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ORIGINAL RESEARCH

Age and gender prevalence and its correspondence with the outpatient physical therapy sector of a reference orthopedics and traumatology institute in the municipality of São Paulo

Prevalência de idade e gênero e sua correspondência com os setores de fisioterapia ambulatorial de um instituto de ortopedia e traumatologia de referência da cidade de São Paulo

Prevalencia de edad y género y su correspondencia con los sectores de fisioterapia para pacientes ambulatorios de un instituto de referencia de ortopedia y traumatología en la ciudad de São Paulo

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ABSTRACT | Regardless of the nature of accidents that occur daily, the consequences often require specialized rehabilitation. This study aims to verify which outpatient physical therapy sector of an orthopedics and traumatology institute has the highest prevalence of referral forms for care. In addition, it verifies which gender predominates and what is the relationship between age groups and the outpatient physical therapy sectors of a reference hospital in the municipality of São Paulo. This is a prospective study conducted between March and December 2016 with a sample of 1507 referral forms to the Physical Therapy Outpatient Clinic of the Institute of Orthopedics and Traumatology, Clinical Hospital of the Medicine School of University of São Paulo. The study showed that the Trauma sector for Outpatient Physical Therapy has a higher number of referral forms, the male gender was predominant, and the different age groups corresponded to each Outpatient Physical Therapy sectors.

Keywords | Traumatology; Public Health; Physical Therapy Specialty; Patients; Accidents.

RESUMO | Independentemente da natureza dos acidentes que ocorrem diariamente, as consequências frequentemente exigem reabilitação especializada. Este estudo pretende verificar qual setor de fisioterapia ambulatorial de um instituto de ortopedia e traumatologia apresenta maior prevalência de fichas de encaminhamento para atendimento. Além disso, pretende verificar qual gênero predomina e qual é a relação entre as faixas etárias e os setores de fisioterapia ambulatorial de um hospital de referência da cidade de São Paulo. Trata-se de um estudo prospectivo realizado entre março e dezembro de 2016 com uma amostra de 1507 fichas de encaminhamento ao Ambulatório de Fisioterapia do Instituto de Ortopedia e Traumatologia do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo. O estudo mostrou que o setor Trauma em Fisioterapia Ambulatorial apresenta maior quantidade de fichas de encaminhamento, que o gênero masculino foi predominante e que há uma correspondência das relações entre diferentes faixas etárias e os setores de Fisioterapia Ambulatorial.

Descritores | Traumatologia; Saúde Pública; Fisioterapia; Pacientes; Acidentes.

RESUMEN | Independientemente de la naturaleza de los accidentes que ocurren a diario, las consecuencias a menudo requieren rehabilitación especializada. Este estudio tiene como objetivo verificar qué sector de fisioterapia ambulatorio de un

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instituto de ortopedia y traumatología tiene la mayor prevalencia de formularios de derivación para la atención. Además, tiene la intención de verificar qué género predomina y cuál es la relación entre los grupos de edad y los sectores de fisioterapia para pacientes ambulatorios de un hospital de referencia en la ciudad de São Paulo. Este es un estudio prospectivo realizado entre marzo y diciembre de 2016 con una muestra de 1507 formularios de derivación a la Clínica Ambulatoria de Fisioterapia del Instituto de Ortopedia y Traumatología de la Facultad de Medicina de la Universidad de São Paulo, Hospital das Clínicas. El estudio mostró que el sector de Trauma en Fisioterapia Ambulatoria tiene un mayor número de formas de derivación, que predomina el género masculino y que existe una correspondencia entre las relaciones entre los diferentes grupos de edad y los sectores de Fisioterapia Ambulatoria.
Palabras clave | Traumatología; Salud Pública; Fisioterapia; Pacientes; Accidentes.

INTRODUCTION

Musculoskeletal injuries can occur from the first to the last day of life[1], and one of the major causes of these injuries is traffic accidents. These usually cause serious consequences on the health of victims, such as trauma, lesions, temporary or permanent disability and amputations, often requiring prolonged treatment, which leads to high expenses for the state[2]. Traffic accidents are a direct cause of the high costs of the Unified Health System (SUS)[3].

Some traffic accidents are serious and occur with predominantly male people in their productive life, between 20 and 40 years. They are caused by speeding, alcohol consumption and cellphone use[4]. A study of accidents involving motorcyclists treated in emergency public services recorded 15,433 cases in 2014 with use of the Violence and Accident Surveillance System (Sistema de Vigilância de Violências e Acidentes, of which 9,673 involved male motorcyclists aged 20 to 30 years[5].

Most accidents involving motorcyclists and cyclists are known to cause knee, leg, wrist and hand trauma, since limbs are the most exposed regions in these individuals[6]. Most trauma leads to disabilities that can negatively affect the quality of life of the victims, causing dependence for some daily activities[7].

In addition to the trauma resulting from traffic accidents, it is necessary to mention the trauma resulting from domestic accidents, which are caused by falls on stairs, chairs, wet floors and slabs, often leading to fractures and other musculoskeletal injuries[8,9].

To meet this complex demand, the municipality of São Paulo relies on trauma support offered by reference hospitals, in which high-cost procedures with advanced technological equipment are performed[10].

Studies such as this contribute to the profile creation of patients who are referred and treated in the outpatient physical therapy sector of reference hospitals. Thus, it is possible to improve the performance of industry professionals who have to meet this demand and, consequently, maximize the quality of care.

This study aims to verify which outpatient physical therapy sector of an orthopedics and traumatology institute has the highest prevalence of referral forms, which age and gender predominates, and what is the relationship between age groups and outpatient physical therapy sectors of a reference hospital of the municipality of São Paulo.

METHODOLOGY

Study type

This is a descriptive, prospective and quantitative study conducted at the premises of the Institute of Orthopedics and Traumatology, Clinical Hospital of the Medicine School of University of São Paulo (IOT-HCFMUSP).

Study population

The sample consisted of 1,507 records from SUS patients sent to the physical therapy outpatient clinic between March and December 2016, whose purpose was orthopedic trauma treatment.

We selected records of SUS patients of both sexes and all age groups referred for treatment at the Physical Therapy Outpatient Clinic of the Institute of Orthopedics and Traumatology. Referral records with incomplete data (age, surname, description of trauma) were excluded from the study.

Procedures

Patient characteristics were analyzed from referral forms for treatment in the following sectors of the

physical therapy outpatient clinic: Amputee, Spine, Knee, Microsurgery, Shoulder, Oncology, Feet, Pediatrics, Hip, Reconstruction, Lower Limb Trauma (MMII) and Upper Limb Trauma (MMSS). The MMII and MMSS sectors are exclusively for patients who suffered acute trauma that required reparative surgical intervention. We collected data related to the prevalence of orthopedic trauma as per the IOT-HCFMUSP outpatient physical therapy sectors, according to the distribution and incidence of trauma in each sector, age distribution, and gender distribution.

Statistical analysis

The study data were grouped and tabulated in Microsoft Excel. We performed a descriptive analysis and frequency distribution per sector according to the type of injury.

The contingency table analysis followed Pereira's recommendations[11]. We first assessed the association between the "sectors" and "age" variables by the χ^2 test, then examined the association between the category pairs of these variables by standardized residual analysis, and lastly studied the relationships between all categories of both variables in a simple match analysis.

This study aimed to characterize the categories of the selected age group according to the excess of occurrences paired under differing sector categories. We adopted a level of significance of 5% ($p<0.05$) for both the association between variables in the χ^2 test and for the association between the variable categories during residual analysis. This level of significance for excess occurrences corresponds to a residual with a positive value greater than 1.96.

All analyses were performed using the R environment version 3.4.1 with FactoMineR version 1.38 and FactoExtra version 1.0.5.

RESULTS

The sample analyzed corresponds to the period between March and December 2016 and consisted of referral forms for orthopedic trauma treatment at the physical therapy outpatient clinic.

With regard to gender, 866 (57.46%) patients were male and 641 (42.54%) female.

The predominant sector was MMII, with 596 patients (34.9%), the second most frequent involvement occurred in MMSS, with 218 patients (12.8%), totaling 814 patients (almost half of the sample, 47.7%). The other sectors reached percentages below 10% each (Table 1).

Table 1. Distribution and incidence of trauma by sector

Sectors	Incidence of trauma	Percentage
Amputee	47	2.75%
Spine	157	9.18%
Knee	126	7.37%
Microsurgery	13	0.76%
Shoulder	89	5.26%
Oncology	48	2.8%
Feet	126	7.37%
Pediatrics	112	6.55%
Hip	128	7.48%
Reconstruction	49	2.86%
MMII trauma	596	34.87%
MMSS Trauma	218	12.75%
Total	1,709	100%

MMII: lower limbs. MMSS: upper limbs.

The contingency between sector and age group (Table 2), verified by the χ^2 test, reveals that these are dependent variables ($p<0.001$), that is, sectors and age group do not combine randomly.

Table 2 presents the standardized residual analysis that allows to characterize the sectors of each age group according to the type of treatment in physical therapy (Table 2).

Most service categories are barely distanced from one another, as if they were roughly equivalent, suggesting that they could perhaps be grouped into a single generic category, such as occurrence by age group. The age ranges: 50–59, 60–69, and 70–79 are located in the lower left quadrant of the graph, as are the Knee, Spine, Shoulder, Amputee, and Hip service categories (Figure 1).

The age groups 20–29, 30–39, 40–49 and 80–89 years are more closely related to the categories of Reconstruction and MMII Trauma.

The age group 0–9 years is closer to Pediatric care. Both categories are on the opposite side of the graph, suggesting that there is no association between this sector and age group and the remaining categories.

Table 2. Analysis of standardized residues between categories.

	Age Group									
Occurrence	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90–99
Amputee	−1.7	−1.5	−0.8	−0.5	−1.0	−0.8	**3.8**	**2.9**	0.3	−0.5
Spine	−1.3	−1.2	−2.9	−0.2	1.5	**3.1**	1.0	0.2	−1.1	−1.0
Knee	−2.8	0.0	0.9	0.0	−1.8	0.7	**2.5**	1.3	−1.7	−0.8
Microsurgery	1.6	−0.4	0.1	−0.8	0.7	1.7	−1.3	−1.0	−0.7	−0.3
Shoulder	−2.3	−0.2	0.9	−2.9	−0.1	**4.0**	**2.7**	−1.3	0.6	−0.7
Oncology	−0.4	**4.5**	0.8	−2.6	1.3	−2.1	−1.7	1.6	−1.3	−0.5
Feet	−0.4	0.6	−1.2	0.2	0.4	**2.5**	−1.8	0.2	−1.2	−0.8
Pediatrics	**20.2**	**12.3**	−4.6	−4.4	−4.0	−4.0	−3.8	−2.9	−2.1	−0.8
Hip	−2.8	−3.9	−4.6	−1.4	0.1	**6.1**	**4.1**	**3.5**	−1.7	−0.9
Reconstruction	−1.7	0.3	**2.3**	**3.9**	−0.3	−2.1	−0.9	−1.9	−1.3	−0.5
MMII trauma	−5.0	−2.6	**6.0**	**3.4**	**2.4**	−3.5	−5.6	−0.8	**3.7**	**4.1**
MMSS Trauma	1.0	−1.9	−0.5	1.2	−0.8	−2.6	**4.1**	−1.0	1.8	−1.2

MMII: lower limbs; MMSS: upper limbs. Standardized residues that correspond to the significance level for the excess of occurrences are shown in bold.

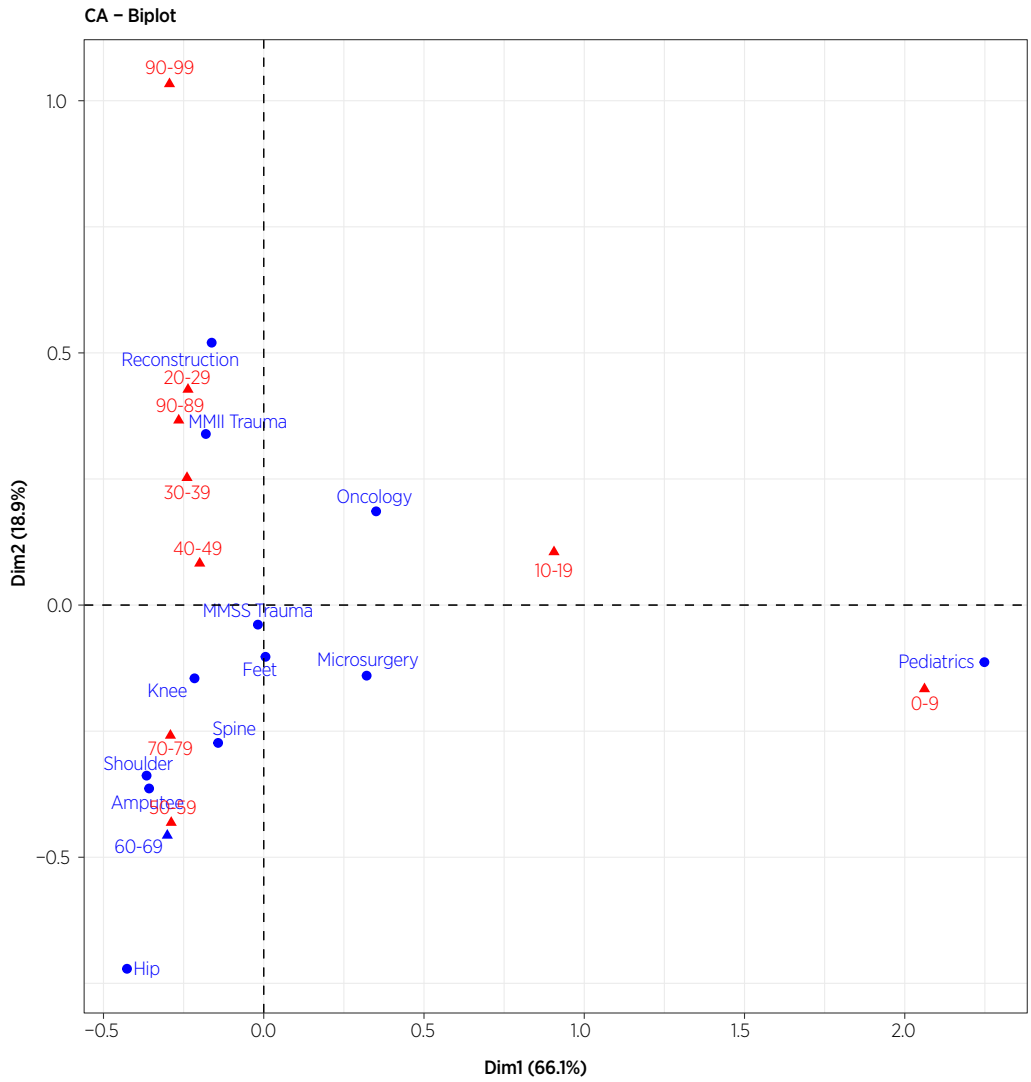

Figure 1. Correspondence analysis of the relation between the categories of age group and sectors of outpatient physical therapy in an orthopedics and traumatology institute of a reference hospital

DISCUSSION

Patients with trauma in the lower limbs were shown to correspond to most of the study population, with 596 (34.87%) referrals for orthopedic trauma treatment. Because it is the largest capital of Brazil, the municipality of São Paulo has high rates of traffic accidents daily, which leads us to believe that most patients with lower limb trauma are caused by traffic accidents.

Our study looked at outpatient physical therapy sectors named Amputee, Spine, Knee, Microsurgery, Shoulder, Oncology, Fett, Pediatrics, Hip, Reconstruction, Lower Limb Trauma and Upper Limb Trauma. Each sector has different characteristics and profiles. In the Pediatrics sector, for example, the age ranges of patients were 0–9 and 10–19 years. The MMII group on the other hand covered five age groups: 20–29, 30–39, 40–49, 80–89 and 90–99 years of age, with a higher percentage between 20–29 years. Regarding Table 2 and Figure 1, there is a clear association of some sectors with specific age ranges. Thus, a higher frequency of children (0–9 years) is observed in the Pediatrics sector; of pre-adolescents and adolescents in Pediatrics and Oncology; young adults (20–49 years) undergoing reconstruction and lower limb trauma, likely because they are more exposed to these types of injuries. Patients between 50 and 59 years prevail in the Spine sector, showing chronic injuries due to work activities or habits adopted throughout life, whereas the age group of 50 to 69 years old predominates in the Shoulder sector due to tendon injuries. Individuals between 50 and 79 years old prevail in the Hip sector, which shows occurrences related to arthroplasties, whereas the age group between 60 and 79 years old predominates in the Amputee sector as it presents occurrences resulting from circulatory problems. Patients between 80 and 99 years prevail in MMII Trauma, and those between 60 and 69 years for MMSS Trauma resulting from falls due to declining postural balance. The Institute of Orthopedics and Traumatology, Clinical Hospital of the Medicine School of University of São Paulo (IOT-HCFMUSP), in addition to being a reference for treatment in the locomotor system and in other areas, deals with high complexity cases, trauma victims of high energy that are distributed along the mentioned groups[12].

Taylor and Young[13] observed the epidemiology of orthopedic trauma for one year at a general district hospital in England, and their results showed that, of the 2,817 patients studied, 1,511 (53%) suffered lower limb fractures and 893 (31%) upper limb fractures, coinciding with the results of this study, which achieved the highest percentages in these sectors, respectively.

In their study with patients treated at SUS emergency services in the main capitals of Brazil, Mascarenhas et al.[5] also indicated that the lower limbs are the body part most affected by trauma in young men between 20 and 39 years old. Oliveira and Braga[1] conducted a similar study, but with patients seen at a university orthopedic school-clinic. When analyzing the medical records, they realized that the knee was the most affected body segment.

Studies such as those by Karloh et al.[14] on the prevalence of orthopedic trauma disorders seen at the physical therapy service of a clinic hired by the city hall in the Unified Health System of a municipality observed that, in their sample of 444 individuals, the main body parts that required physical therapy were knee, shoulder, spine, hip, hand and elbow.

Rodrigues et al.[6], in their studies in the municipality of São Paulo, found that knee and leg are the most commonly-injured segments in motorcyclists and cyclists, and that the limbs are precisely the most unprotected regions, corroborating our study. Barbosa et al.[15] analyzed the profile of patients with traumatic upper limb injuries treated at the physical therapy service of a reference hospital, and observed that the male gender predominates with regard to this type of injury and that there is a high rate of surgical treatment, with mean age of 34 years old.

In the studies by Lino Junior et al.[8], Dantas et al.[9], Bezerra et al.[16], domestic accidents were stressed as frequent causes of trauma referred for orthopedic trauma treatment.

Another important piece of data analyzed in this study demonstrates the age range of patients treated at IOT-HCFMUSP. The range of 40 to 49 years was the most prevalent, followed by 30 to 39 years, corroborating the study by Ghisleni et al.[17] and Heim et al.[18] who obtained a population with mean age of 40 years.

Dellatorre et al.[19] identified in their study which sex and age group were the most affected by orthopedic disorders referred to the orthopedics outpatient clinic of an institution. The male gender was the most recurrent one, corresponding to 60% of the total and to high prevalence of these disorders in the age group between 20 and 49 years. This was similar to Mehrpour et al.[20], who identified a higher prevalence in males, whose most frequent issue was bone fracture.

Gawryszewski et al.[21] analyzed the services provided by emergency services in São Paulo to land transport accidents, and found that motorcyclists were responsible for most hospitalizations. Motorcyclists would likely fit within the Knee, Microsurgery, Reconstruction, Lower Limb Trauma and Upper Limb Trauma sectors in our study, demonstrating how traffic accidents can span multiple sectors.

According to Trevisol et al.[4], Mascarenhas[5], Cruz et al.[22], Santos et al.[23], Malta et al.[24], the age group between 20 and 29 years was the most involved in orthopedic trauma.

The clinical implications of this study indicate that knowledge of age and gender prevalence in each sector, in addition to providing consistent patient volume data by sector, allows physical therapists to be grouped and qualified according to these needs. In order to extend this data to other services, it is important to conduct a multicenter study with longer follow-up to see if this is a pattern of reference hospitals. The Outpatient Physical Therapy service of the Institute of Orthopedics and Traumatology of HC/FMUSP has one physical therapist for each sector who works for a period of five hours, except in the case of the Trauma sector, which has two five-hour periods, with two physical therapists in each period. With regard to infrastructure, the HC/FMUSP has 15 stretchers and two decks for service.

This study provided important information about the body region most affected by trauma and the most prevalent age and gender of patients, but it was limited to these elements, without exploring other relevant data such as trauma etiology, socioeconomic factors and patient occupation. We also restricted ourselves to the analysis of individuals from SUS, not evaluating cases seen in private hospitals. It is important that future studies analyze patients for a longer period, 12 months or more, as this period is used to compare annual rates, which allow for the evaluation of the prevalence of certain types of trauma according to the time of the year.

CONCLUSION

This study showed that the Trauma outpatient sector of an orthopedics and traumatology institute has the highest prevalence of referral forms. In addition, it showed the predominance of males and indicated a correspondence between different age groups and specific outpatient physical therapy sectors.

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