

Pathologies prevalence study in occupational therapy

*Sílvia Sá Malheiro*¹, *Edite M.G.P. Fernandes*², *M. Teresa T. Monteiro*², *A. Ismael F. Vaz*²

¹Occupational Therapy Division, Psychiatric Department, São Marcos Hospital, Braga, Portugal

²{emgpf;tm;aivaz}@dps.uminho.pt, Systems and Production Department, Minho University, Braga, Portugal

Abstract

Presentamos en este artículo un estudio de la prevalencia de patologías en tratamientos de rehabilitación en la terapia ocupacional realizados a lo largo de 15 años. También se presenta un análisis descriptiva de las variables demográficas (sexo y edad) de un grupo de pacientes.

Keywords: Occupational therapy, prevalence, statistical analysis.

1. Introduction

We have performed a retrospective study concerning demographic variables of some adult patients subject to treatments in the Occupational Therapy Division of the Psychiatric Department in São Marcos Hospital, Braga since 1989. In the pathologies prevalence study, our purposes were to investigate whether age and gender differed in their contribution to the number of rehabilitation treatments as well as to analyze the proportions of some pathology treatments in certain specific periods, namely after Christmas and Easter holidays.

The majority of the patients had neurologic pathologies, only a small percentage had orthopaedic pathologies. Patient diagnoses included a wide range of illnesses and injuries, such as *cerebrovascular disorder*, *traumatic brain injury*, *spinal cord injury*, *hand injuries*, *fractures*, *rheumatic diseases*, *Guillain-Barré-Syndrome*, *nervous system diseases*, *brachial plexus injuries* and *brain tumor*.

According to the pathology a specific treatment is prescribed by a psychiatric doctor [1] and it is performed by an occupational therapist. In the Occupational Therapy Division (OTD) operate three or four graduated occupational therapists that treat in-patients as well as out-patients. The in-patients are subject to treatments once or twice a day; for the out-patients the treatments

frequency depends on the pathology and on its stage. The duration of each treatment is on average 30 minutes, although it may be frequently changed according to the pathology. The treatments can be executed individually or in group although with different pathologies and purposes.

The treatments aim to provide sensibilities stimulation, spasticity inhibition, muscular strengthening, postural control training and equilibrium exercise, daily life activities training, cognitive ability training including oral and writing expression [2]. Some kinds of treatments are [3]: technical intervention (Bobath, Rood, PNF), activities (to feed on, bodily hygiene, to dress and to undress, deambulation, entertainment, sports, workmanship, etc) and teaching patients and family to work well.

2. Method

2.1. Subjects

A total of 7132 rehabilitation treatments on adult patients aged more than 14 years were done during a 15 years period. The occupational therapist Sílvia Malheiro of the OTD has been recording all the information concerning the number of executed treatments in each month of the period 1989-2003, the associated pathologies as well as the sex and age of patients.

The majority of the treatments (67.9%) were done on patients with *cerebrovascular disorders* (2871 treatments), *traumatic brain injuries* (758) and *spinal cord injuries* (1213). The overall treatment incidence rates for male (53.3%) and female (46.7%) patients were found to be different.

2.2. Data analysis

Data were analyzed using STATA v6.0 [4]. Prevalence rates for the pathologies under rehabilitation treatments at the OTD, descriptive statistics (mean, standard deviation, median and 95% confidence interval) and frequencies for the appropriate demographic variables (sex and age) were determined.

3. Results

Since January of 1989, occupational therapist Sílvia Malheiro of the OTD has been recording the number of rehabilitation treatments carried out on adult patients and for each of the patients, the diagnosis, sex and age. The number of treatments by month and year of the 15 years period is shown in Table 1.

Based on the available data, we found differences on the overall treatment incidence rates for male (53.3%) and female patients (46.7%).

We may also conclude that 27.1% of the treatments were done during the January-March period, 26.7% during the April-June period, 25.7% during the

Table 1: Number of treatments by month and year

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1989	45	38	45	45	46	39	35	25	30	32	39	36
1990	36	31	34	23	25	23	20	23	28	30	38	42
1991	48	40	46	42	44	44	33	22	26	27	28	25
1992	22	24	22	27	35	24	28	23	24	30	30	28
1993	35	33	34	31	34	33	34	25	30	36	43	49
1994	48	33	39	41	50	42	33	26	23	28	32	40
1995	50	52	51	45	48	47	35	35	39	29	41	38
1996	46	47	45	44	46	31	45	34	36	44	54	47
1997	44	48	52	58	51	48	50	32	37	65	65	60
1998	55	56	50	58	55	59	55	33	37	51	56	51
1999	56	41	51	49	37	36	40	26	21	30	34	33
2000	29	36	48	41	50	56	30	39	35	38	36	35
2001	40	45	58	44	59	49	38	35	23	50	48	47
2002	61	55	35	43	41	47	36	33	34	44	44	43
2003	53	41	35	37	39	38	44	36	37	45	47	44

October-December period, while the July-September period had the smallest number of treatments (20.5%). This last percentage could be explained by the occupational therapists as well as patients Summer holidays.

In all four periods, the male treatment incidence rates are superior to the female incidence rates, with the lowest value (52%) in the April-June period and the highest (55.4%) in the July-September period, although the differences are not statistically significant.

3.1. Pathology treatment prevalence rates

Patient diagnoses treated at the OTD include the following illnesses and injuries: *cerebrovascular disorder*, *traumatic brain injury*, *spinal cord injury*, *hand injuries*, *fractures*, *rheumatic diseases*, *Guillain-Barré-Syndrome*, *nervous system diseases*, *brachial plexus injuries* and *brain tumor*. In the *spinal cord injury* group we joined together *tetraplegia* and *paraplegia*. Table 2 contains the percentages of treatments done during the 15 years of follow-up. In the *Others* category we included *brachial plexus injuries* and *brain tumor* because they had separately low treatment prevalence rates when compared with the other eight diagnoses listed in the table.

The overall *cerebrovascular disorder (CVD)* treatment prevalence rate was 40.3% (2871/7132 treatments) with a statistically significant different distribution by gender: 53.7% for male and 46.3% for female treatments. The *traumatic brain injury (TBI)* contributed with 10.6% of the treatments (758/7132), where 76.8% of them were done on male patients. The treatment prevalence rate of *spinal cord injury (SCI)* patients was 17% (1213/7132) with a quite different distribution by gender: 66.8% for male and 33.2% for female patients. The proportional distribution of the treatments by gender for each diagnosis is shown in the last two columns of Table 2. Based on a chi-square test we

Table 2: Patients diagnoses treated at the OTD

Patient diagnoses	Percentage	Male (%)	Female (%)
<i>cerebrovascular disorder</i>	40.3	53.7	46.3
<i>traumatic brain injury</i>	10.6	76.8	23.2
<i>spinal cord injury</i>	17	66.8	33.2
<i>hand injury</i>	9.8	50.8	49.2
<i>fracture</i>	3.8	36.3	63.7
<i>rheumatic disease</i>	9.7	5.2	94.8
<i>Guillain-Barré-Syndrome</i>	2.8	71.3	28.7
<i>nervous system disease</i>	2.2	51	49
<i>Others</i>	3.9	56.1	43.9

may conclude that the pathology treatment percentages are quite statistically different in each gender ($p < 0.0005$).

The most prevalent pathology treatment in women was the *cerebrovascular disorder* (39.9%), followed by *rheumatic disease* (19.6%), *spinal cord injury* (12.1%) and *hand injury* (10.3%). In men, the most prevalent pathology treatment was the *cerebrovascular disorder* (40.6%), followed by *spinal cord injury* (21.3%), *traumatic brain injury* (15.3%) and *hand injury* (9.3%).

We also found that the distribution of the number of treatments for each of the above mentioned pathologies is quite statistically different in each year ($p < 0.0005$). When analyzing the number of rehabilitation treatments by trimester, we found that most of the pathologies are more frequent in the January-March period, although *spinal cord injury* and *fracture* occur more often in the April-June period, and *rheumatic disease* and *Guillain-Barré-Syndrome* in the October-December period. These differences were found to be statistically significant at any level greater than 4.3%.

3.2. Descriptive analysis of CVD, TBI and SCI patients

The purpose of this section is to present a descriptive analysis of demographic variables (age and sex) of all the patients with *CVD*, *TBI* and *SCI* treated at the OTD since 1989 as they are by far the most prevalent treatments.

Data concerning with *CVD* patient treatments were classified by gender and age (< 30 , 30-39, 40-49, 50-59, 60-69, 70-79 and ≥ 80 years of age) cohorts as shown in Table 3. Figure 1 presents the corresponding histograms by gender.

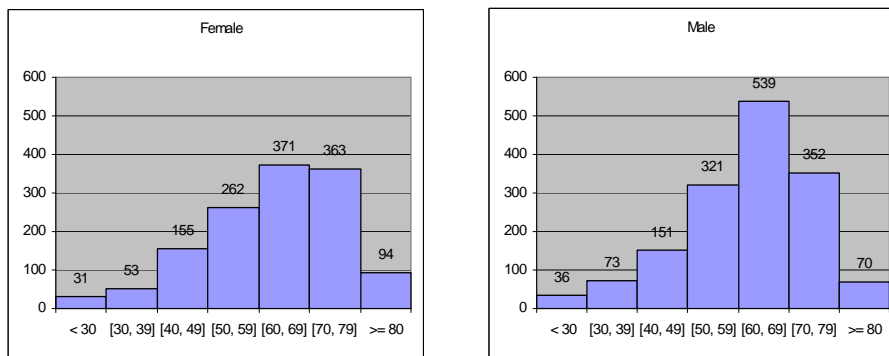
To determine whether age cohorts and gender differed in their contribution to the total number of treatments, a chi-square test was done. We just found that the observed differences in the number of treatments are statistically significant ($p < 0.0005$). The χ^2 statistics has 6 degrees of freedom and is

Table 3: Number of *CDV* patient treatments by gender and age cohorts

		< 30	[30, 39]	[40, 49]	[50, 59]	[60, 69]	[70, 79]	≥ 80
N.t.	Female	31	53	155	262	371	363	94
	Male	36	73	151	321	539	352	70
	Total	67	126	306	583	910	715	164
Perc.		2.3	4.4	10.7	20.3	31.7	25	5.7

N.t. - Number of treatments; Perc. - Percentage

equal to 28.6227. Table 3 also shows that 31.7% of the treatments were done on patients between 60 and 69 years of age, while 56.7% of them were done on patients between 60 and 79 years of age. In four of the seven cohorts, the male incidence rates are superior with 57.9% in the 30-39 and 59.2% in the 60-69 age cohorts. The highest incidence rate for women is in the ≥ 80 years group (57.3%).

Figure 1: Histograms of *CDV* patient treatments

A similar analysis was done for *TBI* patient treatments (see Table 4 and Figure 2). As the majority of these patients are quite young, the age cohorts defined for this group were < 20 , 20-29, 30-39, 40-49, 50-59, 60-69, 70-79 and ≥ 80 years of age. The observed differences in the number of treatments are also statistically significant ($p < 0.0005$). The χ^2 statistics has 7 degrees of freedom and is equal to 63.3369. The highest proportion of treatments (38%) occurred in the 20-29 age cohort. Note that 65.8% of the *TBI* treatments were done on the youngest patients (less than 30 years of age) which usually are injured due to road accidents. The accidents at work (building construction and agriculture) are mostly responsible for the highest proportion of treatments on male patients in the 30-39 (86.4%) and 40-49 (78%) cohorts. The male incidence rate in the 20-29 group is also very high (85.1%). The patients aged more than 50 years are treated mainly as a result of fall.

Table 4: Number of *TBI* patient treatments by gender and age cohorts

		< 20	[20, 29]	[30, 39]	[40, 49]	[50, 59]	[60, 69]	[70, 79]	≥ 80
N.t.	Female	57	43	14	13	27	17	5	0
	Male	154	245	89	46	27	17	2	2
	Total	211	288	103	59	54	34	7	2
Perc.		27.8	38	13.6	7.8	7.1	4.5	0.9	0.3

N.t. - Number of treatments; Perc. - Percentage

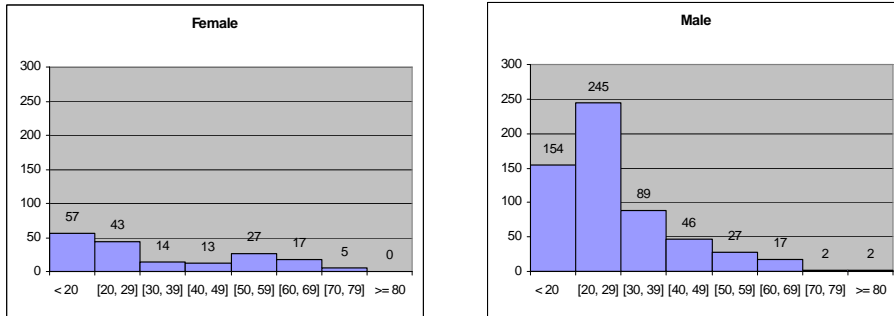
Figure 2: Histograms of *TBI* patient treatments

Table 5 contains identical information for *SCI* patient treatments. The histograms for female and male patients are shown in Figure 3. The χ^2 statistics has 7 degrees of freedom and is equal to 90.0707. The observed differences in the number of treatments when classified by gender and age cohorts are quite significant ($p < 0.0005$). The 40-49, 50-59 and 60-69 groups contributed with 56.9% of the treatments. The percentage of treatments in the 20-29 cohort (15.3%) is worth mentioning. The male incidence rates are superior in almost all cohorts with exception for the patients aged 70 years and older. The accidents at work are again mainly responsible for this injury. However, it is in the 20-29 and 30-39 age cohorts that the incidence rates for men are highest, 79% and 78.8% respectively.

The average age of *CVD* patients treated at the OTD was 61.7 ± 13.4 years (25th percentile=54.5, median=64.5, 75th percentile=74.5 years). For pa-

Table 5: Number of *SCI* patient treatments by gender and age cohorts

		< 20	[20, 29]	[30, 39]	[40, 49]	[50, 59]	[60, 69]	[70, 79]	≥ 80
N.t.	Female	11	39	32	64	57	118	70	12
	Male	28	147	119	118	196	137	58	7
	Total	39	186	151	182	253	255	128	19
Perc.		3.2	15.3	12.5	15	20.9	21	10.6	1.6

N.t. - Number of treatments; Perc. - Percentage

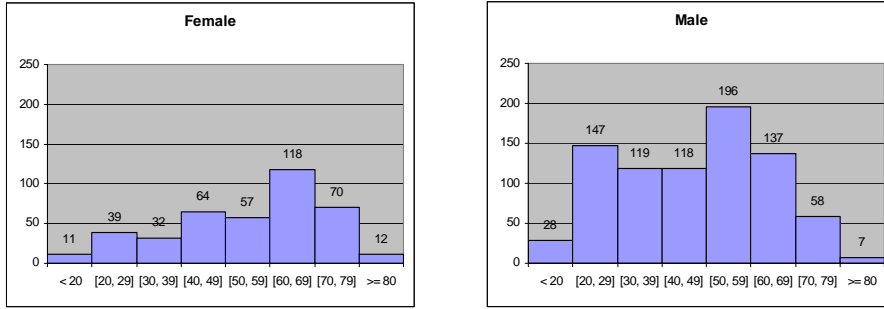
Figure 3: Histograms of *SCI* patient treatments

Table 6: Age descriptive statistics by gender

	<i>CVD</i>		<i>TBI</i>		<i>SCI</i>	
	Female	Male	Female	Male	Female	Male
N.t.	1329	1542	176	582	403	810
Mean	62.2	61.3	33.4	27.9	54.6	46.7
S.d.	13.8	13.1	18.9	13.1	17.4	16.9
95% CI	[61.5, 63]	[60.6, 62]	[30.6, 36.2]	[26.8, 29]	[52.9, 56.3]	[45.5, 47.8]
Median	64.5	64.5	24.5	24.5	54.5	44.5

N.t. - Number of treatments; S.d. - Standard deviation; 95% CI - 95% Confidence interval

tients with *TBI*, the average age was 29.2 ± 14.8 years (25th percentile=14.5, median=24.5, 75th percentile=34.5 years), and for *SCI* patients, the average age was 49.3 ± 17.5 years (25th percentile=34.5, median=54.5, 75th percentile=64.5 years).

Separate analyzes have been done for women and men. Mean, standard deviation, 95% confidence interval and median of age were calculated separately for female and male patients and are shown in Table 6.

For different variances at any level greater than 4.3%, we found that the female and male *CVD* patient age means, 62.2 and 61.3 years old respectively, are only statistically different from each other at any level greater than 6.8%. However, for variance differences on *TBI* patients age ($p < 0.00005$), the two-sample t test gives quite significant differences between female and male age means ($p = 0.0004$) (33.4 and 27.9 respectively). For equal variances of the *SCI* patient age, the differences in the female and male age means (54.6 and 46.7 respectively) were found to be quite statistically significant ($p < 0.00005$).

3.3. Descriptive analysis by trimester and year

The know-how and perception of the occupational therapists motivated the descriptive analysis that follows. Rehabilitation treatments were grouped by trimester. Table 7 contains means and standard deviations of patient age and frequency counts for each trimester. In fact, after Christmas and Easter

Table 7: Descriptive statistics of patient age by trimester

	<i>CVD</i>			<i>TBI</i>			<i>SCI</i>		
	Aver.	S.d.	Freq.	Aver.	S.d.	Freq.	Aver.	S.d.	Freq.
J-M	61.1	12.9	775	28.9	14.4	210	48.1	17.1	311
A-J	61.4	13.2	739	29.4	14.2	197	51.6	16.9	336
J-S	61.6	14.2	610	29.6	15.8	160	49	17.9	265
O-D	62.7	13.5	747	28.9	15	191	48.3	17.9	301

J-M - January-March; A-J - April-June

J-S - July-September; O-D - October-December

Aver. - Average age; S.d. - Standard deviation

Freq. - Frequency counts

holidays the number of *CVD*, *TBI* and *SCI* patient treatments seems to increase as new patients appear in the OTD as consequence of habits immoderation related to food, drink, tobacco and physical exercises as well as road accidents. As expected we found that the highest proportion of *CVD* (27%) and *TBI* (27.7%) treatments occurred during the January-March period and 27.7% of *SCI* treatments were done in the April-June period.

We also found that the average age was highest on the October-December period for *CVD* patients (62.7 years of age) and on the July-September period for *TBI* patients (29.6 years of age), although none of the age mean differences in each mentioned patient group are statistically significant. The group of *SCI* patients treated during April-June period had the highest average age (51.6 years of age) and the observed differences on age means are now statistically different ($p=0.0396$). Significant differences were observed between the variances (Bartlett's test) only at any level greater than 7.3% in the first group of patients and no significant differences in the variances were observed in the second and third groups.

When analyzing the patient age by year in the 15 years of follow-up, we obtained the values listed in Table 8. Based on the descriptive data, we found that the average age of *CVD* patients treated at the OTD has been decreasing in the last five years. For the *TBI* and *SCI* patients no special pattern was found for the evolution of age means, although we should mention the low value obtained in 2003 for *TBI* patients. Figure 4 shows the age means evolution for the three groups of patients.

We carried out a oneway analysis of variance to conclude that the age mean observed differences throughout the 15 years for the three groups of patients are considered highly significant ($p<0.00005$, $p=0.0003$ and $p<0.00005$ respectively).

Table 8: Descriptive statistics of patient age by year

	<i>CVD</i>		<i>TBI</i>		<i>SCI</i>	
	Average age	Standard deviation	Average age	Standard deviation	Average age	Standard deviation
1989	61.3	10.8	34.5	13.8	49.1	12.5
1990	64.4	9.9	31.4	14.6	45.9	15.4
1991	62.8	11.6	30.9	17.7	42	15.4
1992	60.9	15.6	22.3	4.9	49.1	14.6
1993	63.3	13.5	22.8	9.4	51.4	20.9
1994	64.5	10.3	26.4	16	45.3	16.3
1995	61.5	13.7	30.1	17.4	49.6	16.8
1996	63.1	11.9	31.7	15.7	54.3	16.7
1997	63.1	11.9	28.2	16	52.6	16.9
1998	64.8	12.3	28.7	15.9	52.5	16.2
1999	63.6	13.7	28.4	13.5	52.2	17.7
2000	61	13.8	29.5	12.8	41.5	20.4
2001	58.5	15.6	31.4	12.6	31.4	12.6
2002	57.4	16.2	33	18.7	55.7	16.8
2003	53.4	15.1	22.1	8.8	49.8	17

4. Conclusions

The results of our study provide evidence that the treatment incidence rates on male and female patients are quite different and depend on the pathology treated at the Occupational Therapy Division. Age and gender related differences were also found in the number of treatments done on patients with *cerebrovascular disorder*, *traumatic brain injury* and *spinal cord injury*. Our data also indicate that the age mean differences between male and female subjects are highly significant only for *traumatic brain injury* patients and *spinal cord injury* patients. Habits immoderation especially related to food, drink and tobacco as well as road accidents explain the highest percentage of treatments occurred during January-March period, after Christmas holidays, and April-June, after Easter holidays. The analysis done on the patient average age during the 15 years follow-up period showed that the differences are quite statistically significant. The differences are especially relevant for *cerebrovascular disorder* patients where a systematic decrease was found during the last five years. According to the health experts the reason of this decrease is the strong change of the nowadays life like food, sedentary habits and stress.

5. Acknowledgement

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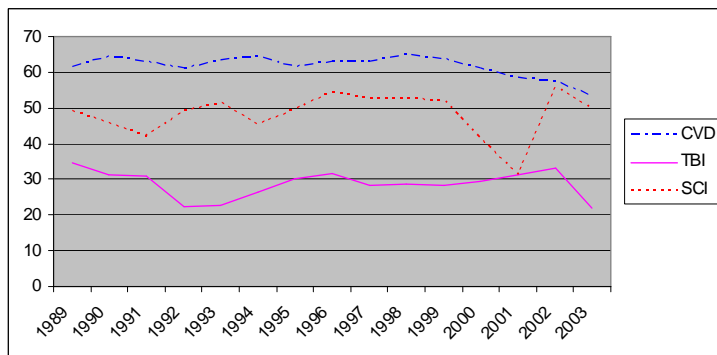


Figure 4: CVD, TBI and SCI patient age means in the 15 years period

the data.

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