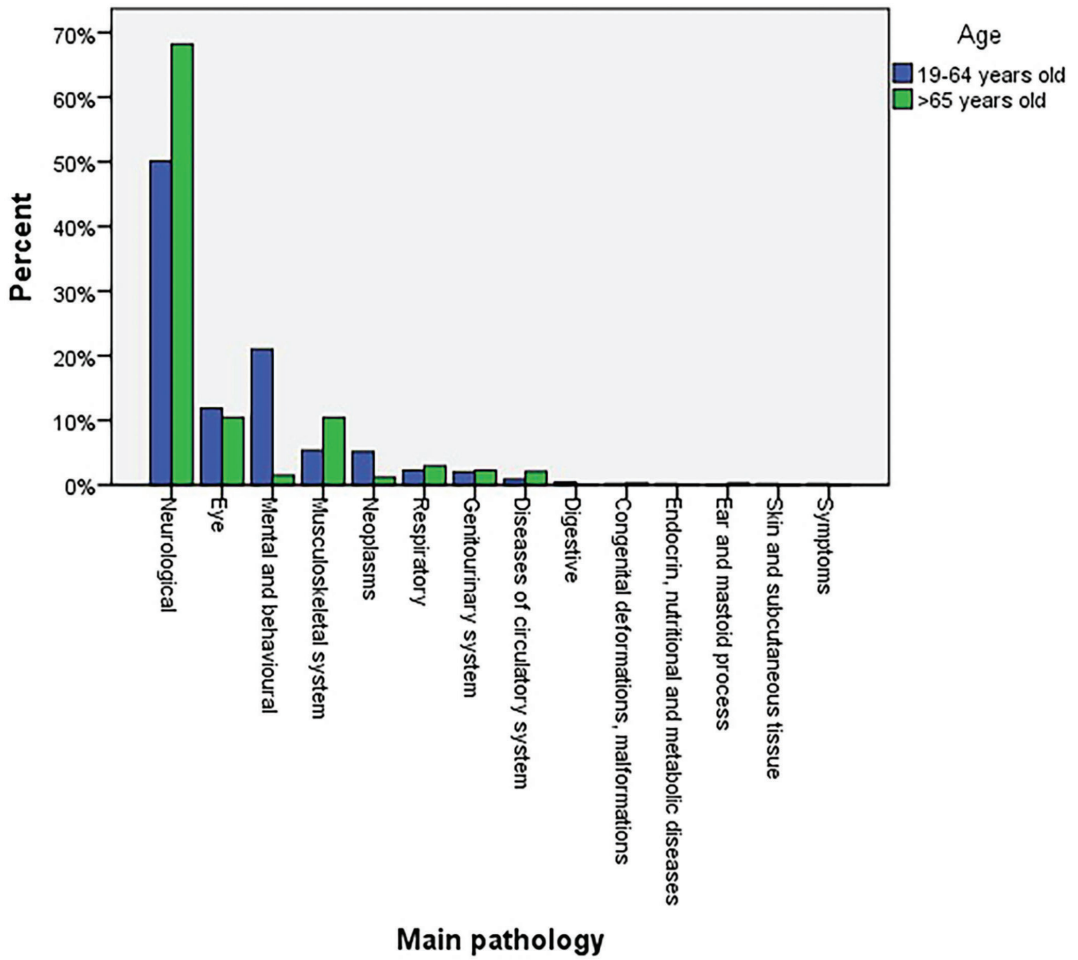

Figure 1. Distribution of the main pathologies that cause severe disability in age groups (19-64 vs 65+).

DISCUSSION

The number of people with disabilities is growing, because worldwide populations are aging and older people are at higher risk of severe disability (11). This study aimed to determine the pathologies that cause severe disability and investigate whether the distribution of causative pathologies were different between age and gender subgroups. The medical records of subjects admitted to a Health Council to obtain a health certificate were reviewed in a tertiary hospital in Izmir, Turkey. The results showed that females and elderly were more likely to be severely disabled. In the elderly group with severe disability, the rate of females was higher than males. This is consistent with the findings of previous literature.

Table 1. Distribution of the leading diseases that cause severe disability in gender and age subgroups.

Pathologies ICD-10 codes	Groups						
	19-64years old			65+ years old			Total
	M N(%)	F N(%)	Total N(%)	M N(%)	F N(%)	Total N(%)	N(%)
Neurological G00-G99	134(52.5%)	90(46.9%)	224(50.1%)	149(64.5%)	308(70.2%)	457(68.2%)	681(61%)
Eye diseases H00-H59	28(11%)	25(13)	53(11.9%)	33(14.3%)	37(8.4%)	70(10.4%)	123(11%)
Mentaland behavioral F00-F99	50(19.6%)	44(22.9%)	94(21%)	4(1.7%)	6(1.4%)	10(1.5%)	104(9.3%)
Musculoskeletal and connective tissue M00-M99	9(3.5%)	15(7.8%)	24(5.4%)	18 (7.8%)	52(11.8%)	70(10.4%)	94(8.4%)
Neoplasm C00-D48	11(4.3%)	12(6.3%)	23(5.1%)	28(0.9%)	6(1.4%)	8(1.2%)	31(2.8%)
Respiratory J00-J99	7(2.7%)	3(1.6%)	10(2.2%)	11(4.8%)	9(2.1%)	20(3%)	30(2.7%)
Genitourinary N00-N99	7(2.7%)	2(1%)	9(2%)	5(2.2%)	10(2.3%)	15(2.2%)	24(2.1%)
Circulatory system I00-I99	3(1.2%)	1(0.5%)	4(0.9%)	7(3%)	7(1.6%)	14(2.1%)	18(1.6%)
Digestive K00-K93	2(0.8%)	-(-)	2 (0.4%)	1(0.4%)	0(0%)	1(0.1%)	3(0.3%)
Congenital deformations, malformations Q00-Q99	1(0.4%)	-(-)	1(0.2%)	1(0.4%)	1(0.2%)	2(0.3%)	3(0.3%)
Endocrine E00-E90	1(0.4%)	-(-)	1(0.2%)	-(-)	1(0.2%)	1(0.1%)	2(0.2%)
Ear and mastoid process H60-H95				-(-)	2(0.5%)	2(0.3%)	2(0.2%)
Skin and subcutaneous tissue L00-L99	1(0.4%)	-(-)	1(0.2%)				1(0.1%)
Other							1(0.1%)
Total (%)	255 (100%)	192(100%)	447(100%)	231(100%)	439(100%)	670(100%)	1117(100%)
p			0.333			0.096	
						<0.001*	

*Statistically significant

Table 2. First three most common neurological and musculoskeletal causes of severe disability.

Rank of diseases	19-64 years old n=447	≥65 years old n=670	Total n=1117
Neurological			
1st rank	Stroke	Dementia	Dementia
2nd rank	Spinal cord injury	Stroke	Stroke
3rd rank	Dementia	Parkinson's disease	Spinal cord injury
Musculoskeletal			
1st rank	Amputation, Inflammatory	Knee osteoarthritis	Knee osteoarthritis
2nd rank	diseases* Knee	Arthroplasty **	Arthroplasty
3rd rank	osteoarthritis,	Hip fracture	Inflammatory disease

*Inflammatory joint diseases (Rheumatoid arthritis, Ankylosing Spondylitis, Behcet's disease)
**Hip and/or Knee arthroplasty

From 60 years and older, more than half the subjects were reported to have severe or worse disability. Severe disability was more common with increasing age (12). In Turkey, although disability studies exist, the prevalence and causes of severe disability have not been well-defined. According to data from the Turkish Statistical Institute Statistical Yearbook 2015, the rate of patients >15 years old who are not able to care for themselves, as defined by their performance in various domains of daily activities (feeding, dressing, bathing, ability to move freely, etc.) was 2.8–3.8%. The proportion of subjects who had difficulties with mobility (for example, who cannot walk without help from another person) was 7.3%, and 75.5% of subjects >65 years old. The current population aged >65 years old is 5.9 million (approximately 8% of the total population) in Turkey, and has been projected to reach over 8.5 million (approximately 10% of the total population) in 10 years' time, which may lead to an increased number of elderly people with severe disability in the future (13).

Females, people in the poorest wealth quintile, and older people had a higher prevalence of disability across all countries (2). In many studies, dependence is reported to be more common among females, and increases with age. Greater longevity and comorbidity in females, and the higher mortality experienced by older males compared to females, may be the causes of this gender difference (14).

Distribution of diseases that cause severe disability

Across all disability severity levels and all age groups, back and neck pain were among the most prevalent diseases in males and females (2,3), but the distribution of diseases that cause severe disability differed. In many studies, neurological disorders have been found to contribute most to severe disability (3,5,15). This is consistent with the findings of our study.

There are few studies that have evaluated the distribution of diseases that cause severe disability in our country. Kıvanç et al. (5) reported a study based on Health Council medical records of subjects >64 years old from the Erzurum region of Turkey. The most common disabilities were neurological and those resulting from eye diseases, consistent with the findings of our study.

Neurological diseases

In this study, the most common neurological diseases causing severe disability were dementia, stroke, and spinal cord injury, in decreasing order of frequency.

The absolute number of dementia cases increases with increasing life expectancy (12). Among dependent elderly people, the prevalence of dementia has been reported to be 49–73% (16) and has been found to be highly predictive of severe/extreme disability in those aged ≥75 years (17). Advances in the prevention and treatment of aging-related diseases, such as dementia and Alzheimer's disease, should improve the health of and reduce disability in older-age people.

Stroke was reported to be among the most disabling diseases, with a higher degree of disability than other neurological problems (18). Stroke was the most frequent neurological cause of severe disability in subjects aged 19–64 years, and the second most frequent cause in those aged 65 years and older in this study. Although there have been advances in the prevention and treatment of stroke, including reperfusion therapies, stroke continues to be a major cause of disability. The development of efficacious therapies for stroke is needed to reduce disability and improve long-term outcomes associated with stroke (19).

Parkinson's disease was the third most common neurological cause of severe disability in elderly subjects in this study. Parkinson's disease was reported to be more common at older ages, and results in severe disability in the performance of daily activities (3,20).

Several studies from Turkey that have evaluated the neurological causes of disability, as determined by a health board in a tertiary center, have reported that stroke and dementia were two of the most common neurological diseases, consistent with the findings of our study (6,21,22). The patient populations of these studies were younger than that of our study's, and included all severity levels. We only included cases of severe disability. This implies that stroke and dementia are the main diseases that cause neurological disability, across all severity levels.

Eye diseases

Turkish data from the Institute for Health Metrics and Evaluation data showed that sense organ diseases were the second leading cause of years lost due to disability in 2015 (12). Consistent with this finding, eye diseases were found to be the second most frequent cause of severe disability in elderly in this study. In a study from Turkey by Kıvanç et al, eye diseases were also found to be the second most frequent cause of disability, with a frequency of 17.1% in the severely disabled elderly (5).

Musculoskeletal disorders

Musculoskeletal disorders were the third most common cause of severe disability in the elderly in our study. Although musculoskeletal disorders were reported to be the leading cause of disability (12), their contribution to severe disability was found to be small, and to rarely cause dependence (15).

The frequency of musculoskeletal disorders increases with age, and these disorders pose a great threat to mobility (17). The most commonly affected daily activities in both mildly and severely disabled individuals have been reported to be those that involve the lower extremity functions. For example, limitations in mobility of the knee are common in arthritis (23). In this study, knee osteoarthritis was the leading musculoskeletal cause of severe disability in elderly. Amputation was the leading musculoskeletal cause of severe disability in young adults. Strategies to reduce the disability caused by musculoskeletal disorders are needed, because these disorders have an impact on both difficulty and dependence (3).

In this study, we have reported the frequencies of primary diseases that contribute to disability severity. The condition with the highest disability rating was assumed to be the main pathology. Chronic health problems often occur together, and the interaction of several conditions, rather than a single condition, contributes to disability (24). There is a clear need to study the coexistent chronic conditions that contribute to disability severity.

The main strength of our study is that its results may represent the causes of severe disability in general, because of the high number of subjects we included. Thus, our data are valuable to policy makers.

The main limitation of our study was that it relied on data collected by the Health Council and maintained in their archives. However, all reports were based on examinations completed by specialists in their fields; therefore, the level of accuracy of the data was assumed to be high.

Studies about severe disability have some challenges. The definition of "severe disability" varies from one country/survey to another. Assessment and definition of severe disability at the international level are needed (3).

In conclusion, this research may provide a baseline indication of the diseases that commonly cause severe disability. Females and the elderly were more likely to experience severe levels of disability. Neurological diseases–mainly dementia and stroke–were found to be the most common causes of dependence. There was no gender difference in the distribution of pathologies causing severe disability, but there were significant differences in age. On the basis of our results, preventive and rehabilitative health service planning should focus on neurological disorders–mainly dementia and stroke, to decrease the disability caused by these conditions.

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