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Original Article

Morbidity and hospitalization costs of chronic diseases for the Unified National Health System

Morbidades e custos hospitalares do Sistema Único de Saúde para doenças crônicas

Morbilidades y costos hospitalarios del Sistema Único de Salud para enfermedades crónicas

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Objective: characterizing morbidity and hospitalization costs of chronic diseases (cardiovascular, respiratory, diabetes and cancer) for the Unified National Health System. **Methods:** a retrospective analytical study that used secondary data from the hospital information system of people aged ≥ 25 years. **Results:** among the four assessed morbidities, cancer and cardiovascular diseases have been the most prevalent. For cancer there was a predominance of females, aged between 45 and 49 years. Males had a higher incidence for cardiovascular diseases, with an age range of 55-59 years. These two diseases were the most costly for the system. The frequency of respiratory diseases follows a declining trend for both genders, while diabetes remained stable during the period. **Conclusion**: the highest prevalence of intervention was cancer among women and in men predominated cardiovascular diseases.
Descriptors: Chronic Disease; Morbidity ; Health Expenditures; Hospitalization; Unified Health System.

Objetivo: caracterizar as morbidades e os custos das internações hospitalares do Sistema Único de Saúde por doenças crônicas (cardiovasculares, respiratórias, diabetes e neoplasias). **Métodos:** estudo analítico e retrospectivo, utilizou dados secundários do sistema de informação hospitalar de pessoas com idade ≥ 25 anos. **Resultados:** dentre as quatro morbidades avaliadas, as neoplasias e as doenças cardiovasculares se mostraram mais prevalentes. Para as neoplasias, houve predominância do sexo feminino, com idade entre 45 e 49 anos. O sexo masculino teve maior participação para as doenças cardiovasculares, na faixa de 55 a 59 anos. Estas duas doenças foram mais dispendiosas para o sistema. Para ambos os sexos, a frequência de doenças respiratórias segue comportamento de queda, enquanto o diabetes se mantém estável no período. **Conclusão**: a maior prevalência de intervenção foi de neoplasias entre as mulheres e nos homens predominou as doenças cardiovasculares.
Descritores: Doença Crônica; Morbidade; Gastos em Saúde; Hospitalização; Sistema Único de Saúde.

Objetivo: caracterizar las morbilidades y los costos de hospitalización del Sistema Único de Salud por enfermedades crónicas (cardiovasculares, respiratorias, diabetes y neoplasias). **Métodos**: estudio analítico y retrospectivo, utilizándose datos secundarios del sistema de información hospitalaria de personas con edad ≥ 25 años. **Resultados**: entre las cuatro morbilidades evaluadas, neoplasias y enfermedades cardiovasculares se han demostrado más frecuentes. Para las neoplasias, hubo predominio del sexo femenino, con edades entre 45 y 49 años. Hombres con mayor participación para enfermedades cardiovasculares, con edades entre 55 y 59 años. Estos dos fueron las enfermedades más costosas para el sistema. Para ambos los sexos, la frecuencia de las enfermedades respiratorias sigue comportamiento de caída, pero la diabetes se mantiene estable en el período. **Conclusión**: la mayor prevalencia de intervención fue de neoplasias entre las mujeres, y en los hombres, las enfermedades cardiovasculares.
Descriptores: Enfermedad Crónica; Morbilidad; Gastos en Salud; Hospitalización; Sistema Único de Salud

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Introduction

Chronic diseases are classified as a major public health problem, since they are increasingly evident in the context of comorbidities[1]. Behavioral factors such as high-calorie diets, sedentary lifestyle, stress, smoking and alcohol abuse are predispositions to disease, especially diabetes, hypertension, cancer and respiratory and cardiovascular diseases, musculoskeletal system diseases, and nutritional and metabolic endocrine diseases[2].

Worldwide, chronic diseases account for 63% of deaths (36 million people each year) affecting the population of individuals under 60 years of age, especially in low-income and middle-income countries[3]. In Brazil in 2007[4], the percentage (72%) of deaths related to chronic diseases was higher than the world average, with mortality rates of about 540 deaths per 100,000 inhabitants. In Paraná (a state in Southern Brazil), the rate in 2009 was approximately 348.1 deaths per 100 thousand inhabitants[5].

In 2010, the Unified National Health System spent the equivalent of 2.4 billion reais (68% of total spending) on hospital admissions for chronic diseases and 1.2 billion (32%) on outpatient treatment. The costs of injuries provided to patients with these diseases are higher than those for prevention[6]. Thus, regional studies on morbidity and costs become relevant for providing local indicators, which can be used in the development of public policies for preventing chronic diseases and to improve the management of the system.

Thus, the aim of this study was to characterize morbidity and hospitalization costs of chronic diseases (cardiovascular, respiratory, diabetes and cancer) for the Unified National Health System.

Method

This is a retrospective analytical study, developed with data collected from the Hospital Information System of the Unified National Health System in Maringa Parana (available at: http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/nrPR.def.).

The information available through the system is secondary and is free from a public domain. Data collection took place between June and December 2013, considering the following selection criteria: 1) place of residence; 2) gender; 3) period (2008-2012); 4) age group II (25 to 80 years and older) and 5) type of disease (respiratory, cardiovascular, diabetes and cancer), according to the morbidity list of the International Classification of Diseases 10th edition Chapters. The analysis was centered on these four disease groups and the chosen age group due to its relevance in the profile of Unified National Health System hospitalizations and expenditures. The period of 2008-2012 was selected due to the full availability of information for this city at the time of collection.

The causes of hospitalization were grouped according to the morbidity list of the International Classification of Diseases 10th edition Chapters, which are: a) Chapter X - Respiratory Diseases; b) Chapter IX - Diseases of the Circulatory System; c) Chapter IV - Nutritional and Metabolic Endocrine Diseases (due to the prevalence in this research, emphasis was placed on Diabetes) and; d) Chapter II – Neoplasms/Cancers (tumors). The variables collected in this research were: a) number of hospitalization authorizations paid for by the Unified Health System and b) total amount (absolute) of admissions for the four disease groups. In the search for this information, the municipality was on the horizontal axis and the outlined variables in columns (vertical axis).

Descriptive statistics were applied from the distribution of simple and relative frequency, in addition to calculating the average. The average cost per hospitalization was measured by dividing the total amount paid by the Unified National Health System by disease group and the number of hospital admissions in each group. After collection, the data was tabulated, organized and summarized in a Microsoft Excel 2010 spreadsheet. The Statistical Package for Social Sciences software for Windows, version 18 was used

for estimations.

The study was submitted to and approved by the Research Ethics Committee of the University Center of Maringa (number 562.087).

Results

Table 1 shows that the total admissions for respiratory diseases in the city analyzed between 2008 and 2012 was 507 cases; 319 for men and 188 for women. The highest concentration was in 2008 (39.1%) and the lowest in 2012 (8.9%). The average annual admissions was equal to 101.4.

For males and females, the highest concentration of admissions occurred in 2008 (125 and 73 cases, respectively). In terms of age group, it was found that men aged between 60 and 69 years (100 cases) were predominant in the number of hospitalizations between 2008 and 2012. For women, this was evidenced as being between 60 and 79 years (88 admissions).

Hospital admissions for cardiovascular diseases accounted for 4,125 cases (Table 2). Of this total, 2,292 were men and 1,833 were women, respectively. The highest frequency of hospitalizations (23.1%) occurred in 2009. The average in this period corresponded to 825 annual admissions.

Table 2 shows that men had higher levels of hospitalization for cardiovascular disease in the years 2008 and 2009, with 515 cases per year. This fact was recorded for Women in 2009 (439 cases). The predominant age group was 55-69 years (947 hospitalizations) for males and 50-69 years for women (873 cases).

Table 3 shows that from a total of 1,394 admissions for diabetes, most cases (24.0%) occurred in 2010, with the annual average of 278.8 cases. In the highlighted period, 732 males and 662 females were admitted due to this disease with the predominant frequency for both genders occurring in 2010. The hospital morbidity for this type of disease in men and women of Maringa was found to be between 55 and 80 and older.

Table 1 - Distribution of hospitalizations due to respiratory diseases, according to gender, age group and year (n=507)

Age group	2008	2009	2010	2011	2012	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
Men (n=319)						
25-29	9 (7.2)	3 (3.5)	5 (8.6)	2 (7.1)	1 (4.5)	20
30-34	3 (2.4)	3 (3.5)	1 (1.7)	1 (3.6)	1 (4.5)	9
35-39	2 (1.6)	2 (2.3)	1 (1.7)	-	1 (4.5)	6
40-44	3 (2.4)	4 (4.7)	3 (5.2)	2 (7,1)	-	12
45-49	12 (9.6)	2 (2.3)	6 (10.3)	2 (7,1)	-	22
50-54	1 (0.8)	5 (5.8)	6 (10.3)	2 (7.1)	2 (9.1)	16
55-59	9 (7.2)	5 (5.8)	6 (10.3)	-	2 (9.1)	22
60-64	21 (16.8)	17 (19.8)	5 (8.6)	7 (25.0)	2 (9.1)	52
65-69	21 (16.8)	14 (16.3)	9 (15.5)	2 (7.1)	2 (9.1)	48
70-74	15 (12.0)	8 (9.3)	9 (15.5)	2 (7.1)	2 (9.1)	36
75-79	15 (12.0)	13 (15.1)	-	4 (14.3)	4 (18.2)	36
≥ 80	14 (11.2)	10 (11.6)	7 (12.1)	4 (14.3)	5 (22.7)	40
Total	125 (100.0)	86 (100.0)	58 (100.0)	28 (100.0)	22 (100.0)	319
Women (n=188)						
25-29	2 (2.7)	3 (7.7)	2 (7.4)	-	1 (4.3)	8
30-34	4 (5.5)	5 (12.8)	2 (7.4)	2 (7.7)	-	13
35-39	2 (2.7)	3 (7.7)	2 (7.4)	-	1 (4.3)	8
40-44	15 (20.5)	3 (7.7)	-	1 (3.8)	1 (4.3)	20
45-49	3 (4.1)	-	-	1 (3.8)	3 (13.0)	7
50-54	4 (5.5)	4 (10.3)	2 (7.4)	2 (7.7)	-	12
55-59	5 (6.8)	5 (12.8)	-	1 (3.8)	5 (21.7)	16
60-64	5 (6.8)	5 (12.8)	3 (11.1)	3 (11.5)	4 (17.4)	20
65-69	9 (12.3)	2 (5.1)	5 (18.5)	4 (15.4)	1 (4.3)	21
70-74	11 (15.1)	4 (10.3)	5 (18.5)	5 (19.2)	1 (4.3)	26
75-79	9 (12.3)	3 (7.7)	1 (3.7)	6 (23.1)	2 (8.7)	21
≥ 80	4 (5.5)	2 (5.1)	5 (18.5)	1 (3.8)	4 (17.4)	16
Total	73 (100.0)	39 (100.0)	27 (100.0)	26 (100.0)	23 (100.0)	188
Grand total	198	125	85	54	45	507

Table 4 identifies 9,881 hospital admissions caused by cancer, being 4,354 men and 5,527 women, respectively. The year 2010 presented a predominant frequency of 20.3% for all cases. The average hospitalization amounted to 1976.2. In 2010, the highest number of males admitted for this type of disease occurred in the municipality (944 cases) and the predominant age group was 60-74 years (1,807 admissions). For females, this fact occurred in 2012 (2,197 cases) with the age between 45 and 59 years being higher than the others.

Table 5 shows the absolute and average costs of Unified National Health System hospital admissions for respiratory diseases, cardiovascular diseases, diabetes and cancer. It shows that SUS had a total expenditure of R$24,795,000.00, of which R$13,539,000.91 for men and R$11,255,000.09 for women. Cardiovascular diseases (51.2%) and cancer (43.6%) represented the most costly classes in the analyzed period.

Table 2 - Distribution of hospitalizations due to cardiovascular disease, according to gender, age group and year (n=4,125)

Age group	2008	2009	2010	2011	2012	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
Men (n=2,292)						
25-29	9 (1.7)	11 (2.1)	4 (0.8)	1 (0.8)	4 (0.9)	29
30-34	3 (0.6)	13 (2.5)	9 (1.8)	7 (2.1)	7 (1.6)	39
35-39	12 (2.3)	20 (3.9)	21 (4.3)	8 (2.4)	9 (2.1)	70
40-44	21 (4.1)	45 (8.7)	21 (4.3)	19 (5.6)	16 (3.7)	122
45-49	37 (7.2)	43 (8.3)	35 (7.1)	33 (9.7)	31 (7.2)	179
50-54	61 (11.8)	63 (12.2)	50 (10.2)	43 (12.7)	48 (11.1)	265
55-59	62 (12.0)	70 (13.6)	61 (12.4)	57 (16.8)	70 (16.2)	320
60-64	73 (14.2)	46 (8.9)	82 (16.7)	48 (14.2)	64 (14.8)	313
65-69	74 (14.4)	67 (13.0)	73 (14.8)	40 (11.8)	60 (13.9)	314
70-74	51 (9.9)	57 (11.1)	56 (11.4)	37 (10.9)	43 (10.0)	244
75-79	52 (10.1)	45 (8.7)	44 (8.9)	23 (6.8)	34 (7.9)	198
≥ 80	60 (11.7)	35 (6.8)	36 (7.3)	23 (6.8)	45 (10.4)	199
Total	515 (100.0)	515 (100.0)	492 (100.0)	339 (100.0)	431 (100.0)	2,292
Women (n=1,833)						
25-29	12 (3.0)	6 (1.4)	9 (2.1)	4 (1.4)	4 (1.5)	35
30-34	5 (1.2)	14 (3.2)	11(2.5)	13 (4.5)	-	43
35-39	15 (3.7)	25 (5.7)	27 (6.2)	10 (3.5)	2 (0.8)	79
40-44	26 (6.4)	29 (6.6)	43 (9.9)	16 (5.6)	16 (6.0)	130
45-49	26 (6.4)	46 (10.5)	32 (7.4)	20 (7.0)	19 (7.1)	143
50-54	32 (7.9)	51 (11.6)	54 (12.4)	36 (12.5)	30 (11.3)	203
55-59	43 (10.6)	44 (10.0)	49 (11.3)	38 (13.2)	27 (10.2)	201
60-64	54 (13.3)	52 (11.8)	74 (17.0)	51 (17.8)	27 (10.2)	258
65-69	44 (10.8)	54 (12.3)	31 (7.1)	39 (13.6)	43 (16.2)	211
70-74	51 (12.6)	34 (7.7)	35 (8.0)	26 (9.1)	34 (12.8)	180
75-79	49 (12.1)	36 (8.2)	23 (5.3)	13 (4.5)	40 (15.0)	161
≥ 80	49 (12.1)	48 (10.9)	47 (10.8)	21 (7.3)	24 (9.0)	189
Total	406 (100.0)	439 (100.0)	435 (100.0)	287 (100.0)	266 (100.0)	1,833
Grand total	921	954	927	626	697	4,125

Table 3 - Distribution of hospitalizations due to diabetes, according to gender, age group and year (n=1,394)

Age group	2008	2009	2010	2011	2012	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
Men (n=732)						
25-29	8 (5.4)	3 (2.1)	4 (2.4)	1 (0.8)	-	16
30-34	2 (1.3)	1 (0.7)	-	5 (4.1)	1 (0.7)	9
35-39	2 (1.3)	5 (3.5)	4 (2.4)	-	3 (2.0)	14
40-44	10 (6.7)	9 (6.3)	10 (6.0)	8 (6.6)	8 (5.3)	45
45-49	6 (4.0)	8 (5.6)	13 (7.8)	13 (10.7)	12 (7.9)	52
50-54	12 (8.1)	11 (7.7)	9 (5.4)	11 (9.1)	18 (11.8)	61
55-59	28 (18.8)	27 (18.9)	22 (13.2)	15 (12.4)	24 (15.8)	116
60-64	22 (14.8)	13 (9.1)	28 (16.8)	11 (9.1)	15 (9.9)	89
65-69	16 (10.7)	18 (12.6)	20 (12.0)	22 (18.2)	22 (14.5)	98
70-74	12 (8.1)	18 (12.6)	22 (13.2)	8 (6.6)	13 (8.6)	73
75-79	15 (10.1)	12 (8.4)	11(6.6)	7 (5.8)	15 (9.9)	60
≥ 80	16 (10.7)	18 (12.6)	24 (14.4)	20 (16.5)	21 (13.8)	99
Total	149 (100.0)	143 (100.0)	167 (100.0)	121 (100.0)	152 (100.0)	732
Women (n=662)						
25-29	3 (2.2)	-	4 (2.4)	8 (7.3)	2 (1.8)	17
30-34	5 (3.7)	2 (1.4)	2 (1.2)	1 (0.9)	-	10
35-39	9 (6.7)	3 (2.2)	3 (1.8)	2 (1.8)	1 (0.9)	18
40-44	4 (3.0)	9 (6.5)	4 (2.4)	2 (1.8)	5 (4.4)	24
45-49	5 (3.7)	7 (5.1)	12 (7.2)	5 (4.6)	6 (5.3)	35
50-54	7 (5.2)	5 (3.6)	15 (9.0)	4 (3.7)	6 (5.3)	37
55-59	20 (14.8)	16 (11.6)	14 (8.4)	13 (11.9)	22 (19.5)	85
60-64	14 (10.4)	21 (15.2)	27 (16.2)	17 (15.6)	14 (12.4)	93
65-69	12 (8.9)	24 (17.4)	19 (11.4)	14 (12.8)	17 (15.0)	76
70-74	13 (9.6)	12 (8.7)	20 (12.0)	13 (11.9)	13 (11.5)	71
75-79	21 (15.6)	14 (10.1)	18 (10.8)	17 (15.6)	14 (12.4)	84
≥ 80	22 (16.3)	25 (18.1)	29 (17.4)	13 (11.9)	13 (11.5)	102
Total	135 (100.0)	138 (100.0)	167 (100.0)	109 (100.0)	113 (100.0)	662
Grand total	284	281	334	230	265	1,394

Table 4 - Distribution of hospital admissions due to cancer according to gender, age group and year (n=9,881)

Age group	2008	2009	2010	2011	2012	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
Men (n=4,534)						
25-29	9 (1.1)	3 (0.4)	17 (1.8)	17 (1.9)	16 (1.7)	62
30-34	31 (3.8)	13 (1.6)	17 (1.8)	29 (3.3)	24 (2.6)	114
35-39	30 (3.7)	9 (1.1)	30 (3.2)	19 (2.2)	26 (2.8)	114
40-44	51 (6.3)	33 (4.1)	46 (4.9)	19 (2.2)	42 (4.6)	191
45-49	54 (6.7)	79 (9.9)	58 (6.1)	90 (10.2)	66 (7.2)	347
50-54	66 (8.2)	78 (9.7)	97 (10.3)	67 (7.6)	87 (9.5)	395
55-59	64 (7.9)	66 (8.2)	123 (13.0)	99 (11.2)	127 (13.8)	479
60-64	128 (15.8)	149 (18.6)	99 (10.5)	130 (14.7)	122 (13.3)	628
65-69	113 (14.0)	105 (13.1)	154 (16.3)	136 (15.4)	136 (14.8)	644
70-74	74 (9.2)	111 (13.8)	106 (11.2)	110 (12.5)	134 (14.6)	535
75-79	102 (12.6)	54 (6.7)	92 (9.7)	82 (9.3)	65 (7.1)	395
≥ 80	86 (10.6)	102 (12.7)	105 (11.1)	84 (9.5)	73 (8.0)	450
Total	808 (100.0)	802 (100.0)	944 (100.0)	882 (100.0)	918 (100.0)	4.354
Women (n=5,527)						
25-29	32 (3.0)	40 (3.7)	29 (2.7)	22 (2.1)	27 (2.1)	150
30-34	53 (5.0)	39 (3.6)	41 (3.9)	53 (5.1)	57 (4.5)	243
35-39	86 (8.2)	56 (5.2)	78 (7.3)	64 (6.1)	81 (6.3)	365
40-44	108 (10.2)	94 (8.7)	125 (11.7)	115 (11.0)	148 (11.6)	590
45-49	128 (12.1)	164 (15.2)	159 (14.9)	157 (15.0)	188 (14.7)	796
50-54	122 (11.6)	147 (13.6)	111 (10.4)	125 (11.9)	139 (10.9)	644
55-59	123 (11.7)	140 (12.9)	130 (12.2)	129 (12.3)	161 (12.6)	683
60-64	102 (9.7)	107 (9.9)	109 (10.2)	109 (10.4)	114 (8.9)	541
65-69	91 (8.6)	111 (10.3)	93 (8.7)	89 (8.5)	118 (9.2)	502
70-74	74 (7.0)	80 (7.4)	86 (8.1)	77 (7.3)	127 (9.9)	444
75-79	63 (6.0)	40 (3.7)	57 (5.4)	56 (5.3)	54 (4.2)	270
≥ 80	72 (6.8)	64 (5.9)	46 (4.3)	52 (5.0)	65 (5.1)	290
Total	1054 (100.0)	1082 (100.0)	1064 (100.0)	1048 (100.0)	1279 (100.0)	5.527
Grand total	1,862	1,884	2,008	1,930	2,197	9,881

Table 5 - Absolute and average costs (by years) of hospitalizations for the Unified National Health System, for chronic diseases and gender

Disease	Male	Female	Total cost R$ 1000 (%)	Average Cost (R$)
	Cost/R$ 1000 (%)	Cost/R$ 1000 (%)		
Cardiovascular	7,867.09 (58.1)	4,802.56 (42.7)	12,669.65 (51.2)	3,071.43
Neoplasm/cancer	4,941.98 (36.5)	5,869.41 (52.1)	10,811.39 (43.9)	1,094.16
Diabetes	342.07 (2.5)	323.22 (2.9)	665.29 (2.6)	477.25
Respiratory	388.77 (2.9)	259.9 (2.3)	648.67 (2.6)	1,279.43
Total	13,539.91 (100.0)	11,255.09 (100.0)	24,795.00 (100.0)	

Discussion

This research showed that hospital admissions for respiratory diseases in Maringa, between 2008 and 2012, showed a gradual decline for both genders. However, prevalence of hospitalization was higher for men. The number of hospitalizations in individuals aged 60 and older was higher than in younger age groups. These results are in line with research conducted in Rio Grande do Sul[7], which analyzed the profile of admissions for chronic diseases in primary care by gender between 2000 and 2010, and which concluded that hospitalizations for men (61.10%) exceeded women (38.90%) for lung/pulmonary diseases. Results regarding morbidity for respiratory diseases disclosed in Maringa and other regions of Brazil can be explained by the lifestyle of men; high consumption of tobacco and alcohol, their low demand for health services offered by primary care and their higher occupational exposure[8].

This research also showed that there was a decline in cases of cardiovascular diseases in the city of Maringa, especially among female admissions. This fact may be related to increased demand for health care in primary care and active pursuit of this group for the early detection of disease[9]. It is inferred that the senior age group (60 and older) had the highest number of hospitalizations due to the occurrence of these diseases. Admissions of men for this kind of chronic disease are superior to women in the municipality.

In this line of analysis, research on chronic diseases developed for Brazil and the South region between 1996 and 2007 showed a decline in cardiovascular and respiratory diseases (as evidenced in this study). In the analyzed period, there was a 34% reduction in the occurrence of cerebrovascular diseases and a reduction of 26% related to mortality from ischemic heart disease. It has been found that the morbidity and mortality brought on by cardiovascular causes in Brazil remain high[4].

The small variation in hospital admissions for diabetes found in this research can also be verified by analyzing the national and state statistics. When comparing the years 1994 and 2005 for the elderly Brazilian population, the results also show little variation in admissions for diabetes. In 1994, nutritional and metabolic endocrine diseases (including diabetes being the most relevant) represented 4.49% (110,228 cases) of SUS hospital morbidity; while in 2005, the share amounted to 5.04%, with 112,172 cases[10].

It is worth adding that the population's living habits still do not contribute to a significant drop in the incidence of diabetes[11], due to the presence of high calorie diets, overweight, obesity, physical inactivity, smoking and alcohol, are common in all age groups at national and worldwide levels[12]. In 1995, diabetes reached 4% of the world adult population; in 2025, it will reach up to 5.4%, with the aggravation that in developing countries, the disease will be predominantly involved in the younger age groups

when compared to developed regions[13].

Similarly, another study analyzed the profile of hospital morbidity of the Paraná Health District from 2008 to 2011, showing that nutritional and metabolic endocrine disorders, in those aged 60 years and older, accounted for 4.1% (31,876 cases) of Unified National Health System hospitalizations during the study period[8].

Regarding hospital morbidity from cancer, it was possible to observe a small increase for both genders, but with a higher prevalence in women. This result differs from the study in 2013[14] in the city of Palmas, Tocantins, from 2005 to 2011, which showed a decrease of hospitalizations for the year 2006 (500 cases/100,000 inhabitants) and for the year 2008 (300 cases/100,000 inhabitants) and continued until 2011, except for 2009 showing a significant increase of 400 cases/100,000 inhabitants. This fact can be explained by implementations of different public policies for the prevention and screening of cancers in different regions of the country.

The results of cancer admissions and gender in Maringa also do not follow the behavior evidenced in Paraná[8]. Between 2008 and 2011, there was a higher prevalence of hospitalizations for cancer in men (10.9%) than in women (7.9%) in the state. In this research, the highest rate was for women aged over 40 years.

The prevalence of neoplasms/cancers in a particular region may be due to failure in tracking the cancer screenings assessed by self-reporting, still being less than the desired and the unequal distribution of services[4,8]. In addition, differential exposure to environmental factors related to industrialization, such as chemical, physical and biological agents, and living conditions, which vary in intensity depending on the social inequalities and the genetic differences of each population may contribute to this discrepancy[15].

In this context, cases of cancer arise due to bad lifestyle habits developed by the population, along with the pressure of a capitalist, globalized world; poor nutrition in fiber, high in fat and protein (a risk factor for colon and rectal cancer); the large consumption of alcohol (a risk factor for stomach cancer); occupational exposure (risk factor for lung cancer) and the sun exposure (a risk factor for skin cancer)[16].

On the issue of total expenditures for hospital admissions in Maringa, cardiovascular diseases accounted for the highest average spending and the largest number of admissions compared to other analyzed chronic diseases, with males being the most affected. It was also found that despite cancer revealing average spending below that of respiratory diseases, it accounted for a higher total amount due to the higher number of hospital admissions.

These results are consistent with data obtained for Paraná, that hospitalization only caused by diseases and non-communicable diseases cost more than 340 million in 2004, corresponding to 68.3% of total spending, which already includes healthcare for births. Cardiovascular diseases demanded the highest values, with 26.5% of all hospital spending (more than a quarter of the total), despite representing just 13.3% of admissions. Neoplasms and respiratory diseases, in turn, had 8.5% and 4.3% of hospital expenses, respectively[17].

It is also known that the economic and fiscal costs of chronic diseases are high and show a growing trend in national and worldwide levels. A study conducted in low and middle income countries, including Brazil, Argentina, Colombia and Mexico, found that about 85 billion dollars of economic output will be spent on only cardiovascular disease and diabetes from 2006 to 2015[18].

For example, in a study conducted with 150 patients at a specialized hospital in the South of India between February and July 2012, it was shown that the average cost per diabetic patient with and without comorbidities corresponded to US$314.15 and US$29.91 dollars, respectively. In addition, greater economic weight was observed in male patients (U$332.06 dollars), aged 51-60 years

(U$353.55 dollars) and patients with macrovascular complications (U$142.01 dollars)[19].

In the Unified National Health System, chronic diseases are responsible for major medical expenses. In 2005, the six billion spent for the payment of hospital stay authorizations, not including births; chronic diseases accounted for 58% of total spending, with cardiovascular diseases accounting for 22% of this amount, chronic respiratory diseases for 15%, and cancer for 11%. In this context, chronic diseases negatively affect the economy because they affect labor supply, the budgets of low-income populations and consequently the quality of life of individuals[20].

Conclusion

The highest prevalence of hospitalizations among chronic diseases occurred for cancer affecting females, and cardiovascular disease was predominant for males. Respiratory diseases remained in decline while diabetes remained stable for the number of hospitalization cases.

The analysis proposed in this study enabled epidemiological study of four groups of chronic diseases in Maringa, a time frame study that can be used as an indicator in the development of policies that seek to prevent risk factors for these diseases and promote actions to improve the health of local people. However, it is worth mentioning that restrictions in Brazil regarding information on the municipalities and the updating of secondary data in the Unified National Health System information system lead to difficulties in developing strategies according to the needs of each region of the country.

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Collaborations

Soto PHT, Raitz GM, Bolsoni LL and Costa CKF contributed to the design, analysis, data interpretation, article writing and final approval of the version to be published. Yamaguchi MU and Massuda EM contributed to the writing of the article and final approval of the version to be published.

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