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SUMMARY

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INSTRUCTIONS FOR AUTHORS

SALUS – Journal of Health Sciences / Revista de Ciências da Saúde
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The general publication rules are summarized in the "Uniform Requirements" for Manuscripts Submitted to Biomedical Journals: "Writing and Editing for Biomedical Publication" (www.icmje.org/recommendations). Special suggestions are given to systematic bibliographic reviews and meta-analyzes, retrospective and observational studies on epidemiology, clinical trials, diagnostic accuracy and prospective studies, case reports and case studies. We ask the authors to check the information below before submitting the manuscript to SALUS.

INFORMATIONS FOR AUTHORS

The Salus – *Journal of Health Sciences* is the scientific magazine by EMESCAM – Escola Superior de Ciências da Santa Casa de Misericórdia de Vitória (School of Sciences of Santa Casa de Misericórdia in Vitória) and it is published every four months.

SALUS aims to publish relevant researches in health science and health policy areas that help social development in a globalized manner. It promotes the study, improvement and update of expert professionals, through the discussion, distribution and the promotion of evidence-based information.

The works submitted to publication in SALUS must concern themes related to health sciences and health policies.

The following article categories are published in the magazine: original article, editorial, review/update article, case report, brief communication and preliminary note, letter to the editor, experimental work, clinical-surgical correlation and multimedia. The acceptance will be based in originality, significance and scientific contribution. Articles with mere propagandistic or commercial aims will not be accepted. The authors are responsible for the content and information in their manuscripts. The magazine will be fully published in its website (www.salusjournal.org).

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- 1st Step: article classification
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- 3rd Step: authors' registration
- 4th Step: Abstract inclusion (in Portuguese and English)
- 5th Step: inclusion of the manuscript with references
- 6th Step: sending pictures
- 7th Step: generating the copyright transfer statement, conflict interest and a copy of the Legal Opinion by the Institution's Ethic Committee of Research.
- 8th Step: article sending/Submission finishing

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All scientific contributions are reviewed by the Editor, Associate Editors, Members of the Editorial Council and/or Invited Reviewers. The reviewers answer a small questionnaire, in which they sort the manuscript and make a rigorous examination of all items that must compose the scientific work and assign a score to each item of the questionnaire. In the end, general comments about the work are done and it suggests if the work should be published, corrected – according to the recommendations – or definitely rejected. The editor will make the decision based in these data. In case of discrepancies among the evaluators, a new opinion may be requested in order to get a better judgment. When modifications are suggested, they will be forwarded to the main author and then to the reviewers, so they may check if the demands were attended. The authors have 10 days to perform the modifications demanded by the reviewers and resubmit their articles. The authors must highlight the modifications performed in their texts answering to comments/suggestions by reviewers. Losing this deadline will imply the removal of such articles from the review process. Once articles are accepted, proofs of edited articles (PDF format) will be sent to their authors for evaluation and final approval.

Language

The articles must be written in Portuguese or English, using scientific, clear and precise language, avoiding the informality of colloquial language. The magazine will provide translation for works that do not have an English or Spanish version. SALUS publishes articles in Portuguese and English and abstracts in Portuguese, English and Spanish.

Research with Human Beings and Animals

Investigations in human beings must be submitted to the Ethics Committee of the Institution, fulfilling the Declaration of Helsinki from 1975, reviewed in 2008. (World Medical Association, available at:www.wma.net/en/30publications/10policies/b3/17c.pdf), and the Resolution CNS 466/12 – Brazilian National Health Council (Conselho Nacional de Saúde), available at http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf

Experimental works involving animals must be submitted to the Ethics Committee of Research with Animals, respecting Federal Law n. 11.794/2008, Decree n. 6.899/2009 and CONCEA (National Council for Control of Experimentation with Animals) Resolution n. 12/2013 – Brazilian Guideline of Practice for Care and Use of Animals for Scientific and Teaching Purposes (Diretriz Brasileira de Prática para o Cuidado e Utilização de Animais para fins Científicos e Didáticos – DBCA), available at: http://concea.mct.gov.br.

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SALUS supports the policies for registration of clinical trials by the World Health Organization (WHO) and by the International Committee of Medical Journals Editors (ICMJE), acknowledging the importance of such initiatives for the international recording and broadcast of information about clinical studies, in open access. Therefore, only clinical research articles that received identification number at one of the Clinical Trial Registrations validated by the criteria established by WHO and ICMJE will be accepted. The addresses are available at ICMJE website (www.icmje.org). The identification number must be registered at the end of the abstract.

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We suggest that the authorship criteria of the adopted articles follow the recommendations of the *International Committee of Medical Journal Editors*. Thus, only those who contributed directly to the intellectual content of the work must be listed as authors. The authors must match all the following criteria, in order to have public responsibility for the content of their work:

1.. To have created and planned the activities that led to the work, or interpreted the results found, or both;
2.. o have written the work or revised the successive versions and taken part in the revision process;
3.. To have approved the final version.

People who do not match the above requirements and who had merely technical or general support participation may be mentioned in the Acknowledgement section. The kind of contribution from each author to the study performance and to the manuscript preparation must be explained in the following areas, at the moment of submission:

1. Study design;
2. Data collection, analysis and interpretation;
3. Manuscript writing.

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The use of acronyms must be low. When long expressions need to be repeated, it is recommended that its capital initial letters substitute them after the first mention, which must be followed by the initials between parentheses.

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The use of abbreviations must be avoided in Abstracts (in both languages). Only the generic name of the used medication must be mentioned in the work; the use of commercial names is inadvisable.

SALUS adopts the Universal Official Anatomical Terminology, approved by the International Federation of Associations of Anatomists (IFAF)

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Sections of the Manuscript

Title and Authors: The work title, in Portuguese and English, must be concise and informative. Each author's full name, titles and institutional links must be provided.

Abstract (in Portuguese and English): The abstract must be structured in four sections: Objective, Methods, Results and Conclusion. The Abstract in English must follow the same structure of the Abstract in Portuguese. Acronyms must be avoided. The maximum number of words must follow the recommendations of the table (Limits for each article type). The abstract must not be structured in Case Report articles (informative or free). The clinical-surgical correlations and multimedia sections dispense abstract.

Descriptors: Three to five descriptors (keywords) must also be included. The descriptors may be consulted in the electronic address http://decs.bvs.br/, which contains words in Portuguese and English or www.nlm.nih.gov/mesh, for only English words, or in the respective links available at the submission system of the magazine.

Manuscript Body: The Original Articles and Experimental Works must be divided in the following sections: Introduction, Method, Results, Discussion, Conclusion and Acknowledgements (optional). The Case Reports must be structured with the sections: Introduction, Case Report and Discussion; and the Clinical-surgical Correlations must be divided in Clinical Data, Electrocardiogram, Radiogram, Echocardiogram, Diagnosis and Operation. The Multimedia section must present the following sections: Patient Featuring and Description of the Employed Technique. The Review Articles and Special Articles may be structured in sections according to the author's order.

The Letters to the Editor must, at first, comment, discuss or criticize articles published in SALUS, but they may also refer to other themes of general interest. It is recommended a 1.000 words maximum and it includes five references, maximum, with or without title. Whenever possible, an answer from the authors of articles in discussion will be published along with the letter.

References

The references of printed and electronic documents must be standardized according to the Vancouver style, elaborated by the *International Committee of Medical Journal Editors* (ICMJE, available at: http://www.icmje.org).

The references must be identified with Arabic numerals in the text, superscript, obeying the citation order in the text. The accuracy of the references is an author's responsibility. If more than two references are cited in sequence, only the first and the last must be typed, separated by a dash (Example: [6-9]). In cases of alternate citation, all the references must be typed separated by comma (Example: [6,7,9]). All authors must be cited in publications with up to 6 authors; in publications with more than 6 authors, the first 6 are cited followed by the Latin expression "et al.".

Titles of journals must be abbreviated according to the List of Journals Indexed for MEDLINE (available at:http://www.nlm.gov/tsd/serials/lji.html).

References Models

Magazine Article

Issa M, Avezum A, Dantas DC, Almeida AFS, Souza LCB, Sousa AGMR. Fatores de risco pré, intra e pós-operatórios para mortalidade hospitalar em pacientes submetidos à cirurgia de aorta. Rev Bras Cir Cardiovasc. 2013; 28(1):10-21.

Organization as Author

Diabetes Prevention Program Research Group. Hypertension, insulin, and proinsulin in participants with impaired glucose tolerance. Hypertension. 2002;40(5):679-86.

Without indication of authorship

21st century heart solution may have a sting in the tail. BMJ. 2002;325(7357):184.

Article published electronically before the print version ("ahead of print")

Atluri P, Goldstone AB, Fairman AS, Macarthur JW, Shudo Y, Cohen JE, et al. Predicting right ventricular failure in the modern, continuous flow left ventricular

assist device era. Ann Thorac Surg. 2013 Jun 21. [Epub ahead of print]

Article of Internet Journal

Machado MN, Nakazone MA, Murad-Junior JA, Maia LN. Surgical treatment for infective endocarditis and hospital mortality in a Brazilian single-center. Rev Bras Cir Cardiovasc [online]. 2013[cited 2013 Jun 25];28(1):29-35. Available at:http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-76382013000100006&lng=en&nrm=iso

Book Chapter

Chai PJ. Intraoperative myocardial protection. In: Mavroudis C, Backer C, eds. Pediatric cardiac surgery. 4th ed. Chichester: Wiley-Blackwell; 2013. p.214-24.

Book

Cohn LH. Cardiac surgery in the adult. 4th ed. New York: McGraw-Hill;2012. p.1472.

Thesis

Dalva M. Estudo do remodelamento ventricular e dos anéis valvares na cardiomiopatia dilatada: avaliação anátomo-patológica [Tese de doutorado]. São Paulo: Universidade de São Paulo, 2011. 101p.

Legislation

Conselho Nacional de Saúde. Resolução n. 466, de 12 de dezembro de 2012. Dispõe sobre diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Bioética. 1996;4(2 Supl):15-25.

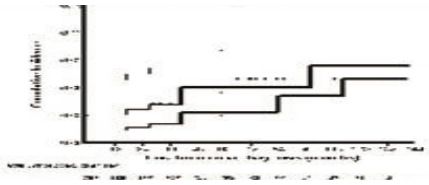
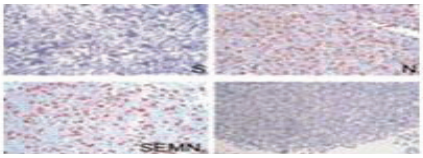
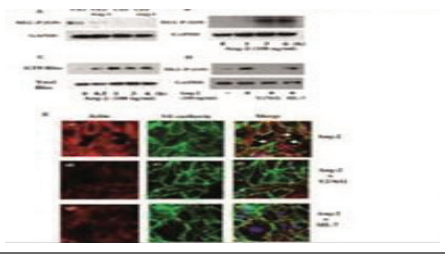
Conselho Nacional de Controle de Experimentação Animal. Resoluções n. 12 e 13, de 20 de setembro de 2013. Dispõem sobre a diretrizes brasileiras para o cuidado e a utilização de animais para fins científicos e didáticos (DBCA) e prática de eutanásia.

Other examples of references may be consulted at the website:

http://www.nlm.nih.gov/bsd/uniform_requirements.html

Tables and Pictures

The Tables and Pictures must be numbered according to order appearance in the text, contain a title and be in separate files. The tables must not contain redundant data, previously mentioned in the text. They must be open in the sides and with a totally white background. The acronyms used in the tables must be mentioned in alphabetical order, in the footnote, with their respective full forms. Similarly, the acronym used in pictures must be explained in the legends. The pictures will only be published in colors if the author agrees to afford the costs of impression of colorful pages. Only images in formats TIFF or JPEG will be accepted, with minimum resolution according to the kind of image, for both black and white and colorful images, according to the Table below:

Tipo	Exemplo	Formato	Resolução
LineArt (imagens com linhas lineares, normalmente gráficos com texto)		TIF OU JPG	900 a 1.200 dpi
Halftone (imagens, normalmente fotografias)		TIF OU JPG	300 dpi
Combo (mistura de gráfico e imagem)		TIF OU JPG	500 a 900 dpi

SALUS requests that authors save the original images with them, because if the images submitted online present any hindrance for printing, we will get in touch so they can send us the originals.

Limits per Type of Article

The following criteria sorted by type of publication must be observed, aiming to rationalize the space in the magazine and allow more articles per edition. The electronic word count must include the initial page, abstract, text, references and picture legends. The titles have 100 characters limit (counting the spaces) for Original Articles, Review and Updating Articles and Experimental Work; the other categories have 80 characters (counting the spaces) title limit.

	Original Article	Editorial	Review / Updating Article	Case Report	Case Report and Literature Review	Brief Communication and Preliminary Note	Letter to the Editor	Experimental Work	Clinical-Surgical Correlation	Multimedia
Maximum number of authors	10	4	5	4	6	4	2	10	4	4
Abstract – Maximum number of words	250	-	200	100	100	100	-	250	-	-
Maximum number of words	6.000	1.000	8.000	1.500	3000	2.000	400	6000	800	800
Maximum number of references	40	10	75	6	20	6	6	40	10	10
Number of tables and pictures	8	2	8	2	6	2	1	8	2	1
Abbreviated Title	—	—	—	—	—	40 Caracteres	—	—	—	—

Table Model:

Table 1 – Model table

AREAS	UNESP	UNICAMP	USP	TOTAL
Interdisciplinary	2	2	2	6
Biological and Health	2	2	2	6
Exact and Technological	2	2	2	6
Human and Arts	2	2	2	6
TOTAL	**8**	**8**	**8**	**24**

Source:

Note:

Picture Model:

Figure 3 – Segmentation examples classified as partially concordant for the Osiris system (yellow outline) and the System for the Detection and Quantification of Pulmonary Emphysema (SISDEP; red outline). Overlapping segmentation contours in wire-level HRCT images (in a and b) and in the base level (in c). In a, the agreement is partial because of the inaccuracies generated in the segmentation of the two systems, in b, for the inaccuracy performed by the segmentation of the DISDEP; and in c, due to inaccuracy caused by the segmentation of the Osiris system.

Check it before sending the work

- Submission letter indicating the manuscript category.
- Statement by authors and co-authors saying that they agree with the content of the manuscript.
- Approval Letter by the Ethics Committee of Research.
- Manuscript written in software Word 97 or above (formatted to A4); font size 12, space 1.5, font Times New Roman; paged; mathematical symbols and Greek characters using font Symbol.
- Manuscript in the limits adopted by SALUS for its category.

EDITORIAL

Salus Journal has its 5th edition completed and it includes themes of epidemiological studies, multidisciplinary intervention and case reports laying particular reference on physiotherapy, with ten articles published in this edition.

Special attention was given to diseases or cardiovascular and respiratory approaches, as well as to the health of the child and the elderly in this edition. It is worth emphasizing the characteristics of the journal in the health area, pointed out in the latest publications and confirmed in this issue with several important topics, designed not only to introduce good practices and specific studies in knowledge areas, but also in studies of Attention not only to the child, but also to the elderly and the population as a whole.

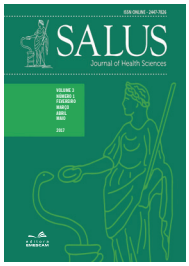
Furthermore, the wide variety of topics on different research areas from reports of epidemiological studies to specific and experimental studies on bacteria, denote the feature of constant evolution of the journal.

Science should not be stuck in terms of lines of reasoning, always in a specific way, but should always be linked to the problems of society, and researchers should try to develop solutions that preferably seek multidisciplinary prevention methods and integral approach of the patient altogether or of health users.

Prof. Dr. Hebert Wilson Santos Cabral

Research and Graduate Coordinator – EMESCAM

REVISTA SALUS
JOURNAL OF HEALTH SCIENCES



ORIGINAL ARTICLE

Health situation of Vitória / ES through electronic records of primary care: an epidemiological study

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Approved on November 3, 2016

Keywords

Diagnosis of Health Situation; Health Profile; Primary Health Care; Health Transition; Electronic Health Records

Abstract

This research aims to describe the health situation in Vitória / ES, in 2014, based on electronic records of primary care. As a methodology, it were checked the frequency of care and the average number of visits per inhabitant according to sex, age group, income from the neighborhood of residence and cause groups / subgroups proposed by the WHO, as well as the average number of visits per case, according to the group / subgroup of Cause. The results indicated a predominance of female patients and the older age groups. Non-communicable diseases were 71.98% of the cases; Infectious / parasitic, maternal, perinatal and nutritional 27.51% and injuries 0.5%, with differences in the distribution according to sex, age group and income of the neighborhood of residence. It was concluded that care in primary care in Vitória / ES reflects the epidemiological transition, with a double impact of chronic diseases in the elderly and infectious diseases in young people. The results obtained are profitable to identify the health profile, as well as discrepancies of attendance in relation to gender, age and income class.

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INTRODUCTION

Developing countries have large counties that are truly complex systems with health problems that are not limited to the patterns characterized in the traditional model of epidemiological transition: population aging, morbidity predominating over mortality and non-communicable chronic diseases with a higher prevalence than the transmissible ones. In these counties, it is possible to observe a combination of infectious and chronic diseases added to the specific conditions of varied urban environment[1-3] where socioeconomic inequality turns out to be an important factor for health differences among neighborhoods[4], contributing towards the epidemiological complexity which knowledge is necessary for the health services administration.

Unified Health System (SUS) has primary care as a gateway in Brazil[5-6]. This way, the data produced at this level of attention are useful for the health situation diagnosis as well as the epidemiological pattern definition of the population [7-10].

Vitória, the capital of Brazilian State of Espírito Santo, located in the southeastern region of the country, ranks fourth in the Human Development Index (HDI)[11], and its public health system is located in the first group in terms of quality, among the Country's counties[12]. The municipal health care network is totally computerized through the Welfare Network (RBE). In 2014, the city registered a population of 352,104 inhabitants[13,14], 78 neighborhoods and 30 basic health units, which offered 90% population coverage[12].

This article consists in an exploratory investigation of the attendances realized in the primary attention services in Vitória, in 2014, for the main goal of the study is to describe the city health situation.

METHODS

In this descriptive cross-sectional study, data were extracted from all electronic records of the visits performed by doctors and nurses at the basic health care center inVitória in 2014.

The records accessed included the fields: patient registration number (personal and non-transferable), patient name, gender, age, date of care, patient's primary health care unit (that is, where the registration was done), patient's neighborhood of residence, code of the procedure performed and cause of care, identified and coded according to the International Classification of Diseases - 10th edition (ICD-10)[15]. Fields were created for the kind of professional attendant who performed the care, and basic health unit where the patient was treated, information was also available in the system**.** The names of the patients were deleted and their registration numbers were re-encoded, guaranteeing anonymity. The names of the professionals who performed care were not collected.

The 2010 Demographic Census data for Vitória were obtained from the Brazilian Institute of Geography and Statistics (IBGE)[13], covering each neighborhood population by sex, age and average monthly household income value, with respect to minimum wage, of permanent private households in the neighborhood of residence.

In a database with 523,745 records, the general completeness and of each field was initially measured. The empty fields, unknown or with not compatible information were considered without information. Call services with IDC-10 not specified were not considered just as they were not those without information on home address, those of residents in three neighborhoods in Vitória where health actions do not take place - the reason for that is because they are in an under litigation area and its population of 8,638 inhabitants is referenced to another city – and the non-residents in the city were not specified either. A total of 109.648 calls were excluded, but 414,097 calls remained at the database.

The variable age was classified in age groups: 1-4, 5-9, 10-14, 15-19, 20-29, 30-

39, 40-49, 50-59, 60-69, 70+. The variable 'neighborhood of residence' was altered into classes according to the average household income of each neighborhood, simply expressed as 'income class' and categorized as: low income (more than 1 to 3 minimum wages), middle-low income from 3 to 5), middle-high income (more than 5 to 10) and high income (more than 10).

Absolute and relative frequencies and the average number of calls per inhabitant, according to sex, age group and income class were obtained. The average attendance per inhabitant was computed by dividing the number of attendances of residents in each neighborhood by the corresponding population in 2010. The average number of visits was studied for the bivariate analyzes.

In a second stage, the cause of care was recodified in the three groups and their 22 subgroups proposed by the World Health Organization (WHO) to estimate the global burden of diseases[16]: (I) transmissible, maternal, perinatal and nutritional conditions, Non-communicable conditions and (III) injuries. The groups and subgroups are described in Figure 1.

For this second stage, the ICD-10 calls not included in WHO categorization and those without a patient's registry number were excluded, so that the number of cases could be obtained. 191,059 exclusions occurred, and 223,038 calls are being studied.

Absolute and relative frequencies of care were calculated by cause groups (I, II and III) and the differences by sex, age group and income class were set apart. Possible association between the cause groups and those variables was investigated using the Pearson Chi-square test, at a significance level of 5% ($p < 0.05$). With regard to identify contingency table cells with behaviors that were significantly different from those expected between independent variables, the Adjusted Residues Analysis was also used, at a significance level of 5% (cut-off point = 1.96) [17].

Figure 1 – Groups and subgroups proposed by the World Health Organization for estimating the global burden of disease.

Group I Communicable conditions, maternal, Perinatal and nutritional
I.A. Infectious and parasitic diseases
I.B. Respiratory infections
I.C. Maternal conditions
I.D. Neonatal conditions
I.E. Nutritional deficiencies
Group II Non-communicable diseases
II.A. Cancer
II.B. Benign Neoplasms
II.C. Diabetes mellitus
II.D. Endocrine, blood and immune disorders
II.E. Mental and behavioral disorders
II.F. Neurological conditions
II.G. Diseases of the sense organs
II.H. Cardiovascular diseases
II.I. Respiratory diseases
II.J. Digestive diseases
II.K. Genitourinary diseases
II.L. Skin diseases
I IM. Musculoskeletal diseases
II.N. Congenital anomalies
II.O. Oral conditions
Group III Injury
III.A. Unintentional Injury
III.B. Intentional Injury

The average number of visits per case according to the cause groups was also obtained. Patients with ICD-10 classified in one group were represented by the 'case', and these patients could simultaneously be considered in different groups of attendance cause.

The income class was summarized, agglutinating the two highest categories in the 'high' category and the two lowest ones, in the 'low' category. This was done for the attendance analysis according to sub-groups of cause.

All variables were coded and the analyses were conducted using Statistical Package for Social Sciences (SPSS), version 23.0.

This study was authorized by the Health Department of Vitória and approved by the

Research Ethics Committee of EMESCAM (CAAE 44858215.6.0000.5065). No conflicts of interest of the authors in relation to this study took place.

RESULTS

From all 523,745 visits without any exclusion, 385,657 (73.63%) were performed by physicians and 138,088 (26.37%) by nurses. Only the age field was filled in at all attendances. The date was not filled in 6. Gender, neighborhood of residence, unit of origin and procedure had similar noncompliance ratios (0.15 to 0.44%), while registration number and ICD-10, respectively, were 16.67 % And 20.15%.

Table 1 shows the distribution of the 414,097 visits included in this study according to sex, age group and income class. The average attendance rate per inhabitant was 1.30, with 1.68 female calls per female and 0.87 female attendance per male[13]. A total of 68,61% of attendance total was of female patients.

Table 1 – Attendance and average service care by gender, age group and income class, in primary care in Vitória, 2014.

Variable		Attendances		Average attendance per inhabitant
		Nº	%	
Gender	Female	284114	68,61	1,68
	Male	129983	31,39	0,87
Age group	0-4	55213	13,33	2,89
	5-9	20387	4,92	1,05
	10-14	16071	3,88	0,70
	15-19	21581	5,21	0,87
	20-29	45183	10,91	0,73
	30-39	48251	11,65	0,96
	40-49	52536	12,69	1,19
	50-59	62432	15,08	1,65
	60-69	49415	11,93	2,38
	70+	43028	10,39	2,43
Income class	Low	53574	12,94	1,77
	Average low	217417	52,50	1,84
	Average high	80943	19,55	1,71
	High	62163	15,01	0,50
Total		414097	100,00	1,30

The proportion of visits was 13.33% in the 0 to 4 years age group, decreased in the following bands, rose again from 20-29 years and peaked in 50-59 (15.08%). The highest average attendance per inhabitant occurred in the 0-4 age group (2.89), followed by 70+ (2.43) and 60-69 (2.38). The range of 10-14 had the lowest average attendance per inhabitant (0.70).

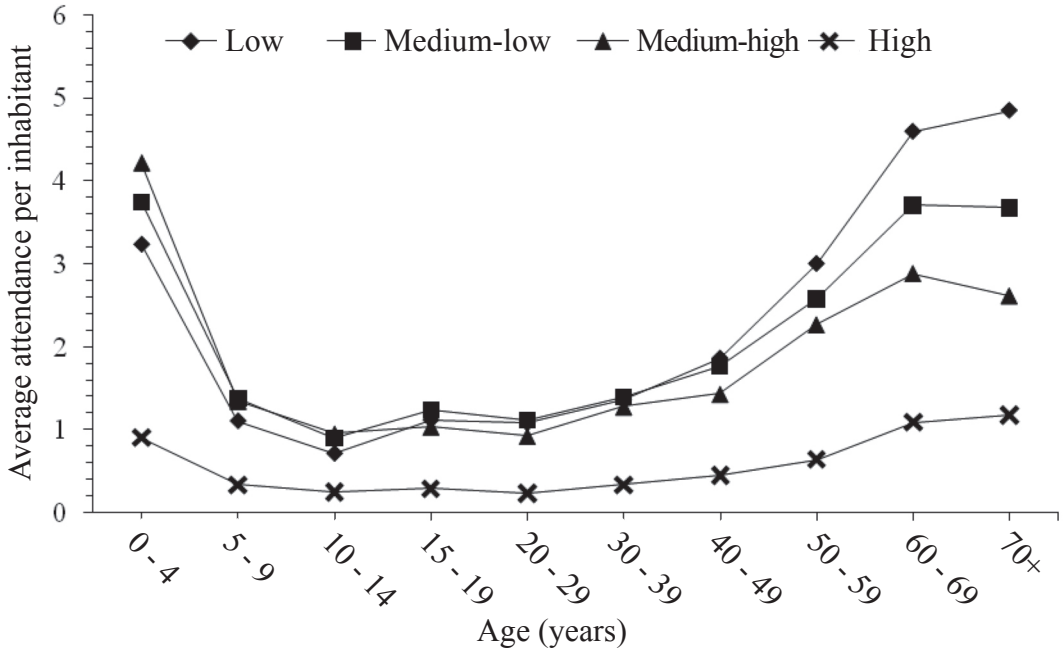
Most of the attendances (52.5%) were of residents from low-middle income neighborhoods and the lowest part (12.94%) from low-income neighborhoods, but the average attendance per inhabitant indicated a similar distribution among the lowest income classes (1.77 per inhabitant), low average (1.84 per inhabitant) and high average (1.70 per inhabitant). Only the highest income class (more than 10 wages) presented lower average (0.50 attendances per inhabitant).

With reference to the attendances distribution between genders by age (data not featured), in the age group 0 to 14 the female / male ratio

ranged from 0.96 to 1.19. It is noticed that the attendance frequency of female patients predominated in a significant way from the 15 to 19 age range, with a female / male ratio ranging from 2.24 to 3.83. The sex ratio of the average number of visits per inhabitant smoothened the discrepancy, presenting lower values in the elderly age group: from 15 to 59 years old, ranged from 2.14 to 3.61, falling from 60 onwards (1.74 to 1.34). The average attendance per inhabitant, according to sex, was similar for the four income classes (female / male ratio between 1.92 and 2.03).

Figure 2 shows the average number of attendances per inhabitant as reported by income class and age group. The high income class had the lowest average attendance per inhabitant in all age groups (range of 1.18 to 0.23). For the three other income classes, it is possible to note a ranking of the lowest to the highest income forming from the age of 40. In the range of 0-4 years, there is a reversal in this ranking, with a higher average of attendance in the upper middle class, followed by the low and low average.

Figure 2 – Average attendance per inhabitant according to income class and age group, in primary care in Vitória, 2014.



Among the 223,038 attendances included in the study of causes, the most expressive group was non communicable diseases (group II), which responded for 80.87% of the visits and 71.98% of the cases (Table 2). Infectious / parasitic, maternal, perinatal and nutritional diseases (group I) constituted 18.90% of the visits and injuries (group III), 0.23%. The average number of visits per case was higher for the causes of group II (2.65), compared to the causes of group I (1.62) and group III (1.08).

The distribution of visits by attendance groups (Table 2) was significantly influenced by gender, age group and income class (p = 0.000).

The number of visits for group II causes, in females, was significantly higher than expected, if the variables were independent, while the number of visits for causes of groups I and III was significantly lower (value of the residue, respectively, higher and lower) Which is 1,96). It is noticed that the opposite was observed in males.

Table 2 – Attendance by cause groups, by gender, age groups and income class, in primary care in Vitória, 2014.

Variable		Group I*			Group II*			Group III*			Total		p-value (χ^2)
		Nº	%	Residue**	Nº	%	Residue**	Nº	%	Residue**	Nº	%	
Gender	Female	26.107	17,16	-30,88	125.776	82,65	31,43	289	0,19	-5,73	152.172	100,00	0,000
	Male	16.054	22,65	30,88	54.589	77,03	-31,43	223	0,31	5,73	70.866	100,00	
Age group (years)	0-4	10.129	58,19	137,87	7.191	41,31	-138,19	88	0,51	7,92	17.408	100,00	0,000
	5-9	4.221	49,14	72,99	4.308	50,15	-73,81	61	0,71	9,49	8.590	100,00	
	10-14	2.911	43,94	52,84	3.673	55,44	-53,41	41	0,62	6,72	6.625	100,00	
	15-19	3.145	39,62	48,01	4.762	60,00	-48,13	30	0,38	2,81	7.937	100,00	
	20-29	5.806	35,29	55,78	10.583	64,33	-56,04	63	0,38	4,27	16.452	100,00	
	30-39	5.250	23,61	18,89	16.924	76,10	-19,03	64	0,29	1,91	22.238	100,00	
	40-49	3.959	12,80	-29,54	26.924	87,05	29,79	46	0,15	-3,2	30.929	100,00	
	50-59	3.337	7,78	-65,44	39.492	92,10	65,78	52	0,12	-5,21	42.881	100,00	
	60-69	1.899	5,12	-74,23	35.145	94,79	74,62	34	0,09	-6,07	37.078	100,00	
	70+	1.504	4,57	-71,91	31.363	95,33	72,22	33	0,10	-5,31	32.900	100,00	
Income class	Low	5.442	19,18	1,27	22.859	80,56	-1,39	73	0,26	1,04	28.374	100,00	0,000
	Average low	24.593	21,01	26,75	92.137	78,73	-26,99	302	0,26	2,95	117.032	100,00	
	Average high	6.861	15,83	-18,21	36.417	84,01	18,56	68	0,16	-3,52	43.346	100,00	
	High	5.265	15,36	-18,23	28.952	84,44	18,30	69	0,20	-1,19	34.286	100,00	
Total	Attendance	42.161	18,90	-	180.365	80,87	-	512	0,23	-	223.038	100,00	-
	Case	26.057	27,51	-	68.173	71,98	-	475	0,50	-	94.705	100,00	-
	Average per case		1,62			2,65			1,08			2,36	-

* Group I: transmissable, maternal, perinatal e nutritional conditions; group II:non-communicable diseases; group III: injuries.

** Qui-square adjusted residue.

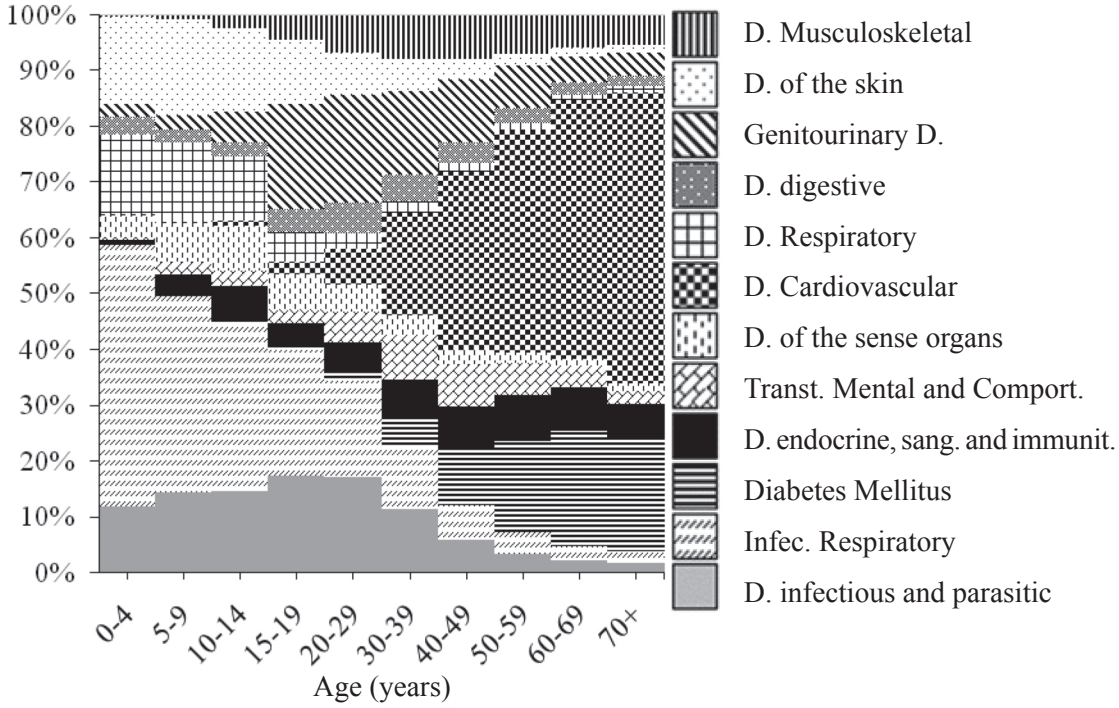
With respect to the age group, it was noticed a positive association with age group I - 39 years or younger - and with group III - 29 years or younger. Referring to the age group of 40 or older, the association was positive with group II.

The two highest income classes had the number of group II visits much higher than expected. On the other hand, in the low middle income class this number was higher for the causes of group I.

The proportional distribution of care for the twelve major cause subgroups, by age group is summarized in Figure 3. The nine main subgroups, together, corresponded to 87.19% (194,457) of the total number of visits (223,038). They were: cardiovascular diseases (28.98%, 64.643), diabetes mellitus (11.25%, 25.089), respiratory infections (10.94%, 24.410), genitourinary diseases (8.07%, 18.010), infectious and (6,44%, 13,924), musculoskeletal diseases (5,46%, 12,171), skin diseases (4,99%, 11,139) and mental disorders (6,78%, 15,124), endocrine, blood and immune diseases And behavior (4.46%, 9947). Respiratory diseases (3.20%, 7133), digestive diseases (3.01%, 6710) and diseases of the sense organs (2.75%, 6142) were less representative than the previous

ones. Some subgroups had very little representation, accounting for 2.27% (5,070) of the total: nutritional deficiencies (0.80%, 1.795), cancer and benign neoplasms (0.57%, 1268), maternal and perinatal conditions %, 832), oral conditions (0.21%, 464), congenital anomalies (0.09%, 199), and intentional and unintentional injuries (0.23%, 512).

Figure 3 – Proportional age distribution of care of the twelve main cause subgroups in primary care in Vitória, 2014* .



* The maternal conditions, neonatal, nutritional deficiencies, cancer, benign neoplasms, neurological conditions, congenital anomalies, oral conditions, unintentional injuries and non-intentional injuries are not represented in the subgroups. Intentional injuries.

Respiratory infections were the diseases that most stood out from 0 to 19 years old, corresponding to 44,56% (7,757) of the attendances up to 4 years old and to 21,04% (1,670) in the range of 15 to 19. From 20 to 29 years old, Genitourinary diseases were the most important (18,00%, 2,961). From 30 years old, cardiovascular diseases predominated, reaching 50.46% (16.602) in the range of more than 70 years old.

The differences by age group between the sexes (data not featured) were small and it was possible to note focal disparities in some subgroups. Considering a female / male ratio, an average of 2.15, genitourinary diseases were the cause of more frequent care in women aged 15 to 59 years (female / male ratio 22,19, ± 3,12), while infectious and parasitic diseases, Diseases and respiratory infections and skin diseases showed to be the most important cause in men aged 0 to 14 years (female / male ratio 0.98, ± 0.10).

Differences by income revealed even lower, with a low / high ratio of 0.14, on average. Infectious and parasitic diseases, in the 0-19 range, gave rise to grater care in the lower income classes (low / high ratio 0.21, ± 0.00), while endocrine and metabolic diseases, genitourinary diseases and respiratory infections predominated more in the classes Of the highest income,

in the bands from 50 onwards (low / high ratio 0.08, ± 0.01).

DISCUSSION

The results demonstrated that the attendances predominate in females and in elderly people, especially females from the age of 20. Other studies present similar data with respect to difference between sexes in search for health services[18,19]. Possible explanations are the social aspects concerning the idea of man as being more resistant to diseases and health standards consisted of high lethality and little symptomatology in males. This reinforces the need for awareness and increased understanding of these issues[20].

With the reference to the causes of care, it is verified that the less frequent conditions, such as injuries, maternal and neonatal pathological conditions and oral conditions are those either attended in emergency services or more often in hospitals or dental practices, escaping the scope of this search. This reinforces the results verified in another study, indicating that primary care data are not sufficient for the correct estimation of the prevalence of diseases[8]. Complementarity with records from the secondary and tertiary levels of care may contribute to a more complete diagnosis of the health situation.

As the epidemiological transition response, non-communicable diseases (group II) account for 71.98% of the cases treated, overlapping with infectious / parasitic, maternal, perinatal and nutritional diseases (group I) and injuries (Group III). A 2004 Brazilian study with data referring to 19981 shows that, in the Southeast region, the proportion of disability-adjusted-life-year (DALY) in group II is slightly lower than that found in primary care in Vitória.

It is also validated that respiratory, dermatological, infectious and parasitic diseases triumph in childhood; Diseases of the genitourinary tract, from 15 to 29 years old; Diseases of the circulatory system and endocrine-metabolic diseases in adults, increasing its importance in old age.

Infectious and respiratory diseases cause impact to younger age groups, and children are more propitious to airway infections, the leading cause of morbidity and mortality in this age group in developing countries. Concurrently, several studies show that air pollution is correlated with a higher risk of these diseases, as well as agglomerations, tobacco smoke and gases from burning fuels[21,22]. In a study covering the period from 2001 to 2003[23], it was shown that pollution levels are relatively low in Vitória when compared to standards proposed by the WHO. Nonetheless, the higher predominance of respiratory disease in certain neighborhoods was attributed to low socioeconomic conditions. Gaps still exist in the research data, contributing to the difficulty to establish which specific factors should be the target of public policies for effective prevention of respiratory diseases in the city.

On the contrary, the large proportion of elderly care and the significant impact of chronic diseases reflect the aging of the population. The high cost, multidisciplinary care and multi-year pharmacological treatment of these diseases make investment in chronic disease risk prevention as well as comprehensive strategies for healthy aging critical and urgent[24-26], saving enormous costs in the future.

In this regard, except in early childhood, the young population is also the one with the lowest attendance in primary care, in Vitória. The doctor´s office, especially in primary care, is considered one of the main places to stimulate the acquisition of appropriate dietary patterns and physical activity, crucial for the prevention of chronic diseases[25,27]. However, it is imperative an investment in care approaches in order to reach this population.

It is important to underline that some subgroups of cause of care present, in Vitória,

a higher proportion of female consultations. Diseases of genitourinary system diseases are the most expressive subgroup as found in the literature[28].

In Brazil, the health expenses of the richest are usually concentrated in private insurance and health plans, which explains a lower expressiveness of the highest income class in the attendance in all age groups. In addition, criticisms of the public sector often have a negative effect on people's opinions and perceptions[29], leading those who have the resources to not use the public sector[12]. The high-income census population accounts for 38.7% of the total and could benefit from primary health care services for the private sector is not organized to undertake health surveillance in the same way as the public sector[6].

The results indicate the highest average attendance per inhabitant in the 0-4 range of the upper middle income classes, followed by the low average. This demonstrates that childcare seems to be more valued by the classes with better socioeconomic conditions than by those with low income, arguing in favor of the incessant search of these patients.

Still referring to socioeconomic reality, the causes of group I are more prevalent in less developed regions of country1, and an increased proportion of these causes is expected according to the lower income of the neighborhoods, as happened in Victoria. Nevertheless, when disease subgroups were analyzed, the difference observed was small. This requires new investigations and approaches, such as agent-based modeling and other methods of complex systems, and suggests the interaction of political, social, economic and biological factors, resulting in an epidemiological complexity that requires a critical analysis of the urbanization process[4]. Research into vulnerable populations of other sociodemographic data can improve the investigation of vulnerable populations

It is worth emphasizing the concern that young and high-income male are in the future more vulnerable to chronic diseases related to lifestyle and also related to distancing from prevention strategies, which can be deduced from the fact that they have fewer attendance care.

Ideal would even be to compare the results found with those of other cities in Brazil. Electronic health records systems may contribute to this process, since they may enable the production of indicators for health surveillance, the management and the implementation of public policies.

This study presents limitations, even though it has produced a broad diagnosis of the health situation in Vitória. The study did not allow the detection of the universe of patients with chronic diseases, for visits to the health service occur every two years or more[8]. Population data from 2010 were used to calculate indicators for 2014, disregarding demographic dynamics. A group-level variable was used for the income indicator, indicating an ecological fallacy in relation to this aspect. Secondary causes that may be involved in the visits were not screened. Considering that some diseases with simpler and well-known diagnostic criteria may have been more diagnosed than others with more subjective criteria, incorrect diagnoses and sub or overdiagnosed diseases may also have occurred in unknown proportions. In addition, the lack of information may have impaired the analysis of important data, such as the cause of care (20.15% of non-fulfillment), indicating the need for professionals to be aware of the importance of registration, as well as the investigation of strategies For better system data quality.

CONCLUSION

The health profile found in primary health care in Vitória reflects the epidemiological transition, with a double impact of chronic diseases at more advanced ages and of infectious diseases at young ages. This

reflects a challenge for management as it requires measures that can heal these two distinct classes of problems.

The results obtained were important to identify the health profile, as well as the discrepancies of attendance in relation to gender, age and income. It was observed that young, male and high-income individuals have fewer visits, probably by distancing themselves from prevention strategies. Therefore they are more vulnerable to chronic diseases due to lifestyle.

Future research should invest in improving the quality of data and methods of analysis of complex systems. The study of injuries, maternal and neonatal conditions and oral conditions, which are the focus of other services, requires complementation with specialized care data.

Electronic records systems implemented in other municipalities could bring significant benefits, as they would allow comparison of indicators, verification of the effect of interventions and planning of comprehensive approaches in populations.

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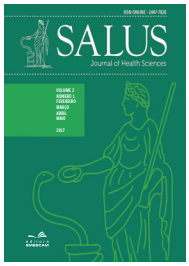

EXPERIMENTAL WORK

Antimicrobial Susceptibility of *Staphylococcus aureus* isolated in Nursing and Medical students

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Keywords

Staphylococcus aureus; Methicillin-Resistant *Staphylococcus aureus*; Oxacillin; Mupirocin; Vancomycin.

Abstract

This study aims to evaluate the occurrence of asymptomatic carriers and the antimicrobial susceptibility profile to mupirocin, oxacillin and vancomycin of *Staphylococcus aureus* isolated in undergraduate students from the first and last period of the Nursing and Medicine courses at EMESCAM. The methods used were nasal swab specimens collected in 147 academics, seeded in hypertonic mannitol agar and biochemical tests were performed to identify S. aureus. Antimicrobial susceptibility testing was performed using the disc-diffusion methodology and the susceptibility of vancomycin was confirmed by the Vitek 2® automated method. The results indicated that of the 147 samples collected, 61 (41.5%) were positive for S. aureus. Among Nursing students, 11 participants (34.4%) were carriers of S. aureus and no MRSA strain was found. Among medical students, 50 (43.5%) were positive, with 6.6% of MRSA lines. No resistance to mupirocin or vancomycin was found in the studied samples.

The research concluded that there was no association between colonization by S. aureus and periods of Nursing and Medicine courses, which indicated an increase in the estimated prevalence. The colonization by MRSA found among students of the first and last periods of Medicine and the profile of antimicrobial susceptibility suggest the possibility of the strains found to be CA-MRSA.

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INTRODUCTION

Staphylococcus aureus (S. aureus) is a Gram positive coccus, colonizer of the skin, perineum and mucosa, such as oral and nasopharyngeal[1]. As the result of its high virulence, it has the potential to trigger several clinical manifestations such as skin and soft tissue infections, infective endocarditis and bacteremia[2]. Regardless of this, there is a high prevalence of asymptomatic carriers, which are a source of dissemination and, in the case of health workers, a means of transporting nosocomial lines[3]. In spite of the fact that it is asymptomatic, some factors may facilitate the installation of an infection, such as depression of the individual's immune response, for example, patients with retrovirus and undergoing more aggressive treatment or invasive medical procedures that open access routes to the microorganismo[4,5].

Bacteria of the genus *Staphylococcus* are ubiquitous[6] and suited to surviving in a hospital environment. They are capable to remain for years in objects such as clothing, textiles and plastics typically used[7], and also in disposable containers of sterile materials such as gauzes and gloves. In such manner, contamination and consequent colonization may occur both after the contact with a carrier as well as with a contaminated object[8].

Some studies related to decolonization of health professionals report great difficulty in eradicating nasal colonization, while subungual decolonization is relatively simple. These data point out that there is a greater possibility of subungual colonization being transient. Nonetheless, nasal colonization has a more stable characteristic[9,10].

In the United States, colonization can reach 89.4 million people, of whom 0.8% are methicillin-resistant *Staphylococcus aureus* (MRSA)[11]. In some Brazilian studies, the rate of S. aureus carriers is around 37%, with 3% MRSA[12].

Alexander Flemming discovered penicillin in the 1920s. This discovery was a milestone in the history of the treatment of infectious diseases. In 1941, the first clinical trial was carried out with this antibiotic, a beta-lactam, determining effective treatment against staphylococcal infections. Nevertheless, a few years later, due to the indiscriminate use, the first strains resistant to the antibiotic were selected. These bacteria were able to hydrolyze the beta-lactam ring of penicillin by means of the enzyme beta-lactamase, becoming it inactive. With the purpose of solving this problem, in the same year a semi-synthetic betalactam was developed, methicillin, which, despite having only intravenous presentation and being related to several cases of interstitial nephritis, had its use recommended. In 1961, the first case of resistance was reported in England and these strains became known as MRSA[13,14]. In Brazil, methicillin was subsequently replaced by a congener, oxacillin.

Beta-lactams bind to proteins which participate in cell wall synthesis, known as penicillin binding proteins (PBPs), which prevent cell wall formation and result in bacterial lysis. The mechanism of action of resistance to methicillin is related to the development of an additional PBP (PBP 2a), with functional action and without affinity for beta-lactam antibiotics. The coding of the new PBPs is related to the acquisition, mainly of the mecA gene, which is part

of a mobile genetic element detected in strains isolated from MRSA. This gene is an integral part of a genomic element called the staphylococcal chromosomal cassette *mec* (SCCmec) [16].

Infections caused by hospital-associated methicillin-resistant *Staphylococcus aureus* (HA-MRSA) are restricted to this environment. The strains that cause infection in individuals with no risk factor for nosocomial infection are known as community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA). Unlike HA-MRSA that presents the mobile genetic element SCC*mec* of types I, II and III, CA-MRSA presents the type IV and type V SCC*mec*. The type IV and V chromosome cassettes are smaller than the other types and do not have coupled genes which encode resistance to other non-beta-lactam antibiotics. Thus, CA-MRSA is generally susceptible to most non-beta-lactam antibiotics[17]. However, the community clone has already been identified in the hospital environment[18,19].

A significant increase in MRSA infections in populations without risk factors occurred in the mid-1990s. A study by the Centers for Disease Control and Prevention (CDC) estimated that in 2005 approximately 1,300,000 infections were caused by CA-MRSA in the United States of America, of which 7% were considered invasive, leading to an incidence of 31.8 cases per 100,000 inhabitants[20].

Vancomycin is a glycopeptide antimicrobial agent recommended as a treatment for MRSA isolates, sensitive to the minimum inhibitory concentration (MIC) susceptibility profile established by the *Clinical and Laboratory Standards Institute* (CLSI) [21].

Mupirocin is a topical antimicrobial agent, initially isolated from *Pseudomonas fluorescens*. It is used in the treatment of skin infections and postoperative wounds, as well as in the decolonization of the nasal mucosa by *S. aureus* strains[22].

Taking into account the high incidence of S. aureus carriers, the various mechanisms of virulence of this pathogen and the progressive submission to the specific influences of the hospital environment in which health professionals are inserted, it is important to investigate the estimated prevalence of asymptomatic carriers of this bacterium, among Nursing and Medical School undergraduate students of the Santa Casa de Misericórdia School of Science (EMESCAM). Hence, this research intends to contribute to clinical, educational and administrative strategies, ensuring good practices of infection control during the provision of assistance to patients and reduction of cases of infections by this agent.

OBJECTIVES

General

To evaluate the estimated prevalence and antimicrobial susceptibility profile of *S. aureus* strains isolated from the nasal cavity of undergraduate students from the first and last periods of the Nursing and Medical School at EMESCAM.

Especifics

To analyze the isolated strains with resptect to the profile of antimicrobial susceptibility to oxacillin, mupirocin and vancomycin.

METHODOLOGY

Study Type

This is an observational, transversal, explanatory and quantitative study, based on data collected by samples of the right nasal vestibule from Nursing and Medical undergraduate students from EMESCAM.

Location and Period

This study was carried out with samples obtained from EMESCAM and Santa

Casa de Misericórdia Hospital of Vitória (HSCMV), taking into account the nature of the activity performed by the students. There was also the contribution of a private microbiological analysis laboratory. The work was carried out from September 2014 to November 2015.

Sample

A total of 147 students enrolled in the first and last periods of EMESCAM's Nursing and Medical courses were subjects to the present study.

Inclusion Criteria

The inclusion criterion consisted in selecting only the first and last period students from EMESCAM's Nursing and Medicine courses through the signing of the Informed Consent Term (ICT).

Exclusion Criteria

Students in the first and last period of EMESCAM Nursing and Medical majors who previously presented some pathology related to *S. aureus* and / or were using antimicrobials which could alter the susceptibility profile.

Statistical Analysis

At first, the data were analyzed by means of descriptive statistics techniques, with numerical, tabular and graphical synthesis of the information collected. All inferential statistics were calculated using significance level of 5%. The association between qualitative variables was performed by chi-square test or Fisher's exact test, if the expected values were less than 5. Data analysis was analyzed on SPSS software version 23.

Ethical Issues

The project was filed in the Brazil Platform and approved on 05/16/2014 by the Research Ethics Committee (CEP) with EMESCAM Human Subjects, according to the following number of the certificate 038353/2014 and CAAE 31116213.4.0000.5065.

The researchers declare that there was no conflict of interest in carrying out this research, which complied with all the terms contained in the Resolution 466/12 of the National Health Council / Ministry of Health and all other complementary resolutions.

The research group was committed to ensuring privacy and confidentiality of information obtained and used for the development of this research. The results obtained in the development of this work were used only to reach the stablished objectives of this research, and were not used for other researches without the consent of the CEP.

Collection Of Biological Material And Incubation

The materials used in the collection were appropriatel identified with the student's code, date, major and period of each volunteer. The clinical specimen was collected from the mucosa of the right nasal vestibule using sterile swab and subsequently embedded in *Stuart*®[23] transport medium. The samples were transported to the Laboratory of Microbiology of EMESCAM, followed by sowing on hypertonic mannitol agar and incubation at 37ºC for 24-48 hours[23].

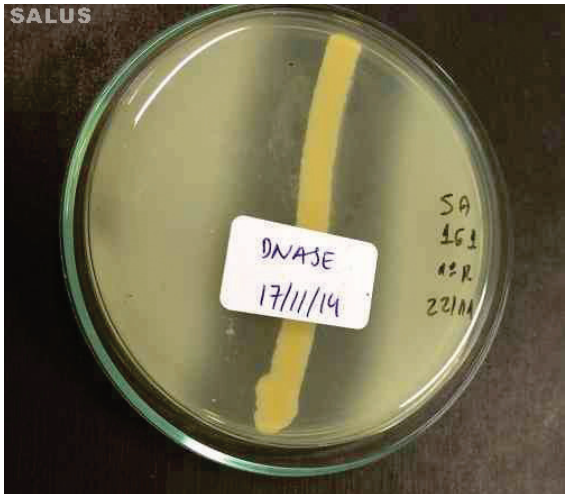
Analysis of Bacteriological Reading and Identification

After sowing on hypertonic mannitol agar and adequate incubation, the presence of colonies with characteristic growth and turning color of the culture medium to yellow were evaluated, characterizing the presence of S. aureus23 (Figure 1). Gram stain and proof of DNA assimilation (DNAse enzyme production) 23 were performed as confirmatory tests for presumptive identification of S. aureus (Figure 2).

Figure 1 – Characteristic colonies of the species *Staphylococcus aureus* in agar culture medium mannitol

Source: Own Authorship.

Figure 2 – DNA assimilation test (DNAse enzyme production)



Source: Own Authorship.

Evaluation of the Antimicrobial Susceptibility Profile

The antimicrobial susceptibility assessment of *S. aureus* was carried out by the antimicrobial susceptibility test (TSA) by the diffusion disc test method[24] with cefoxitin, mupirocin and vancomycin disks (Figure 3). In the study, cefoxitin discs were used to predict resistance to oxacillin, as it is a very sensitive and specific marker of resistance mediated by mecA25[26]. Oxacillin may also be used for this purpose, but it has a weak association with the presence of *MecA* gene. The same method is used for the diffusion disc test, but only cefoxitin is tested for methicillin resistance. Furthermore, cefoxitin disc tests are at least comparable in accuracy to oxacillin disc tests, but the former is generaly easier to read, because of the greater halo and the possibility of being read using reflected light, and not transmitted, as in the case of the oxacillin disk. Hence, according to the CLSI, which introduced cefoxitin cutoff points for staphylococci in 2005, for *S. aureus* the cefoxitin disc should be preferred to that of oxacillin[27]. With regard to susceptibility to mupirocin, the analysis was performed based on the criteria inserted in CLSI document M100-S20 for screening, due to high levels of mupirocin resistance[28].

Figura 3 – Antimicrobial susceptibility test with cefoxitin, mupirocin and vancomycin disks

Source: Own Authorship.

The interpretation of the TSA result was based on data obtained in CLSI document M100-S25[24].

The susceptibility of vancomycin to MRSA strains was analyzed by the TSA methodology by diffusion disc test and corroborated in a private laboratory using the *Vitek*® 2 automated system (bioMérieux). This system is able to generate TSA results quickly and provides the CIM result, accompanied by interpretation (susceptible, intermediate

or resistant) for most fast-growing aerobic bacteria in a period of 4 to 18 hours[29].

RESULTS

Sampling

A total of 147 samples were collected from 147 individuals.

Three students were excluded from the study in the screening phase because they fulfilled exclusion criteria, more specifically in antimicrobial use, being a student of the first period of Nursing major and two students of the first period of Medical major.

Isolates Of *S. Aureus*

Of the 147 academics who participated in the study, 61 (41.5%) were identified as asymptomatic carriers of *S. aureus*.

3.2.1 Isolates of S. aureus in Nursing course

There was participation of 32 Nursing students, and 11 (34.4%) were found positive for colonization by *S. aureus*. From the first period, 21 students participated and six (28.6%) were identified as asymptomatic carriers. In the last period, 11 students participated in the study and five (45.5%) were colonized (Table 1).

Table 1 – Asymptomatic carriers of *Staphylococcus aureus.*

	Participants	Asymptomatic Carriers	
		Score	%
First Nursing Semester	21	06	28,6%
Last Nursing Semester	11	05	45,5%
First Medicine Semester	62	29	46,8%
Last Medicine Semester	53	21	39,6%

Source: Own Authorship.

Isolates of S. aureus from the Medical major

A total of 115 medical student samples were collected, of which 50 (43.5%) were associated to asymptomatic carriers. From the first semester, 62 students participated and 29 (46.8%) were found positive for *S. aureus* colonization. In the last semester, 53 students participated and 21 (39.6%) were found to be colonized (Table 1).

Profile of Antimicrobial Susceptibility

With respect to the evaluation of antimicrobial susceptibility against mupirocin and vancomycin, all strains were considered sensitive (Table 2).

Table 2 – Results of antimicrobial susceptibility test

Período (N)	Resistência à mupirocina	Resistência à vancomicina	MRSA	
			Contagem	%
Primeiro Período de Enfermagem (N)	00	00	00	00%
Último Período de Enfermagem (N)	00	00	00	00%
Primeiro Período de Medicina (N)	00	00	02	6,9%
Último Período de Medicina (N)	00	00	02	9,5%

Source: Own Authorship. MRSA: methicilin resistant *Staphylococcus aureus*. N: Number of isolated S. aureus.

Among 61 asymptomatic *S. aureus* participants identified by this study, four (6,6%) were classified MRSA by the TSA with cefoxitin disk, two (6,9%) participants from the first semester (n=29) and two (9,5%) from the last semester of Medical major (n=21) (Table 2).

Vancomycin susceptibility was also analyzed in two strains of MRSA, one from the first semester and another from the last semestre of Medical major, by the automated system *Vitek*® 2 (bioMérieux), with the two strains showing a MIC of less than 0.5 µg / ml, that is, the strains were considered sensitive. The MIC of two MRSA samples, one from the first semestre and another from the last semestre of Medical major, was not performed for it was not possible to recover the bacteria to perform the procedure.

DISCUSSION

The estimated prevalence of asymptomatic *S. aureus* carriers identified by this study was 41.5%. This value is consistent with that described in the literature, since in studies conducted in Brazil, the reported rate of *S. aureus* carriers is around 37%[12] whereas in international studies, colonization rates range from 19.5 to 38%[33].

It was possible to observe an increase in the prevalence estimated by asymptomatic colonization of S. aureus in the group of students of the last period of Nursing in comparison to the group of students of the first period of Nursing, with a percentage increase of 16.9%. Nonetheless, there was no statistical association between S. aureus colonization and the periods of the Nursing course (p = 0,442). The low representation of Nursing students in this study does not allow inferring in the final contribution of the work.

With reference to medical students, there was no statistical association between *S. aureus* colonization and academic semester, that suggested an increase in the estimated prevalence (p = 0,441). The ralation of the *S. aureus* carrier rate to the time of hospital involvement was not evidenced, since the first semester students had no contact with the hospital yet and presented a 7.2% higher number of carriers when compared to the students of from the last semester. Results obtained in studies published in Ireland, Nigeria and Australia with the purpose of evaluating the students of Nursing and Medical majors during the training course illustrated, on average, a frequency of 30% of patients with *S. aureus* and also indicated that this value did not change with the increase of the student's exposure to the hospital[34], as it was demonstrated in the present study.

In this study, the presence of MRSA in the first semester of medical school was 6.9% of *S. aureus* isolated in this group, and in the last semester of medical school it was 9.5% of S. aureus isolated in this group. Even though the percentage increase of 2.6% from one period to the other, there was no significant difference between the proportions (p = 0.735). The possibility that isolated strains are CA-MRSA is inferred.

No resistance to vancomycin was observed either by TSA or the *Vitek*® 2 automated system (bioMérieux). This data reinforces the possibility that the MRSA strains found in the study are CA-MRSA, since this is susceptible to most non-beta-lactam antimicrobials. This genotypic characteristic is frequently expressed in an antibiogram that shows resistance only to the oxacillin or cefoxitin disc, markers of resistance to beta-lactams[35], as found by this research.

In the the antimicrobial susceptibility evaluation performed by TSA with mupirocin disc there was 100% sensitivity to this antimicrobial, although studies have demonstrated the identification of high resistance levels of *S. aureus* to mupirocin in places such as Nigeria and South Africa,[36] and other studies affirm that the excessive use of this drug may be considered as a risk

factor for bacterial resistance, previously detected[22,36].

This result clarifies the emerging nature of MRSA strains in the community and the potential risk these students play a key role in the epidemiology and pathogenesis of infection, considering that they may be sources of dissemination of *S. aureus* in both community and hospital settings. Nevertheless, in this case, a genetic study would be essential to evaluate the origin of colonization, as the hospital environment is not exempt from having been the cause of colonization, especially in the group of the last semester of medical school.

CONCLUSION

It was noticed in this study is that the rate of colonization by *S. aureus* is in agreement with those found in the literature. There was no statistical association between *S. aureus* colonization and the academic semester of nursing and medical students that could suggest an increase in the estimated prevalence in the cases observed. The MRSA colonization, encountered in the first and last medical school students in this study, and the antimicrobial susceptibility profile suggest the possibility of the MRSA strains found to be CA-MRSA, but for the aetiological confirmation, a genetic study would be necessary. No resistance to mupirocin or vancomycin was found.

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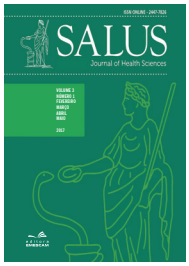

CASE REPORT

The influence of belly dancing in postpartum women with urinary incontinence

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Keywords

Dance Therapy; Urinary Incontinence; Postpartum Period.

Abstract

Belly dancing allows different movements so that can help to prevent the occurrence of urinary problems in women who have recently given birth vaginally. Considering this fact, this study aimed to verify the influence of postpartum women with urinary incontinence problem. One of the authors, who has experience in belly dancing, observed in this dance a new potential technique for the prevention of the disease and a expressive occurrence of urinary incontinence in women who had normal birth. This happens as a result of great aggression to muscles, fascia, nerves and tendons, causing various impacts such as embarrassment, depression, social reclusion, among others. The results showed that the patient's urinary incontinence reduced the urinary incontinence in one patient and eliminated the dysfunction in another. These findings confirm the benefits of this technique in the activation of the pelvic muscles and, therefore, in the improvement or cure of urinary incontinence. Considering that the research sample was not extensive enough, it is suggested that new studies be spearheaded so that an effective proof of the technique´s effectiveness.

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INTRODUCTION

Urinary incontinence is the lack of ability to contain urine voluntarily, and can be classified as: urgency, which occurs when there is an uncontrollable urge to urinate; effort, takes place when any activity that requires physical effort is performed; and the mixed, when there is presence of the other two types. Among the risk factors for urinary incontinence is normal childbirth, which can lead to muscle, nerve and other structural damage[1]. Some belly-dancing movements, especially those of the pelvis, are used in kinesiotherapy, with the purpose of giving a better condition of the pelvic floor, which are the muscles that stabilize it. Considering that the puerperium is the period in which the mother's body recovers from childbirth, whose structures are returning to the place of origin, the movements of the belly dancing can help these puerperal women to avoid the occurrence of urinary incontinence.

According to some literatures, over 200 million people worldwide suffer from urinary incontinence and the majority, made up of women - approximately 59% [2] - do not seek help. The symptoms can be disabling, promoting obstacles in the life of a person[3]. One study[4] argues that women who had normal deliveries are more likely to have moderate or severe urinary incontinence than those who had cesarean delivery. That is, the study authors say that vaginal delivery is associated with a greater risk of any type of incontinence. The majority of normal deliveries occurred with the aid of an episiotomy - an incision made in the perineum area to prevent laceration. This practice, which has been used since the last century, continues to occur frequently in order to avoid severe perineal trauma as well as to prevent pelvic floor damage, in order to avoid future genital prolapse and UI[5].

The movements executed in kinesiotherapy are equivalent to those in the Belly Dance (BD), such as: lateral pelvic tilt, forward and backward rotation, pelvic elevation and depression, anterior and posterior (anterior and posterior pelvic) reversion among others. These movements may be carried out in isolated or associated forms [6]. For this reason, both features may be used to treat complications of a weak pelvic floor [7].

OBJECTIVE

The specific purpose of this study was to verify the influence of the practice of the Belly dancing (DV) in the treatment of urinary incontinence in puerperal. Its specific objectives are to characterize the profile of puerperal women, to analyze the impact of urinary incontinence through the urinary incontinence questionnaire, before and after the practice of belly dancing, and to quantify the urine loss of selected individuals before and after the dance practicing, through the test of absorbent and voiding diary.

METHODS

The present study deals with human beings and for this reason it was submitted to the Research Ethics Committee (CEP) of the School of Higher Sciences of Santa Casa de Misericórdia de Vitória (EMESCAM) for approval, and was approved on October 17, 2015. Patients will be identified numerically by the letter M, in order to ensure the confidentiality of the information, which custody will be the responsibility of the researchers during the five-year period. The norms established in the Directives and Norms Regulating Research Involving Human Beings of Resolution CNS nº 466/12, of December 12, 2012 will be respected.

At first, a bibliographic review was carried out from articles in the following databases: Scielo, Lilacs and Pubmed for the search period between 2003 and 2015, with the following keywords: belly dancing; pelvicfloor; urinary incontinence; dancing. Articles in Portuguese and English were

considered. Books on belly dancing and its modalities were also utilized. After that, a case study with prospective collection was performed at the Gynecology and Obstetrics Service of the Santa Casa de Misericórdia Hospital in Vitória, with a convenience sample considered in eight patients. Of the eight patients, only two met the inclusion criteria.

It were included in this study 2 women aged 20-35 years who underwent normal delivery, with episiotomy, puerperium time of up to three months, with a confirmed diagnosis of urinary incontinence and who accepted to participate in the study, by signing the Free and Clarified Consent Form.

Women who presented any complication during pregnancy or childbirth, multiple pregnancy cases, suspected or diagnosed of herniated disc as well as the diabetic ones were excluded from the study.

The selected patients were endured to an interview through the data collection form elaborated by the researchers, which included name, age, occupation, place of residence, level of education, marital status, GPA, number of antenatal consultations, BMI, weight of the heaviest newborn and the impact of urinary incontinence in daily life as well as in sexual life.

Furthermore, the women completed a voiding diary (with duration of 24 hours), developed by researchers as well, in order to estimate the amount of urine lost in a day.

The patients responded to the *International Consultation on Incontinence Questionnaire - Short Form* (ICIQ-SF), which is validated in Brazil. It is a self-administered questionnaire that assesses the impact of UI on life quality as well as on urinary loss qualification of the patients analyzed. ICIQ-SF is composed of four questions which assess the frequency, severity and impact of UI, as well as a set of eight self-diagnostic items related to the causes or situations of UI experienced by patients[8].

The patients were also submitted to the absorbent test, in order to quantify the loss of urine. They drank 500 ml of water after emptying the bladder. Immediately afterwards an absorbent was placed in the perineal region, with a previously measured weight, and the following activities were requested, repeating ten times each: coughing, jumping, crouching and contracting the abdominal muscles (Valsalva), up and down five stair steps ten consecutive times, wash hands for one minute and walk for 15 minutes. Then, the weight of the absorbent was re-measured. If there is a difference greater than 2 g, the test is considered positive.

Soon after the evaluation, the patients had belly dancing classes twice a week, one hour long. In these classes, given by the researchers, the beginner and basic movements of the belly dancing were used, all of which required pelvic fitting and contraction of the pelvic floor muscles. After a period of four months of classes, the researchers reevaluated the patients in the same parameters of the initial evaluation, in order to compare the results.

RESULTS

The sample consisted of 100% female individuals, mean age 25.5 years with PD ± 2.47 years. There was a puerperal period of up to three months, with the mean weight of the largest newborn being 3525g. Table 1 shows the data of the identification form answered by the patients.

Table 1 – Data of Identification CardPatients M1 M2

Patients	**M1**	**M2**
Age	22	29
BMI	22,49	27,27
Weight of the heaviest New Born	3450 g	3600 g
Steps	20	8
Marital status	Single	Married
School Completion	College (Incomplete)	High School
G.P.A	2 1 1	2 2 0
Pre-natal appointments	2	7
Profession	Housewife	Housewife
Type of Home	Apartament	House
Do you have incontinence?	Yes	Yes
Daytime urinary frequency	8 x	9 x
Nightime urinary frequency	4 x	3-4x
Frequency of sexual intercourse	Few	Few

Tables 2 and 3 presents the data of the voided urinary volume filled in by the patients, lasting 24 hours, containing the volume ingested (ml), the urine volume, the need to urinate, being quantified in mild (+), moderate (++) and severe (+++), the time of loss, the amount of urine loss, being classified in drops (+), spoons (++) and cups (+++), as well as a description of how the loss occurred (Coughed, crouched ...).

Table 2 – M1 participant voiding diary data

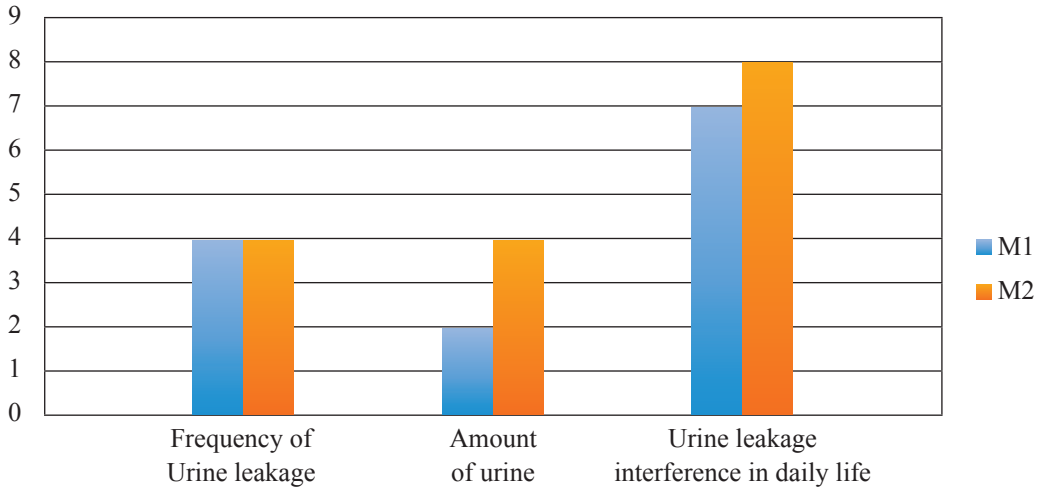
	M1								
Time	07:00	08:30	10:40	12:00	15:00	15:30	17:00	20:00	22:00
Volume of ingested liquid (ml)	200	100		300	150		200		
Urine volume (ml)			200			300		250	150
Need to urinate		Moderate		Mild		Moderate			Moderate
Time of the loss		08:40		12:05			17:15		
Amount of urine loss		Spoons		Drops			Drops		
How did the loss occur		Crouched down		Sat down			Walked		

Table 3 – M2 participant voiding diary data

	M2							
Time	06:30	08:20	10:00	12:00	15:15	16:30	18:00	20:30
Volume of ingested liquid (ml)	250	300	100	300	150		200	100
Urine volume (ml)	200			250		200		250
Need to urinate	Severe			Moderate		Severe	Mild	Moderate
Time of the loss	07:00		10:30			16:30		
Amount of urine loss	Drops		Drops			Spoons		
How did the loss occur	Ran		Sneezed			Crouched down		

The results of the *International Consultation on Incontinence Questionnaire - Short Form* (ICIQ-SF) answered by the patients are displayed in Graph 1, where the answers on the frequency of the loss could be 0 - never, 1 - once a week or less, 2 - Twice a week, 3 - once a day, 4 - several times a day and 5 - all the time. For the amount of urine lost could be 0 - none, 2 - a small amount, 4 - a moderate amount and 6 - a large amount. Concerning the interference of urine loss in daily life, they were asked to choose a number from 0 to 10 where 0 - does not interfere and 10 - greatly interferes.

Graph 1 – Data from the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) answered by the patients.



The patients mentioned that with the belly dancing classes they felt more feminine, were more confident to leave home, had less shame and had an improvement in sexuality, to the point of being praised by their partners. The absorbent used for the absorbent test, already described in the methods, weighed 7.2g prior to performance. After the test, the weight of the absorbent was again measured and the value of 10.26g for M1 and 14.71g for M2 was found, with a mean weight of 12.48g. Based on the test, if the difference between the previous and the previous weight is greater than 2g, the test is positive for urinary incontinence. It may be noticed that the values found in the research indicate positivity in the test.

Subsequently the administration of the belly dancing classes, the patients were re-evaluated using the voiding diary and the absorbent test again. Tables 4 and 5 show the results of the voiding diary of the patients after the intervention.

Table 4 – M1 patient's voiding diary data after the intervention

	M1								
Time	07:00	09:00	11:15	12:10	14:40	16:30	18:00	20:30	22:20
Volume of ingested liquid (ml)	250	100	150	300	150	200	250	100	150
Urine volume (ml)	100		250		300		200		250
Need to urinate	Moderate		Mild	Moderate		Moderate			Severe
Loss Time									
Amount of urine loss									
How did the loss occur									

Table 5 – Data of the voiding diary of the M2 patient after the intervention

	M2								
Time	06:30	08:00	10:20	12:00	15:40	17:10	19:30	21:00	23:15
Volume of ingested liquid (ml)	250		200	350	100	200	300	150	100
Urine volume (ml)	100		150		200			250	
Need to urinate	Light		Moderate		Light		Light	Moderate	
Time of loss		08:00							
Amount of urine loss		Drops							
How did the Loss Occurred		Crouching down							

The test of the absorber was conducted again and weighed after the execution of the requested maneuvers. The weight of the absorber from M1 was 7.6 g and that from M2 was 9.1, averaging 8.15 g. As observed, patient M1 no longer exhibited urinary incontinence, since the difference was less than 2g. Patient M2 still had a difference greater than 2g, but, compared to the initial evaluation, presented a decrease in the volume lost. As observed, patient M1 did not present urine loss in her voiding diary, the absorbent weight initially was 10.26 g, and after the intervention, it passed to 7.6 g, proving that there was elimination of the dysfunction according to the absorbent test. Patient M2 showed a decrease in loss episodes during the day, and the absorbent weight after the belly dance classes was 9.1 g, that when compared to the initial evaluation, which was 14.71 g, shows a decrease in dysfunction in this participant.

DISCUSSION

The demand for urinary incontinence treatments is on the rise, considering that this dysfunction is increasingly affecting the society as a whole, particularly women. According to Volkmer et al (2007)[9], the women affected by this dysfunction present social seclusion, preferring to face the consequences alone. Hay-Smith (2011)[10] argues that one of the most common forms of treatment of urinary incontinence is pelvic floor musculature training, as previously stated. So therefore, even with a small sample, this study proved that this strengthening can be easily implemented in a program of treatment through belly dancing. This is due to the fact that dance makes use of movements of kinesiology, applied to physiotherapy. It was found that, in a puerperal period of up to 3 months, the patients present a real chance of recovering the pelvic muscles, reducing the UI impacts, as Morkoved (2003) said.

Even so, the largest and most shocking urine losses occur in the puerperal period. This is because the woman still presents in her organism substances that facilitate tissue laxity. However, Barbosa et al (2013)[11] affirm that after two years of puerperium patients may still present UI symptoms even if the delivery was cesarean section, which does not guarantee an absence of dysfunction. In this case we noticed that there is no difference between the primiparous and the secondary, but there is a relation between the BMI in the gestations. Research participants reported that during the first pregnancy they had a lower birth weight than before the second pregnancy, further substantiating the appearance of such a fact. In order to add values to our study, the absorbent test was positive, as well as in other studies that use this same test, proving to be effective in the form of evaluation and guaranteeing the researchers and participants a way to measure this loss

Urinary tract infection. Albuquerque et (2011)[12] reported the patients' complaints with UI and the absorbent test, considering that it is an inexpensive and highly sensitive test. The results of this study concluded that the test has high significance, giving positive to those with high UI complaint. It was observed that the positive results of the research influenced directly the personal life of the patients, since they reported an improvement in the side effects secondary to the condition, following the study of Abram and Pedrão (2005)[13], in which they attest that the Participants had improved body knowledge and improved secondary UI symptoms. Luccas and Nohel (2010) noted that belly dancing provided an improvement in the maintenance of pelvic floor contraction, even when participants did not present urinary incontinence. It was observed in this study that the women had an improvement of the contraction thus presenting a reduction of the urinary dysfunction.

CONCLUSION

The results of this study observed that Belly Dancing proved to be effective for the treatment of urinary incontinence, since it reduced values in the absorbent and impact test of UI, promoted an improvement in femininity as well as social interaction and body acceptance by patients .This dysfunction is a social problem and, therefore, further studies should be carried out in order to encourage the search for treatment through health professionals. For that, we suggest that a campaign be made on social networks in order to encourage people to seek out a well qualified professional who can help them.

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REVISTA SALUS
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ORIGINAL ARTICLE

Analysis of cardiopulmonary function and quality of life of patients with bronchiectasis

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Keywords

Bronchiectasis; Quality of Life; Peak Expiratory Flow Rate.

Abstract

The main objective of this study is to analyze the changes in cardiopulmonary function and the quality of life of patients diagnosed with bronchiectasis. For this purpose, the method used was a cross-sectional, retrospective observational study in which 08 patients were evaluated, of which 07 were female and 1 was male, with a mean age of 57.12 years. The study included patients aged ≥ 18 years, diagnosed with bronchiectasis, undergoing treatment at the Physiotherapy Clinic of EMESCAM, who accepted to be part of the study, by signing the informed consent form. Patients who did not respond to the SF-36 questionnaire or who did not have sufficient data in the medical record were excluded. The study consisted of two moments. In the first moment, a bibliographic research was done through the databases: PubMed, Lilacs, MedLine and Cielo. In the second moment, the medical records were selected and analyzed and the SF-36 questionnaire was used to evaluate the quality of life. The results of the research demonstrated that there was no statistically significant difference between pulmonary function variables and quality of life; that the majority of patients had a reduction in maximal inspiratory pressure; had a peak expiratory flow in the six-minute walk test; and that, coincidentally, they were the same who presented a worse quality of life.

Thus, it can be observed that the majority of the patients studied presented alterations in their cardiopulmonary function and, in addition, to observe that these alterations possibly implied in the worsening of the quality of life of the patients evaluated by the SF-36 questionnaire, Functional capacity and pain, in which they presented lower percentage.

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INTRODUCTION

Bronchiectasis is a chronic lung disease of various etiologies, usualy characterized by a vicious cycle of decreased mucociliary transport, infection and bronchial inflammation, culminating in permanent dilation of the bronchi and bronchioles and structural damage of the airways, causing many changes in the respiratory system. The reduction of mucociliary transport results in retention of secretions and predispose patients to other infections[1,2].

The clinical course is characterized by chronic or recurrent cough with purulent sputum, with a foul odor. The hypersecretion of the airways prevails in the morning or by changes of decubitus, patients may present hemoptysis, emaciation, inappetence, halitosis, lethargy and prostration[3,4].

Many factors contribute to the onset of bronchiectasis, such as chronic lung infection, foreign airway elements and hereditary diseases such as cystic fibrosis and primary ciliary dyskinesia[5].

There is no well-defined statistical data on the prevalence of bronchiectasis in Brazil. However, due to high incidence of tuberculosis and the ineffective control of respiratory infections in childhood, it is estimated to be higher than that found in developed countries. In 2012, in the United States the number of people diagnosed with bronchiectasis was estimated at more than 100,000[6,7].

People are usually in the most productive phase of their lives when they are affected by bronchiectasis. According to literature, the variation is around 28.7 to 48.0 years old. The predominance increases with age and it is higher in women and Asians[8,9].

Respiratory physiotherapy aims to aid in the mobilization of airway secretions, augmenting expectoration and, thus, enhancing pulmonary ventilation; reducing bronchial obstruction and airway resistance, favoring gas exchange and improving respiratory effort. When there is impairment of the musculoskeletal system, rehabilitation must act in the physical reconditioning, boosting the tolerance to the exercises[10,11].

In this context, we aim to analyze the changes in the cardiopulmonary function and the quality of life of the patients with bronchiectasis who are undergoing treatment in the Physiotherapy Clinic of EMESCAM.

METHOD

This is a cross-sectional observational study with retrospective data collection. The sample included 08 patients who underwent respiratory physiotherapy twice a week. It was approved by the Research Ethics Committee (CEP) in Humans of the Superior School of Science of the Santa Casa de Misericórdia de Vitória (EMESCAM), under the registration number 1,200,115.

We used as an inclusion criteria patients aged ≥ 18 years with a diagnosis of bronchiectasis, who underwent treatment twice a week at the Physiotherapy Clinic of EMESCAM, from October to December 2015, and accepted to be part of the research, by signing the free and clarified consent form. The exclusion criteria included

patients who did not respond to the SF-36 questionnaire or who did not have sufficient data on the medical record.

The research was conducted in two different moments. Firstly, a bibliographic search was done through the databases: PubMed, Lilacs, MedLine and Cielo. After that, the medical records were selected and analyzed and the SF-36 questionnaire was applied to evaluate the quality of life. With the intention to trace the patients' profile, information on name, age, sex, weight, height, smoking habit and schooling were collected from medical records. For cardiopulmonary evaluation, the results of manovacuometry, peak expiratory flow and the six-minute walk test were collected. Quality of life was assessed using an SF-36 questionnaire administered by one of the researchers. This questionnaire contains 36 items that measure the mental and physical health components through eight domains: functional capacity, limitation by physical aspects, pain, general health, vitality, social aspects, limitation by emotional aspects and mental health.

For the statistical analysis, the Spearman Correlation Coefficient Test was initially applied in order to correlate the variables of the cardiopulmonary function with the quality of life of each patient, as well as a descriptive analysis of the patients' profile was performed. Significant associations were considered with values of $p < 0.05$, the analysis was performed in SPSS version 23.

RESULTS

After analyzing the sample according to the patients' profile, we observed that the mean age presented was 57.1 and the standard deviation was 17.8 years. With respect to the sex of the patients, we observed that 87.5% were female and 12.5% male. Based on the nutritional diagnosis, 4 (50%) patients were eutrophic, 1 (12.5%) were overweight and 3 (37.5%) were those with grade I obesity. The majority of them were literate 87.5%. Regarding the race, we observed that 100% were brown. Conforming to smoking, 5 (62.5%) were non-smokers and 3 (37.5%) were passive smokers. The means and standard deviations of all data collected, as well as the percentage, are described in Table 1.

Table 1 – Profile of patients studied

Variables	N=8
Age	57,1 ± 17,8
Sex	
Female	7 (87,5%)
Male	1 (12,5%)
Ethnicity	
Brown	8 (100%)
Tabagism	
Passive smoker	3 (37,5%)
Non-smoking	5 (62,5%)
Nutritional diagnosis	
Eutrophic	4 (50,0%)
Overweight	1 (12,5%)
Obesity grade I	3 (37,5%)
BMI	27,1 ± 5,7
Education	
NA	1 (12,5%)
EFI	1 (12,5%)
EFC	2 (25,0%)
EMI	2 (25,0%)
EMC	2 (25,0%)

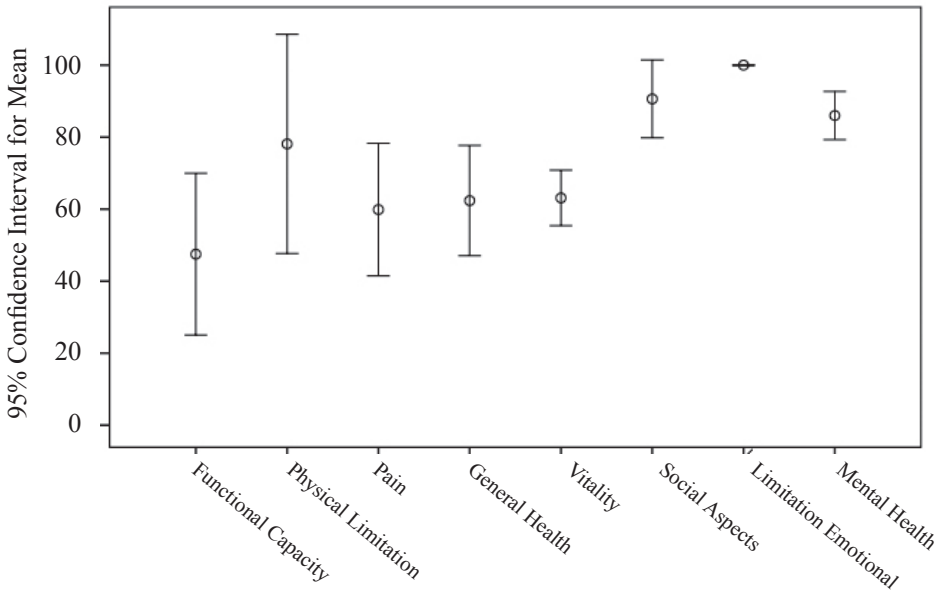
Legend: BMI: Body mass index; EFI: incomplete elementary school; EFC: Complete elementary education; EMI: Incomplete high school education; EMC: High school graduate; NA: Not literate.

Source: Author.

Once the quality of life form data were collected and analyzed, the scores for each question were calculated, and the scores for each of the SF-36 domains were individually tabulated. Soon after, the mean scores of each domain were calculated and a graphical representation of the same was obtained with a 95% confidence interval for the mean in graph 1. It is possible to note that the domain most affected was domain 1: functional capacity with mean 47.5;

accompanied by pain with 59.9; followed by general health status with a score of 62.4; vitality at 63.1; limitation for physical aspects with 78.1; mental health at 86.0; social aspects with 90,6 and limitations due to emotional aspects with a score of 100.0.

Graphic 1 – Qualityof life assessment



The Pimax, Pemax, PFE and TC6 measurements of each patient were correlated with the assessment of quality of life, according to table 2. Of the 8 patients, in general, 7 presented Pimax below ideal, 6 presented Pemax below ideal, 5 showed a limitation of the six-minute walk test, 8 had a reduction in peak expiratory flow, and 4 had a poor quality of life.

The values predicted in general for Pimax were (-90 to -120cmH2O), Pemax of (100 to 150 cmH_2O), PFE (≥ 350 l / min), TC6 (distance > 400 m). Regarding quality of life, this was quantified from 0 to 100, and the closer to 100, the better the patient´s quality of life.

Table 2 – Cardiopulmonary function and quality of life.

Pacients	Pimax	Pemax	PFE	TC6	Quality of life
P1	-80	60	150	0	57,1
P2	-30	30	210	0	75,1
P3	-70	90	315	490	67,2
P4	-60	50	135	199	86,6
P5	-60	60	150	250	66,1
P6	-60	90	210	480	89,3
P7	-80	120	200	290	66,8
P8	-100	100	100	540	79,5

Legend: Pimax: maximal inspiratory pressure; Pemax: maximum expiratory pressure; PFE: peak expiratory flow; TC6: six-minute walk test.

Source: Own author

As reported by Spearman's correlation coefficient statistical test, based on the relationship between the measurements of the cardiopulmonary function and the quality of life of each patient, there was no statistical importance between the variables, considering the correlation coefficient was always small and not significant at the level of 5%.

Table 3 – Correlation between cardiopulmonary function variables and quality of life.

	Quality of life	
	Correlation coefficient	p-value
Pemax	0,012	0,977
PFE	0,000	1,000
TC6	0,359	0,382
Pimax	0,295	0,479

Legend: Pemax: Maximum expiratory pressure; Pimax: Maximum inspiratory pressure; PFE: Peak expiratory flow; TC6: Six-minute walk test;

Source: Own author

DISCUSSION

This study noticed a mean age of 57.12 ± 17.83 years with a higher prevalence of bronchiectasis in the female sex (87.5%), and more frequently in low education subjects, characteristic of developing countries, according to what has been described by Zanchet et al. The BMI found (27.12 ± 5.27 kg) reveals that these patients are out of normal weight. Most volunteers never smoked (62.5%).

Based on the responses of the 8 patients to the questions contained in the SF36 form, the following results were obtained for quality of life assessment: it was possible to observe that the lowest mean score reached of 47.5 refers to domain 1: functional capacity, demonstrating the impact of the disease on the daily activities of these patients. A study has emphasized that the main objective of the physiotherapeutic intervention is the maintenance or improvement of functional independence through global action, in order to break the cycle of physical weakness-inactivity[11].

There is not enough research on the subject in the literature. Few studies have evaluated the impact of bronchiectasis on quality of life. Nonetheless, Lee et al[13]. stated that bronchiectasis may negatively affect patients' lives, confirming, thus, our study, in which a moderate reduction in scores was observed for almost all SF-36 domains. This shows that the patients with bronchiectasis evaluated in our research had a reduction in the quality of life in general.

The values of respiratory muscle strength (Pimax and Pemax) and peak expiratory flow (PEF) were reduced when compared to the predicted for the Brazilian population, indicating a reduction in ventilatory muscle strength and a limitation of expiratory airflow in patients of bronchiectasis evaluated by this study. Koulouris et al[14]. demonstrated the presence of expiratory flow limitation in patients with bronchiectasis, reducing exercise tolerance and increased dyspnea, as well as dynamic hyperinflation. This study also corroborates our research.

Newall et al[15]. established that pulmonary rehabilitation is effective in improving exercise tolerance in patients with bronchiectasis, showing that there are significant improvements in respiratory muscle strength, through an increase in Pimax values.

This study also noticed that even though no significant statistic was found among the correlated variables, quite possibly due to the reduced sample, most of the patients studied presented a reduction in Pimax, PEF and the six-minute walk test, as well as a reduction in their life quality.

The research of Zaniniet et al.[16] evaluated 135 adult patients with bronchiectasis, handling the TC6 before and after pulmonary rehabilitation. The results of the study revealed that 108 patients had a very short

distance. Nevertheless, they were able to walk a greater distance after the treatment, showing, this way, the importance of using this instrument as an evaluation measure in patients with bronchiectasis. It is important to emphasize that exercise performance is a factor that contributes to the quality of life of these patients.

Muller et al[17]. carried out a study in which 6 patients with bronchiectasis were evaluated for exercise tolerance through the TC6. Of these, 4 presented a distance in the test, smaller than the predicted. The conclusion of the authors is that bronchiectasis may lead to a reduction in exercise tolerance, as assessed by the TC6.

CONCLUSION

It was possible to noticed in this study that the majority of the patients studied had a decrease in their cardiopulmonary function, mainly in Pimax, PEF and TC6, suggesting that these factors imply in the worsening of the quality of life, mainly in the functional capacity and pain domains, evaluated by the questionnaire SF-36.

In view of the limited sample of patients in this study, it is crucial to continue this research, in order to collect new data, in an attempt to substantiate the significance in the correlations and the correctness in the results found.

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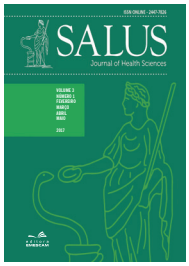

ORIGINAL ARTICLE

Balance in patients with multiple sclerosis

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Keywords

Multiple Sclerosis; Postural Balance; Physical Therapy Modalities

Abstract

This study aims to characterize the epidemiological profile of MS patients, in addition to comparing the balance before and after physical therapy. The main objective of this study is to analyze the balance in patients with MS before and after physiotherapeutic intervention. For this purpose, initial evaluation and reevaluation after 12 physiotherapy sessions were used as methodology. The desire to perform the work is justified by the fact that multiple sclerosis is a progressive chronic disease that affects young adults at the peak of their productivity, triggering a series of complications, such as loss of balance, increase in the occurrence of falls, Biopsychosocial impact on society. In addition to that, it is also justified by the contribution to a greater knowledge about the clinical aspect of this disease. It can be noticed from the results obtained that there is a positive difference in the balance before and after the physiotherapeutic intervention, as shown by the DGI and BERG scores. Thus, it can be concluded that in order to improve the balance of MS patients, it is imperative that these patients use physiotherapy.

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INTRODUCTION

Multiple Sclerosis (MS) is considered as one of the most common pathologies affecting the Central Nervous System (CNS). It is a chronic and progressive disease that reaches mainly young adults, in the age group of 20 to 40, more prevalent in females and white race[1-5].

It is estimated that, worldwide, more than two million people have MS[6,7]. In Brazil, approximately 10,376 patients are being treated. Data from the Brazilian Multiple Sclerosis Association register more than 30,000 individuals with MS[6].

MS is an autoimmune disease in which activated T cells cross the blood-brain barrier to initiate an inflammatory response, leading to demyelination and axonal injury[8]. The main mechanisms that trigger ME disease are still unknown.

Motor symptoms of MS include spasticity, reflex spasms, contractures, gait disturbances, and fatigue that may be persistent or related to physical activity or to lesser degrees of mental effort. These are often the initial symptoms of an exacerbation[9].

Cerebellar and bulbar symptoms may also be present and may be perceived as balance deficits, nystagmus, intention tremor difficulties in swallowing and breathing. Sensory symptoms resulting from MS present as numbness, paresthesia, dysesthesia, distortion of the superficial sensitivity and musculoskeletal pain[9].

Anatomically speaking, MS affects the central nervous system, especially the optic nerve, cervical cord, brain stem and periventricular white matter[9,10].

The literature presents different terms to classify MS, but, in general, the disease is subdivided into the different clinical types:

a) Sender-Recurrent (RR): Early in the disease there may be either a complete recovery, or residual sequels and deficits may start to accumulate by the repetition of the seizures.

b) Primary Progressive (PP): progression of the disease from the beginning, symptoms develop gradually and there are no outbreaks. Improvements occur in shorter time.

c) Secondary Progressive (PS): characterized initially by exacerbations-remissions, followed by progression of impairment and minimal remissions.

d) Progressive Exacerbation (PE): progressive disease from the beginning, but without clear acute exacerbations, which may or may not have some recovery or remission, which is less frequent[9,10].

According to Santos, 2010[11], since the initial phase of MS is characterized by transient symptoms that last from five days to one week, so subtle, these characteristics lead the individual not to give importance to the first clinical manifestations of the disease.

Balance

According to Tookuni et al. (2005)[12], Equilibrium is "the maintenance of the center of gravity, which must lie within the area of the base of support of the body and that receives constant adjustments of the musculoskeletal system".

For the accomplishment of activities of daily life, it is imperative that the individual affected by ME exercises the ability to balance. A study conducted by Rodrigues et al.[13], in 2008, showed that "imbalance is the biggest complaint of patients with multiple sclerosis, evidencing vestibular dysfunction in most cases". The main objective of this study was to evaluate the effects of physiotherapy on the Equilibrium and Quality of Life of patients with Multiple Sclerosis. The results indicated that "The balance and quality of life of individuals with MS improved significantly with targeted physiotherapeutic intervention"[13].

Multiple Sclerosis and Physiotherapy

Muscle weakness and fatigue are responsible for the decrease in the daily activities of MS patients, resulting in muscle impairment due to inactivity[14].

Physiotherapeutic interventions work towards the improvement of muscle strength and endurance in individuals with MS are limited. Therapeutic exercise was avoided for many years in these patients for the increasing in body temperature and fatigue that may act as a propellant for a new outbreak[15].

The practice of therapeutic exercises, one of the resources of Physiotherapy, boosts an increase in V02 max, better glycemic control, increase of muscle mass, improvement of self-esteem and self-confidence, and improvement of patients' quality of life[16].

Physiotherapy improves patients' quality of life, significantly improves balance and movement, promotes maintenance of muscle strength, thus minimizing the limitations, complications brought about by MS, and improves the functionality of these patients[16].

Exercises were avoided until recently, as they sought to conserve energy, control fatigue, and mitigate the risk of new outbreaks. Nevertheless, sedentary lifestyle has had negative repercussions, such as increased risk of heart disease and decreased functional capacity[17].

Thus, this study seeks to analyze the balance in patients with multiple sclerosis before and after physiotherapeutic intervention, to characterize the epidemiological profile of these patients, regarding gender, age, ethnicity, housing, socioeconomic status, and to investigate the interference of physiotherapy in the balance Of MS patients.

METHODS

Exploratory and quantitative case study with 10 participants in the research, 90% female and 10% male, with a mean age of 46.2 years, who underwent physiotherapy once a week for a total of 12 sessions of 40 minutes. The project of this research was authorized by the Ethics and Research Committee (CEP) in Human beings of the Superior School of Sciences of the Santa Casa de Misericórdia de Vitória EMESCAM under registry CAAE: 47027215.2.0000.5965.

The study included patients diagnosed with MS of both sexes, aged less than 65 years old, attending the Clinical School of Physiotherapy of EMESCAM, who agreed to do the research by signing a Free and Informed Consent Form (TCLE). The excluded patients were those with visual and auditory problems that affect the balance, wheelchair users, or any problem that could impede the active participation in the research, patients who lacked physiotherapy sessions more than three times. Firstly, a bibliographic search was carried out using as scientific data selected scientific papers published in Pubmed, Medline and Scielo, published in the period 2000-2015, publications in English and Portuguese.

Key-words: multiple sclerosis; quality of life; physiotherapy.

Before the physiotherapeutic intervention, evaluations were applied, such as the application of the Dynamic Marching Index (DGI) to evaluate the dynamic balance. Shumway-Cook et al., 1997 developed the DGI to assess peripheral vestibular changes, dynamic balance, mobility, daily life activities, and risk of falls[18]. The scale consists of dynamic tests that instigate vestibular stimuli of gait with obstacles, steps and etc., consisting of 8 items with 4 alternatives, ranging from 0 to 3 points, where 0 indicates severe impairment and 3 indicates normal performance of the Function; The scale has a maximum score of 24 points, being indicative of risk of falling when an index less than or equal to 19 points[18].

As to evaluate the balance and measure the risk of falls, the Berg Balance Scale

was created by Katherine Berg in 1992. Miyamoto et al. (2004) translated and adapted to the Portuguese language. Its main goal is to evaluate the static balance, indicating, this way, the risk of falls. It is composed of activities of coordination, balance, capacity of change of decubitus, evaluation of the transfers of patients, among others[19]. It is based on 14 common items of daily life, in which each item has 5 alternatives that range from 0 to 4 points, 0 being the inability to develop the requested action and 4 the total ability to perform the function. Berg's maximum scoring score is 56 points, where a cut-off value of 45 points is considered a drop predictor and an index of less than or equal to 36 points is associated with a 100% fall risk. Thus, the higher the score, the lower the risk of falls[19].

Once the balancing scales were applied, physiotherapeutic work was started, which included exercises for Swiss Ball Balance, Elastic Bed, Imbalance Board, gait training, circuits overcoming obstacles, strengthening of lower limb muscle groups such as quadriceps, Gluteus medius, vastus medialis, gluteus maximus, and trunk musculature such as straight and oblique abdominals, transverse abdominal, multifidus, specific muscle stretching, such as hamstrings, pectorals and paravertebral, Frenkel coordination exercises and Proprioceptive Neuromuscular Facilitation (NPF). After the physiotherapeutic work, the patients were reevaluated and the balance scales were applied one more time.

The research was implemented within the scope of the Multiple Sclerosis Extension Project that works in the Clinical School of Physical Therapy of EMESCAM of Vitória in Espirito Santo in the period of 12/11/2015 to 11/02/2016 once a week, with 40 minutes each session, Totaling 12 sessions.

Physiotherapy Intervention

Exercises for balance training, proprioception and muscular strength gain were performed, such as alternately positioning the feet to a specific target, with markings on the floor; Stand up and sit under a specific count; Rotate under a specific count; Weight transfer; Walking sideways and forward (parallel lines were used to control foot positioning, stride length and step width).

In order to improve Proprioception, exercises were performed with Swiss ball, elastic bed and imbalance board. Patients also performed stretching exercises of the posterior muscle chain. In order to gain overall range of motion (WMD), stretching exercises of the posterior muscle chain were included. Proprioceptive Neuromuscular Facilitation Exercises (FNP) were performed to improve muscle strength, since PNF has the capacity to teach and carry out a therapeutic program that not only stimulates the muscles, but also the whole body, since it has a range of richer and more elaborate exercises. Frenkel exercises were used to improve balance and gait. These exercises have a series of activities with progressive and rhythmic difficulty, aiming at a better proprioceptive control and, as a consequence, a better functional movement. Among the 10 initial patients, 4 were excluded due to lack of physical therapy sessions. Thus, only 6 were statistically analyzed.

RESULTS

Considering the characterization of the sample, the result was more predominant in females, representing 90%. With regard to ethnicity, the white race represented a predominance of 50% of the sample, then the brown race with 40% and, finally, the black race with 10%. As for marital status, married couples accounted for 60%, then singles, 30%, and then widowers representing 10% of those surveyed. Referring to profession, 50% are retired, 10% of the housewives and 40% are professionally active of various technical specialties; 30% of the sample live in the municipality of Serra, 30% in Vila Velha, 20% in Cariacica and 20% in the city of Vitória.

A descriptive analysis of mean and standard deviation data was performed to make it possible to compare the balance before and after treatment. The DGI and BERG test scores indicated that the therapeutic intervention produces an improvement in balance. The mean of the DGI before the physiotherapeutic intervention was 14.8 ± 7.0 and after the intervention was 17.8 ± 5.3. Berg's mean before physical therapy intervention was 40.2 ± 12.4 and after the physiotherapeutic intervention was 42.7 ± 12.1, indicating improvement in balance, as can be seen in the Table 1.

Table 1 – Comparison of balance before and after physiotherapeutic intervencion

	Mean	Median	Standard Deviation
DGI before	14,8	15,0	7,0
BERG before	40,2	44,0	12,4
DGI after	17,8	19,5	5,3
BERG after	42,7	46,0	12,1

DISCUSSION

Oliveira et al[20] affirm that the practice of physical activity by patients with MS has increased significantly in recent years. This practice improves the balance and functional capacity of patients, as several studies have shown, because the exercises provide positive effects on physical functioning, without any negative effects on the symptoms of Multiple Sclerosis. The result of the study showed that patient balance improved significantly, both when evaluated by the Berg scale when testing the static balance, and by the DGI when testing the dynamic balance.

The greatest complaint of patients with multiple sclerosis is related to the imbalance, as the studies of Rodrigues et al, 2008 also attested[13]. This suggests that targeted physiotherapeutic intervention significantly improves the balance and quality of life of individuals with MS. Hence, the studies of Mann et al., 2009[21], and the study by Almeida et al[22], 2007, demonstrated that conventional physiotherapy associated with balance training is essential in the physiotherapeutic protocols for MS patients. Paltamaa et al [23], 2012, demonstrated the reason why patients with mild or moderate deficiency levels showed improved balance with progressive resistance exercises and balance training.

This study described the sample considering the following variables: sex, age, ethnicity, Marital Status, kind of job, number of children, outbreaks number and municipality of origin. The predominance was female, representing 90%. With regard to ethnicity, the predominance was white, 50%. The epidemiological study of Flores et al[1], (2014) showed a predominance of the white and female race in people affected with MS, thus substantiating the data of this research. As for age, the study obtained a mean age of 46.2 ± 15.14 years, as well as studies by Willis et al[3], 2014, which attest that MS is a disease that affects young adults. As for the professional activity, 50% of the patients studied are retired and the retired patients, 80% of them are retired due to disability. This result is equivalent to that found by Oliveira et al[24] in 2013, when attested that 38% of patients with MS were retired due to disability and 24% were professionally active.

CONCLUSION

The study evidenced that in order for patients with MS to achieve better balance and functional independence, it is of paramount importance that they benefit from physiotherapy. This fact was measured by the Berg balance scale and the Dynamic Marching Index (DGI). In addition, this study further asserted that women, white race and young adults are the most affected

by MS. It was also noticed that such patients are mostly inactive and retired.

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ORIGINAL ARTICLE

Profile of newborn premature extubated in an Intensive Care Unit Neonatal

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Keywords

Newborn, Premature, Noninvasive Ventilation.

Abstract

This study aims to describe the profile of extubated preterm newborns regarding birth weight, gestational age, classification, time of mechanical ventilation and ventilation modality after extubation, as well as to verify the frequency of physical therapy and resources used. As a methodology, a Field Study was carried out characterized as a transversal study with retrospective data collection, using a convenience sample. A total of 641 records of preterm neonates born between January 2008 and December 2014 were analyzed, hospitalized at the neonatal intensive care unit of the Santa Casa de Misericórdia Hospital in Vitória, submitted to orotracheal intubation. A descriptive analysis considering frequencies and percentages for qualitative variables and mean, median and standard deviation for qualitative variables was performed. The study was approved by the research ethics committee of the School of Sciences of the Santa Casa de Misericórdia de Vitória. The results showed that the profile of the newborns studied was male, 57.9%, low birth weight, 51.2% and moderate premature, 60.3%. The mean mechanical ventilation time was 4.64 days. Of the total number of charts analyzed, 84.3% underwent physiotherapy, of which 98% underwent abdominal thoraco rebalancing techniques and 88.2% required motor physical therapy. It was concluded that the majority of newborns submitted to orotracheal intubation are male, of low weight and of prematurity considered moderate.

Most intubated newborns undergo physical therapy, and the most commonly used technique within the neonatal intensive care unit is abdominal re-equilibration.

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INTRODUCTION

Prematurity has been considered a broad public health problem, especially in developing countries[1,2], and studies indicate that there are many causes that lead to this prematurity. According to the Ministry of Health, in 2010, in Brazil, 7.2% of Live Births were pre-term[3].

Preterm newborns (PNW) are those born with gestational age (GI) of less than 37 weeks. As they present some structural and functional peculiarities, such as more horizontal ribs and diaphragms, they have an immaturity of the respiratory system, altering its functioning. In addition, they have a reduced amount of fatigue-resistant muscle fibers and narrower airways impairing respiratory mechanics, making them more vulnerable, thus increasing the likelihood of developing complications[4,5].

Autopsy investigations have shown that between 32% and 52% of all perinatal deaths are related to respiratory pathologies[6]. Intensive care units (NICUs) have been used as an alternative to increase the survival of these patients, respiratory support, usually Offered by mechanical pulmonary ventilation (MPV), which, although beneficial, is invasive and is directly associated with complications. Therefore, it is important that fast and adequate weaning occurs directly influencing the success of the method[7-9].

Furthermore, The success of extubation depends on the patient's ability to spontaneously perform breathing and maintain adequate gas exchange[10,11].

When the patient needs to undergo a new intubation within 72 hours after extubation, this is considered a failure. It is only known that reintubated patients are predisposed to develop morbidity and mortality[12].

Fávero et al. (2011) argue that early extubation is a relevant factor in determining the success of the method and may strongly influence pulmonary complications, which arise when patients are unable to make the necessary adjustments.

Due to complications of VMP, mild noninvasive ventilation (NIV) techniques are used as an alternative to ensure ventilation assistance in a less invasive manner, as an effort to minimize lung injury. The use of this method allows the maintenance of greater pressure in the airways, ensuring the recruitment of more alveoli, reducing dead space, improving pulmonary mechanics and increasing gas exchange[7,13].

The use of continuous positive airway pressure (CPAP) has been defended as the first choice in PTNBs with some type of respiratory morbidity, and has proven to be an effective way. Besides improving oxygenation, CPAP relieves inspiratory muscle fatigue, avoids alveolar collapse, increases functional residual capacity, and decreases respiratory effort, reducing airway resistance[8,14,15].

Another method of NIV to be highlighted is intermittent nasal positive pressure ventilation (nIPPV). In accordance with some studies, this method has shown a lower need for reintubation in relation to CPAP, for it offers inspiratory support intermittently and with a higher positive pressure level than the expiratory one. It has been more frequently used because it reduces thoracoabdominal asynchrony and potentiates the stability of the chest wall, in addition to improving tidal volume, minute volume and decreasing inspiratory effort[7,9].

In order to prevent possible complications and respiratory complications and to assist in the recovery of patients presenting with these morbidities, physiotherapy has frequently performed within neonatal intensive care units (NICUs) with the intention of providing hemodynamic stability, preventing perfusion / ventilation changes , Decrease lung resistance and respiratory work, help maintain airways with minimal secretion, avoiding bronchial obstruction and pulmonary hyperinflation, and improve mucociliary clearance and reexpand collaborative areas[16].

Considering the above, the objective of this research was to characterize the profile of extubated PTNBs regarding birth weight, gestational age, classifying, duration of MV and ventilation modality used after extubation, as well as to verify the frequency of physiotherapy and the resources used.

METHODS

This study was approved by the research ethics committee (CEO) of the Santa Casa de Misericórdia School of Sciences of Vitória (HSCMV), registered under the number 1,099,365, characterized as a transversal study with retrospective data collection. A total of 521 records of newborns hospitalized between January 2010 and December 2014 were analyzed, together with 120 charts analyzed by researchers Simoura JB and Tosta AAM, born between January 2008 and December 2009, collected for The study "Study between the use of intermittent positive pressure ventilation and continuous positive airway pressure in preterm newborns after tracheal extubation", totaling 641 charts analyzed. Of these, 121 files of PTNB admitted to the NICU of HSCMV were selected. The study included all preterm infants with GI ≤ 36 weeks and 6 days and birth weight (PN) <2000 g, submitted to CPV and orotracheal intubation (IOT), and extubated within 40 days of life. RNs that presented congenital anomalies that compromised the cardiorespiratory system; Genetic diseases; Neuromuscular disease that compromised mechanical ventilation; APGAR less than 4 in the fifth minute of life; Intracranial haemorrhage of degrees III and VI; Malformations of the central nervous system; Depression of the central nervous system by drugs were excluded. The data were collected in the company responsible for archiving HSCMV documents and in the hospital in a systematized way, through the form elaborated by the researchers, containing neonatal variables such as date of birth, sex, GI, PN, APGAR, PN / IG adequacy, Time of NPV, mode of NIV post extubation, whether or not failure, failure time, acquired respiratory morbidity, physical therapy, how many sections and techniques were used.

A descriptive analysis of the data was used in order to consider the frequencies and percentages for qualitative variables and data summary measures as mean, median and standard deviation for the quantitative variables.

RESULTS

Of the sample included in this study, 57.9% of the newborns were male and 42.1% were female. Regarding the birth weight, 51.2% were of low weight (BP), 37.2% very low weight (MBP) and 11.6% extreme low weight (EBP), with a mean weight of 1471.04 Grams, ± 359.79 grams. Regarding gestational age, 10.8% were classified as borderline, 60.3% as moderate and 28.9% as extreme (table 1), mean gestational age was 31.4 weeks, ± 2.1 weeks (Table 2). Regarding weight / gestational age adequacy, 88.4% were considered adequate for gestational age (GIA), 11.6% were small for gestational age (GIP) and none were classified as large for gestational age (GIG). When the time of mechanical ventilation was considered, 34.7% were one day or less, 32.2% were

between 2 and 5 days and 33.1% were more than 5 days in the ventilator, with an average time of 4.64 days, ± 5.67 days. Of the total, 65.3% used nIPPV while 34.7% used CPAP.

Physiotherapy was performed in 84.3% of PTNBs (Table 1). Regarding the techniques used, almost all of the newborns underwent abdominal wall rebalancing, 88.2% underwent motor physical therapy (table 3).

Table 1 – Regarding the RN Profile

CHARACTERISTICS		N	%
SEX	Male	51	42,1
	Female	70	57,9
WEIGHT AT BIRTH	BP	62	51,2
	MBP	45	37,2
	EBP	14	11,6
GESTACIONAL AGE	Extreme	35	28,9
	Limitrofe	13	10,7
	Moderate	73	60,3
ADEQUACYPN/IG	AIG	107	88,4
	PIG	14	11,6
NON-INVASIVE VENTILATION	CPAP	42	34,7
	NIPPV	79	65,3
PHYSIOTHERAPY	NO	19	15,7
	YES	102	84,3

BP: Low weight.
MBP: Very low weight.
EBP: Extreme low weight.
PIG: Small for gestational age.
AIG: Suitable for gestational age.
GIG: Great for gestational age.
CPAP: Positive pressure continuous.
nIPPV: Nasal intermittent positive pressure

Table 2 – Quantitative variables

	Average	Median	Standard deviation
WEIGHT AT BIRTH	1741,04	1525	359,79
GESTATIONAL AGE	31,42	32	2,15
VENTILATION TIME	4,64	3	5,67

Table 3 – Physiotherapy techniques carried out

Techniques	N	%
RTA	100	98,0
AFE	44	43,1
BabyBobath	90	88,2
MHB	46	45,1
Apro. Articular	59	57,8
Stretching	16	15,7

RTA: Rebalancing abdominal thoracic.
AFE: Aceleration of expiratory flow.
MHB: Bronchial hygiene maneuvers.

DISCUSSION

The study showed that most of the analyzed sample consisted of male patients (57.9%), classified as suitable for gestational age (88.4%), with a mean birth weight of 1471.04 ± 359, 79 grams and mean gestational age of 31.4 ± 2.1 weeks. Venzon (2006), despite showing similar numbers of males (54.9%), mean birth weight and gestational age were lower than those found in this study, being 1034.21 ± 174.19 grams And 28.79 ± 1.96 weeks, respectively. Fávero et al. (2011) also observed that the prevalence of OTI is higher in males (58.3%).

Relating to physiotherapy, the figures demonstrates that a considerable part of the sample (84.3%) performed some technique, and that of these, almost all (98%) had respiratory physiotherapy

CONCLUSION

Of all included in this study, it was noticed that the profile of the intubated infants is male, low birth weight, with a mean weight of 1471.04 grams, moderate prematurity, with a mean of 31.4 weeks, suitable for gestational age , Mean time of VPM of 4.64 days and most uses nIPPV.

The most used technique in physiotherapy performed in a large part of the PTNB was the abdominal reequilibrium.

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REVISTA SALUS
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ORIGINAL ARTICLE

Physical activity, quality of life and functional performance in the activities of daily life of elderly

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Keywords

Elderly; Physiotherapy; Everyday Activities; Quality of Life; Physical Exercises.

Abstract

The main objective of this study is to evaluate the level of physical activity, quality of life and functional performance in the daily activities of the elderly who participate in a physiotherapy group. The method used for the research was a cross-sectional case series study in 32 elderly people, where the participants were submitted to a data collection form and then to the application of questionnaires, through the following instruments: IPAQ for the evaluation of the level of physical activity of the elderly, Katz and Lawton-Brody Index for the identification of independence in basic and instrumental activities of daily living and Brazilian Version of the Quality of Life Questionnaire - SF-36 . The results of the research revealed that the mean age of the individuals studied was 72.81 ± 8.66 years, with the majority of women. Regarding the level of physical activity, 20 participants were classified as active, 12 as moderately active and none of the participants were categorized as sedentary. Regarding the degree of dependence on basic daily life activities, 81.3% of the elderly were categorized as independent and the others as partially dependent. As for instrumental activities of daily living, all were classified as independent. The worst performance in the Limitations by Physical Aspects and the best scores in the Mental Health domain were observed in the evaluation of the quality of life. Significant differences between the analyzed variables could not be established.

When comparing the data obtained with other findings, the results of the research revealed that physical activity exerts a positive influence on functional performance in activities of daily living and quality of life of the elderly.

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INTRODUCTION

Population aging is a natural phenomenon, irreversible and worldwide repercussions, which has been occurring in an accelerated way in Brazil[1,2]. As reported by data obtained in the IBGE[3] demographic census, in the city of Vitória, Espírito Santo, the elderly represented 12.4% of the total population in 2010.

The aging process is progressive and dynamic that generates morphological, physiological, biochemical and psychological changes, resulting in the progressive loss of the individual's ability to adapt to the environment[4].

Besides anatomical and physiological alterations characteristic of normal aging, it is conceivable to associate with a pathological condition, in which chronic non-transmissible diseases prevails, leading to a greater decline in the capacity to perform the basic activities of daily living, changes in the autonomy, independence and quality of life of the individual[5,6].

Physical activity is essential for the maintenance of health aging. Its benefits are extensive and include reduced risk of cardiovascular disease, thromboembolic stroke, hypertension, type II diabetes mellitus, osteoporosis, obesity, colon cancer, breast cancer, anxiety and depression[7].

Recommendations on the type and amount of physical activity are indispensable for health promotion and disease prevention in the elderly are present in several literatures[8,9]. Chou, Hwang and Wu[10] observed that there is evidence that regular physical activity minimizes the physiological changes associated with aging, promotes cognitive health, and complements the treatment of chronic diseases in the elderly, although such practice cannot stop the process of aging. In addition, it slows down the deterioration in the ability to perform activities of daily living and promotes the maintenance of a good quality of life.

Therefore, the main objective of the study was to evaluate the level of physical activity, quality of life and functional performance in the activities of daily living of elderly people participating in a physiotherapy group in a clinic school in Vitória.

METHODS

A cross-sectional case series study was carried out at EMESCAM from July 2015 to May 2016, at a Clinical School of Physiotherapy of the College of Sciences of Santa Casa de Misericórdia de Vitória (EMESCAM). Convenience sample of 38 elderly people. A Data Collection form for obtaining personal data related to the sample was initially applied. The study included patients of both sexes, aged 60 years or older, according to what the World Health Organization recommends in developing countries, with independent ambulation, who agreed to sign the ICF and who attended the group Of physiotherapy for more than 6 months. Elderly patients with severe neurological and musculoskeletal disorders, or with cognitive deficits that compromised the understanding of the interview, were excluded. Of the participants, two did not agree to sign the EHIC, three participated in the group for less than 6 months and one individual had a neurological sequel and were excluded from the study.

Only the individuals who met the inclusion criteria were submitted to scales using the following instruments: IPAQ (International Physical Activity Questionnaire), version 8, long form, Katz Index, Lawton-Brody Index and SF-36 (Medical Outcomes Study 36-Item Short-Form Health Survey). The interviews were individual and there was previous training for the application of the instruments.

The International Physical Activity Questionnaire (IPAQ), which verified the level of physical activity (AF) of the elderly, also allows estimating the weekly time and the energy expenditure in physical activities of light, moderate and vigorous intensity in different contexts of daily life, such as: Work, transportation, domestic tasks and leisure, and also determines the time spent in passive activities performed in the sitting position.

The version 8, long form, usual week[11-13] was applied and, after the interview, the scores and the classification of the elderly were calculated according to the IPAQ Guidelines for Processing and Data Analysis[19], expressing the Results in MET-minutes / week.

Participants who performed vigorous activity for at least three days were categorized as active, accumulating at least 1500 MET-min / wk or when the sum of all activities reached a minimum of 3000 MET-min / wk for at least seven days. Those whose combination of activities reached five or more days, spent at least 600 MET-min / wk, when they practiced five or more days of moderate and / or light intensity activity for 30 minutes a day or when they performed three or more Days of vigorous intensity activity at least 20 minutes per day were considered to be moderately active. On the other hand, the elderly who did not practice any type of physical activity, or who did not fulfill the classification criteria of the other categories, were classified as sedentary.

The Katz Index[14-16], which consists of an instrument containing 6 basic tasks of daily living: bathing, clothing, personal hygiene, transfers, continence and feeding, was used to identify independence in basic daily life activities. Each task receives the independent score (1 point) or dependent score (0). The maximum score of 6 points indicates independence for basic activities of daily living, 4 and 5 points show partial dependence or moderate deficit and 2 points or less reveal significant dependence or marked deficit.

The Lawton-Brody Index[17] allowed the observation of performance in instrumental activities of daily living. The instrument comprises 9 tasks such as telephone use, shopping, meal preparation, household chores, transportation use, medication management, and money. The items are classified according to the need for help, the quality of the execution and the initiative, varying from 1 to 3, in which 1 represents the need for total help to carry out the activity, 2 that the elderly need some help and 3 total independence function. If the elderly present a final score between 19 and 27, it is classified as independent between 10 and 18 semi-dependent points and 1 to 9 points is categorized as dependent.

SF-36[18] was used to observe the quality of life of the elderly. It is a generic instrument of easy administration and comprehension, divided into 8 domains: functional capacity, physical aspects, pain, general health, vitality, social aspects, emotional aspects and mental health. It presents a final score, for each dimension, ranging from 0 to 100, with 0 being the worst and 100 being the best state of health. Although there is no global score proposed, the domains can be grouped into two components: physical, which encompasses the domains functional capacity, physical aspects, pain and overall health; And mental, which encompasses the domains vitality, social aspects, emotional aspects and mental health.

The descriptive analysis of the data collected was carried out taking into account the frequencies and the percentage for the qualitative variables and data summary measures as mean, median and standard deviation for the quantitative variables. In order to verify the association between functional performance and physical activity levels, we chose to use the chi-square test or Fisher's exact test when one or more expected frequencies were less than 5. And for the comparison between the Domains of quality of life with physical activity levels, the Mann-Whitney test was used. The values were considered statistically significant when $p < 0.05$. The program used was "SPSS version 22". The research was approved by the Ethics Committee (CEP) of the College of Sciences of the Santa Casa de Misericórdia de Vitória (EMESCAM), under the number of opinion 1,162,062 on July 28, 2015.

RESULTS

The sample consisted of 32 elderly people, who were participants in the physiotherapy group of the EMESCAM school clinic, where 28 were female (87.5%) and 4 were male (12.5%), with a mean age of 72,8 ± 8,7 years.

The analyzed individuals were characterized by color, schooling, income, marital status and occupational status, as shown in Table 1. Besides, they were questioned about the number of children and an average of 3.03 ± 2.40 children, Ranging from 0 to 8, with 75% having up to 3 children.

Table 1 – Distribution of the elderly in relation to color, education, income, marital status, occupational situation and presence of morbidities

Color	**n**	**%**
Brown	15	46,9
White	9	28,1
Black	8	25,0
Education		
No schooling	3	9,4
Elementary School incomplete	16	50,0
Elementary School complete	2	6,3
High School incomplete	8	25,0
High School complete	3	9,4
Income		
None	2	6,3
Up to 1 SM	13	40,6
>1 a 2 SM	10	31,3
>2 a 3 SM	5	15,6
> 3 a 4 SM	1	3,1
> 4 SM	1	3,1
Marital Status		
Married	12	37,5
Single	9	28,1
Widower	8	25,0
Divorced	3	9,4
Ocupacional Situation		
Retired	17	53,1
Pensioner / Other benefits	8	25,0
Housewife	4	12,5
Retired and working	2	6,3
Paid work	1	3,1
Morbidities		
Systemic Arterial Hypertension	21	65,6
Hypercolesterolemia	8	25
Diabetes Mellitus	4	12,5
Cardiopathy	4	12,5
Arthrosis	4	12,5
Hypo/Hyperthyroidism	3	9,4
Osteoporosis	2	6,3
Withou morbidity	1	3,1

SM = minimum wage

Concerning the presence of morbidities, Systemic Arterial Hypertension had the highest prevalence (65.6%). Of the study participants, 19 (59.4%) reported on only one morbidity, 5 elderly (15.6%) had two and seven individuals (21.9%) mentioned three or more morbidities and just one elderly (3.1%) did not address associated disease.

With respect to the number of drugs used, the mean was 3.29 ± 2.21 drugs, of which 18 (56.3%) used up to three drugs, 8 (25%) used between four and five and 5 15.6%) used more than five medicines. An elderly person did not know to inform about the amount of medicines used.

The members participated in the group for a time greater than six months. Those who attended the group for more than 12 months represented 81.3%. Regarding the weekly participation frequency, 8 elderly people (25%) participated in the activities twice a week, 15 (46.9%) three times a week, representing the majority and 9 (28.1), four times weekly.

Three categories were delineated according to the International Physical Activity Questionnaire, of which 20 participants were classified as active, representing 62.5% and 12 as moderately active, representing 37.5% of the sample. No participant was categorized as sedentary. The mean total physical activity was 3276.69 ± 1099.32 MET's. Household tasks followed by recreation, transportation and work were the main contributors to total physical activity as shown in table 2. In consonance with the intensity of total physical activity, the average energy expenditure was 780.72 ± 477, 46 MET's in mild activities and 2495.98 ± 969.82 MET's for moderate activities. None of the participants performed any vigorous activity in the various fields of IPAQ.

Table 2. Equivalent total metabolic in the IPAQ domains

	Minimum	Maximum	Average	DP
Work	0	6102	486,94	1468,12
Transportation	0	1188	505,12	280,32
Home	180	7680	2527,56	1802,34
Recreation	400	1817	894,38	326,97

DP = standard deviation

With respect to the degree of dependence on the basic activities of daily living, 26 elderly (81.3%) were classified as independent in all tasks and the others as partially dependent. The continence activity was the one that presented the lowest proportion of independence, for 6 elderly (18.7%) reported not having complete control of urinating and / or evacuating functions. According the instrumental activities of daily living, all the elderly were classified as independent. This way, the mean score was 25 ± 2.1 points, ranging from 19 to 27 points.

The results of the data obtained by the SF-36 instrument, described in table 3, revealed the worst performance in the field of Limitations by Physical Aspects and the best scores in the Mental Health domain.

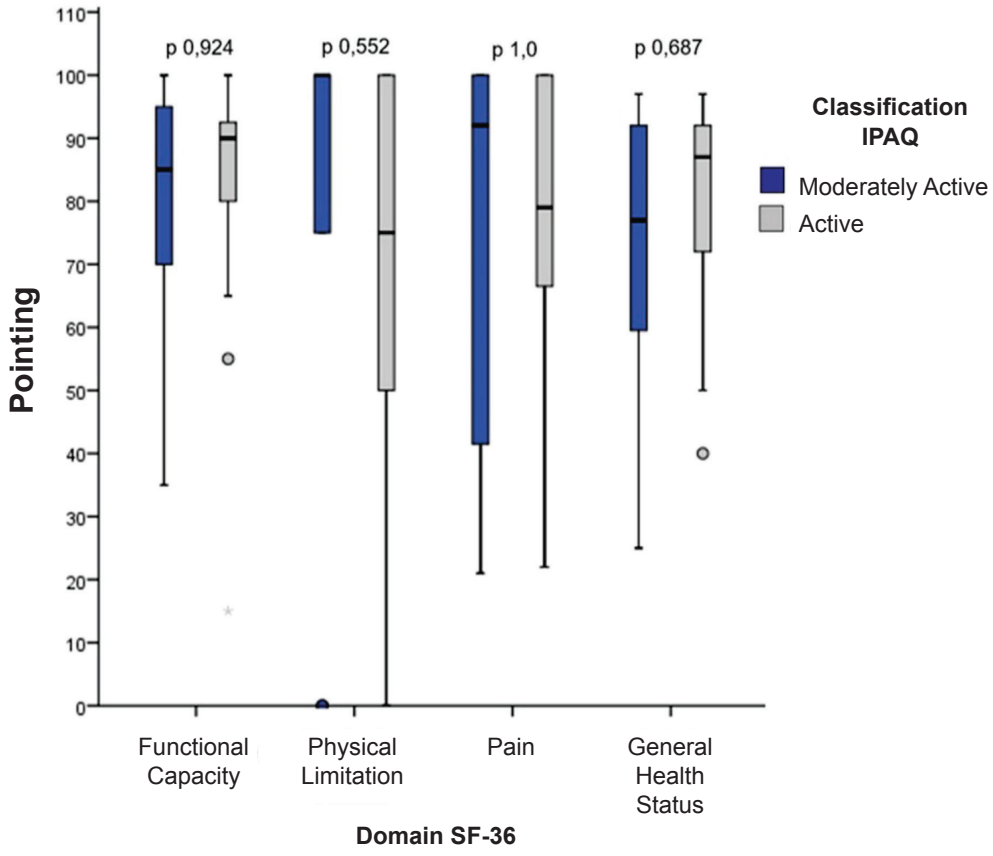
Table 3. Scoring in the domains of SF-36

	Minimum	Maximum	Average	Median	DP
Physical Component					
Functional Capacity	15	100	81,9	90,0	19,4
Limitation by Physical Aspects	0	100	73,3	87,5	35,6
Ache	21	100	75,9	84,0	25,9
General Health Status	25	97	77	84,5	18,4
Mental Component					
Vitality	45	100	82	90,0	15,3
Social Aspects	25	100	81,6	100,0	26,2
Emotional Aspects	0	100	80,2	100,0	35,8
Mental Health	16	100	84,3	92,0	19,2

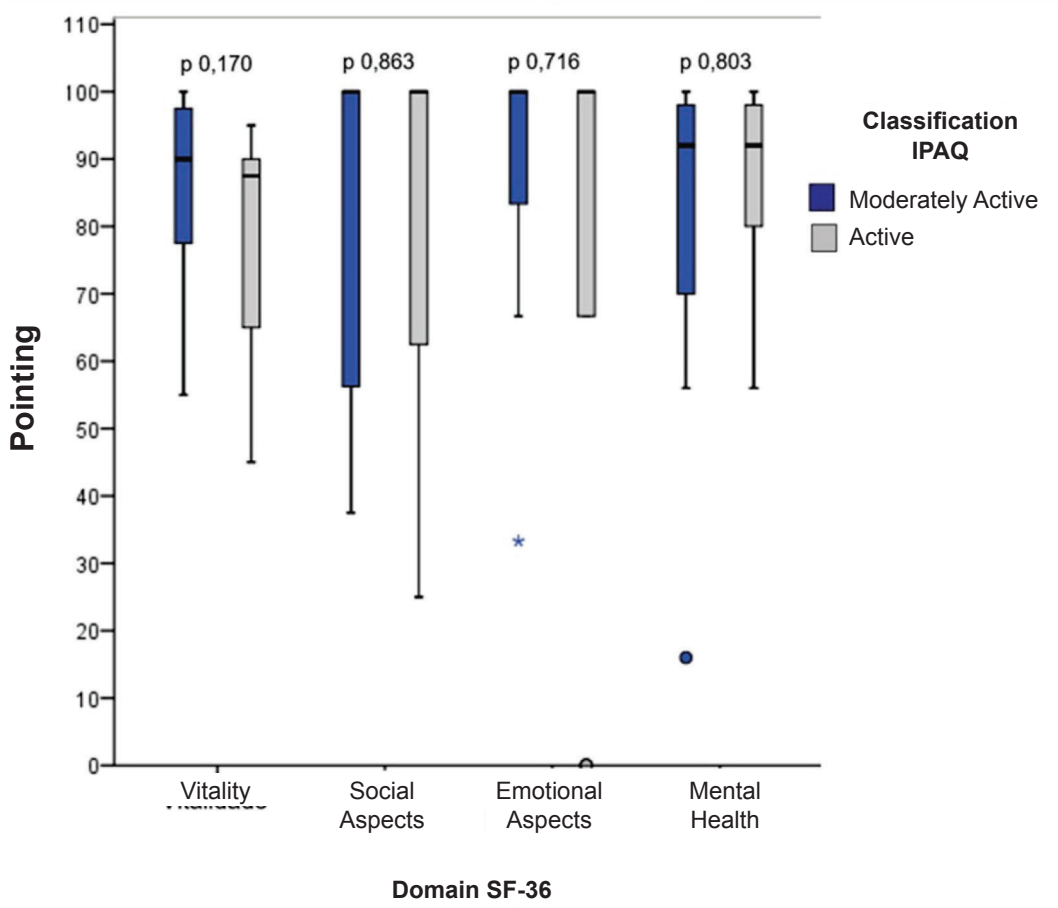
DP = standard deviation

The chi-square test was used to determine the association between different levels of physical activity and functional performance in basic activities of daily living. The result showed no association between the variables (p> 0.05). It was not possible to establish an association between physical activity levels and functional performance in instrumental activities of daily living, since all the elderly were categorized as independent. The Mann-Whitney test was used to compare scores on the physical component (Graph 1) and mental (Graph 2), among the physical activity levels of the elderly. The result pointed out that there is no significant difference in the quality of life between the moderately active and active categories (p> 0.05) in the physical and mental components.

Graphic 1 – Comparisson of the physical components of the quality of life among the classification levels of IPAQ



Graphic 2 – Comparison of the mental components of the quality of life between the classification levels IPAQ



DISCUSSION

The practice of regular physical activity is a crucial resource for the increment of physical function, taking in account that it influences the maintenance of quality of life and performance in activities of daily living in older individuals[19]. In this study, the majority of the elderly who practiced exercise were female - data similar to the findings of researchers in other studies[10,20]. The largest participation in the elderly group was of women, probably due to their high demand for health services.

Age is considered one of the determinants of risk for the development of chronic and debilitating diseases[21]. Thus, Cavalcanti et al.[22], when verifying the prevalence of such disorders in a group of elderly in Paraíba, verified the predominance of Systemic Arterial Hypertension in the individuals analyzed. Rocha et al.[23] observed, in the state of Bahia, the prevalence of Arterial Hypertension, followed by Hypercholesterolemia, Diabetes Mellitus and Cardiopathy. Data from the two studies were in agreement with the findings of this study.

The importance of physical activity in promoting healthy aging is notorious. It is known that when performed on a regular basis, it plays an important role in the health of the population, especially in the health of the elderly[24]. Golubic et al.[25] states that physical activity can be performed in different contexts of everyday life, in addition to domestic tasks, transportation, work and leisure.

Toscano and Oliveira[26] argued that domestic activities, followed by leisure and locomotion, contributed the most to increasing energy demand. It has been

assumed that these results occurred due to the predominance of women in the research. Considering that the sample studied is mostly retired, it was not surprising that physical activities at work were the ones that contributed least to total physical activity.

A weakness in the ability to perform activities of daily living occurs because of the changes resulting from the aging process and the common pathologies in this age group [5]. Nevertheless, the results of the research revealed that all the elderly were independent in the instrumental tasks of daily life and also revealed that only the bladder and bowel functions had low scores.

By contrast, Smanioto and Haddad[27], when they verified the functional performance in 204 institutionalized elderly, noticed that only 33.3% of the individuals were independent to perform basic activities of daily living. Taking into account that the participants in the present study had an adequate level of physical activity, it can be assumed that elderly people who practice physical activity are less dependent on their daily lives.

This study findings show high averages in all domains of quality of life, ranging from 73.3 to 84.3. Nonetheless, it was not possible to establish a significant difference between the elderly classified as active and moderately active, when comparing the results with the level of physical activity of the participants.

Toscano and Oliveira[26] concluded, however, that more active women presented superior results in the quality of life questionnaire in all domains evaluated. These findings were revealed in a cross-sectional population-based study conducted with the objective of comparing quality of life with the level of physical activity in a sample of 238 women aged at least 60 years.

Silva et al.[28] verified similar levels of physical activity among the sedentary elderly and those who performed regular physical activity. This happens because sedentary individuals, although not performing regular physical activity, perform other types of activities such as household chores and work. Nevertheless, these elderly had a reduced quality of life compared to the non-sedentary group, ensuring the importance of physical activity practice in the quality of life of this population.

Gomes and Paiva[29], in a cross - sectional study carried out in the metropolitan region of Vitória - ES, aiming at comparing the quality of life of 70 functionally independent elderly people living in long - term institutions and 210 non - institutionalized elderly people, verified that the institutionalized elderly present worse quality of life in all domains evaluated, compared to the non-institutionalized group.

CONCLUSION

Physical activity is considered an essential intervention in promoting and maintaining the health of the elderly, for it produces benefits in the various systems of the organism and it aids in the treatment of many diseases.

The study showed that elderly participants of a physiotherapy group at a clinic in Vitória exhibit good levels of physical activity and satisfactory performance in daily life activities and, therefore, present high scores in the domains of quality of life. Although it is not feasible to establish significant differences between the analyzed variables, it can be assumed, thanks to the comparison of the data obtained with other studies, that physical activity exerts a positive influence on the functional performance in activities of daily living and the quality of life of the elderly. Even so, it is still necessary to carry out new research involving sedentary, institutionalized or restricted elderly people in the home, in order to compare with the data of this study.

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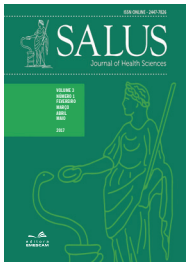

REVIEW ARTICLE / UPDATE

Influence of early mobilization in adult critical patients

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Kewwords

Physiotherapy, Intensive Care Units, Early Ambulation

Abstract

Severe patient is considered to be an imminent risk of loss of life or organ function of the human body, as well as those in fragile clinical condition that require care in the Intensive Care Units (ICU), requiring the assistance of an interdisciplinary team, in which Physiotherapy is able to promote the preservation and functional recovery of human movement, minimizing complications of hospitalization. The main objective of this study is to know the influence of early mobilization through physical therapy in critical adult patients. Regarding material and methods, an integrative review of the literature of the last 5 years found in the PubMed, Lilacs and Scielo database was done. There were 10 studies related to early mobilization in critical adult patients hospitalized in ICU. The results indicated that early mobilization is a safe and viable technique, which reduces hospitalization time, mechanical ventilation, muscle weakness due to immobilization and, despite the benefits, presents limitations, insecurity related to the patient's tubes and catheters. Many studies argue that early mobilization reduces the deleterious effects of prolonged bed rest. The study concluded that early mobilization is a safe, affordable method that provides benefits to the patient. However, it has limitations in practice, such as the lack of professionals and the fear of disconnecting tubes and catheters.

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A critical patient is an individual who has impairment of one or more of the major physiological systems with loss of self-regulation, thus requiring continuous care, as occurs in Intensive Care Units (ICUs)[1]. A common complication in patients admitted to ICUs is the generalized weakness, for bed restriction causes immobility cooperating for the weakness of the skeletal muscles, especially in the respiratory muscles. This immobility may contribute to an increase in the length of hospital stay[2]; to a greater dependence on activities of daily living; to the need for family support; as well as to a greater disability after hospital discharge, which may have a significant impact on the patient's functions and quality of life[3].

The critical patient demands care from a multidisciplinary team, in which physical therapy is crucial, because as a result of human movement, it promotes the preservation of functional recovery, minimizing complications arising from hospital admission, more precisely in the ICU [4]. In this respect, early mobilization is a physiotherapeutic resource which maximizes functional recovery, and is performed through progressive activities, such as kinesiotherapy, bedside sedestation, transfer to a chair, orthostatism and ambulation that, when possible, should be initiated from The first days of hospitalization [3].

It is common to believe that early mobilization of critically restricted bed patients can result in important effects for these patients, such as maintaining skeletal muscle strength and joint mobility, optimizing tissue oxygen transport, improving lung function and Performance of the cardiorespiratory system. According to some authors, early mobilization seems therefore to be favorable to patient recovery, considering that it may be useful in the prevention of both physical problems and psychic problems. Added to that, it can prevent prolonged hospitalization and thus the risks associated with the longer immobilization period. All these factors added can even affect the improvement of the quality of life after hospital discharge [5].

Aforementioned in the literature, early mobilization should be started as soon as possible[7], as it seems to be a safe and viable physiotherapeutic approach capable of producing important physiological effects[6]. Even though there are studies about the early mobilization, it is necessary to know better its influence in the critical adult patient, as a way to deepen the knowledge of the interdisciplinary team, being able, then, to improve the care provided by the professionals involved, especially in physiotherapy.

Thus, the purpose of this study is to understand the influence of early mobilization on critical adult patients, especially in relation to muscle strength, respiratory complications and length of hospital stay.

METHODS

This study is an integrative review of the literature, in which descriptive research was carried out in the database of PubMed, Lilacs (Latin American and Caribbean Literature in Health Sciences) and Scielo (Scientific Electronic Library Online). The search was limited to the English and Portuguese languages and articles with great pertinence to the theme were selected. The types of study selected in this review were: systematic review, observational studies, cohort studies, experimental and clinical trials. The search was based on the combination of the terms: ICU, critical patient, early mobilization. After the bibliographical survey, the inclusion criterion used was that of material which data referred to aspects related to the key words previously mentioned as well as relevance on the subject in question. Direct approach to the topic in articles with languages in English or Portuguese,

published between 2010 and 2016 was used as criterion of inclusion of the studies. Articles that referred to the mobilization of patients who were not hospitalized in ICU were not used.

RESULTS

The harmful effects of bed rest and the benefits of early mobilization have been recognized in hospitalized patients since the 1940s. "Early" is understood to mean mobilization activities that begin immediately after the stabilization of important physiological changes, and not exclusively after the release of mechanical ventilation or discharge from the Intensive Care Unit[8]. With the study of the literature, it was possible to obtain 10 results focusing on Early Mobilization in critical adult patients. The studies included in this review and a summary of some characteristics of each study are presented in Table 1.

Table 1: Summary of results of the studies which met the inclusion criteria.

Study	Type of Study	Participants	Intervention	Evaluated Issues
TEAM Study Investigatorset al. 2015.	Prospective cohort study	192 intubated patients, ventilated for more than 48 hours	Daily data collection during the first 14 days of mechanical ventilation or until discharge from the ICU or death	Physiological information, Richmond Agitation and scoring sedation scale maximum level of mobilization using the ICU mobility scale
JolleySE et al. 2014.	Cross-sectional Study	Physicians, Nurses and Physiotherapists of the team	Questionnaires on early mobilization and meetings	Potential benefits on early ICU mobilization, attitudes toward ICU therapy provision and perceived barriers
MeyerMJ et al. 2013.	Multicenter randomized trial	All adult ICU patients ventilated for less than 48 hours and were expected to continue ventilation for at least 24 hours	Daily goals for early patient mobilization. With the intervention protocol	Evaluated through questionnaires and early mobilization exercises
ZomorodiM et al. 2012.	Pilot Study	3 patients in VM since the date of admission	The protocol consists of 6 events of early mobilization activities	Safety and viability of early mobility protocol for ICU patients due to surgical trauma. Influence in time of MV or hospitalization and perceived vital effects

Study	Type of Study	Participants	Intervention	Evaluated Issues
LeditschkeAI et al. 2012.	Quality Audit	Patients with postoperative surgical hospitalization and trauma	Active Mobilization, Active Transfer, Passive Transfer	Frequency of early mobilization in the ICU and obstacles to early mobilization
ChawlaR et al. 2014.	Questionnaire	Physicians of the Indian Society of Medicine Questionnaire sent by email	Questionnaire	The physician´s vision regarding the practices of analgesia, delirium, early mobilization among others
HarrisCL et al. 2014.	Questionnaire	Physicians, area managers and nurses. Patient records	3 orientation meetings and questionnaire	Barriers to early mobilization, early mobilization protocol and team vision
PermeC et al. 2014.	Observational Study	Patients of the Cardiovascular ICU, aged >18, who met the criteria to start physical therapy	Patients Observation for 8 weeks	Concordance, fisibility and clinical use of the Perme Mobilization Scale in ICUs
HodgsonCL et al. 2013.	Clinical Evaluation	Techniques apllied on the patient in mechanical ventilation	–	The early mobilization with the reduction time of mechanical ventilation
MorrisPE et al. 2012.	Prospective Cohort Study	280 survivors due to acute respiratory failure during hospitalization	–	Index medical variables and early mobility with admissions or death in survivors of acute respiratory failure

VM: Mechanical Ventilation. UTI: Intensive Care Unit.

TEAM Study Investigators, et al.[9] and Morris et al.[10] performed a cohort study. The first one performed a prospective cohort study, in which the population studied was composed of 192 intubated patients, for more than 48 hours. Data collection was performed daily at 12 o'clock, during the first 14 days of mechanical ventilation or until discharge from the ICU or death. The physiotherapist assessed the physiological issues, the Richmond Agitation and Sedation (RASS) scale, according to table 2,[11] and the maximum level of mobilization in the ICU. The study presented a positive result, since during the mobilization there were no serious adverse events, and among the 1,288 physiotherapy visits performed, only six (0.4%) presented cardiovascular or respiratory instability, demonstrating that mobilization is a safe method. On the other hand, Morris et al.[10], in their cohort study of 280 ICU survivors who required mechanical ventilation for acute respiratory failure during hospitalization, aimed to assess whether medical variables and early mobilization Are ultimately associated

with readmission or death in survivors of acute respiratory failure. Of the total of 280 survivors, 132 (47%) required at least one hospital rehospitalization or died during the first year of post-admission, 126 (45%) did not require hospital readmission and remained alive after one year and 22 (8 %) Did not respond, being considered as loss of follow-up. The results showed that the precise mechanism by which early ICU mobility can lead to reduced rehospitalization is unclear, since survivors of respiratory insufficiency requiring mechanical ventilation are vulnerable to hospital readmission and have a high mortality rate within one year. For this, prospective longitudinal studies are needed to assess the effects of long-term early mobility.

The cross-sectional study by Jolley et al.[12] participants were 91 physicians, 17 nurses and 12 team physiotherapists who completed a questionnaire on early mobilization. The questionnaires consisted in evaluating the knowledge of the potential benefits of early mobilization in the ICU, the attitudes regarding the provision of ICU therapy and the perceived barriers to the practice of early mobilization. There were multiple choice questions with answer choices: I agree, I totally agree, I am neutral, I disagree, and I totally disagree. The results of this study concluded that most doctors favor the practice of early mobilization. Nurses, however, feel that mobilization puts the team at risk of musculoskeletal injuries, causing stress at work. Physiotherapists argued that reduced care time and concern about invasive device management are the barriers to early mobilization practice, demonstrating, this way, the need for a cohesive and trained multidisciplinary team for the widespread implementation of early mobilization in ICUs.

Meyer et al.[13] presented a randomized, multicenter study with all patients in the adult surgical ICU, totaling 200 patients from three university hospitals in the United States of America, who were ventilated for less than 48 hours, expecting to continue ventilation at the next 24 hours at the time of screening. Daily goals for early mobilization were drawn with an intervention protocol, and then assessed through questionnaires and early mobilization exercises. The results of the study concluded that early mobilization based on previously established algorithms tends to optimize the efficiency of existing professional and technological resources, with no need for new hiring and acquisitions, safely improving the clinical results of patients hospitalized in the ICU, with no Increase hospital expenses.

Zomorodi et al.[14] analyzed, in a pilot study, 3 patients on mechanical ventilation hospitalized in an intensive care unit, from the date of admission, through a protocol composed of six mobilization activities. The evaluated items investigated whether it is safe and feasible for patients in the surgical ICU to develop and implement an early mobility protocol, whether there is a decrease in time in MV or hospitalization and whether the vital effects are perceived. The results of the study allowed concluding the importance of the multidisciplinary role in the development of an early mobilization protocol. In conclusion, more comprehensive studies are needed to determine if an early mobility protocol for patients admitted to such units is effective, considering that there is no gold standard for patient mobilization in intensive care units.

Leditschke et al.[15] performed a quality audit, which monitored 176 patients with postoperative surgical hospitalizations in the ICU for four weeks, evaluating the frequency of early mobilization in the intensive units and likewise assessed the obstacles encountered in performing the mobilization. The capacity of active mobilization, active transference, passive transference was

evaluated and the patients who were not mobilized were also evaluated. Among the mobilization records, there were two adverse events - both episodes of hypotension. The results of this study revealed that 54% of the patients analyzed received some type of mobilization, demonstrating the high frequency and safety of the method, contrary to the reluctance of the teams of some ICUs to mobilize the patients, despite the low risk and potential benefits. It is essential to emphasize that the mobilization in the patients who did not receive it could have been possible with small changes, such as, for example, selection of place for devices of vascular access, time of accomplishment of procedures and improvement of the degree of sedation.

Chawla et al.[16] applied a 6-month e-mail questionnaire to 659 physicians of the Indiana Society of Medicine in their study, evaluating the physician's view of analgesia, delirium, and early mobilization among others. In analyzing the data presented on mobilization practices, 92% believed that early mobilization plays an important role in patient recovery, that 85% of doctors asked for some form of mobilization on a regular basis and that only 20% believed that inpatients In ICUs can be mobilized safely, while on mechanical ventilators and with invasive monitoring. The main limiting factor for the non-mobilization of ICU patients was the seizure with the displacement of tubes and lines, corresponding to 22% of the responses. As regards 'reason for non-mobilization', only 569 doctors answered the question. 33.7% reported that ICU mobilization is not applicable and is not feasible due to personnel issues (the lack of availability of trained personnel), 13.7% believe that they could not mobilize critical patients with suspensory equipment (ventilators, , Etc.) and 7.8% are afraid of complications that may occur as a result of mobilization.

The study by Harris et al.[17] was attended by professionals from a multidisciplinary team. The intervention was performed through orientation meetings and questionnaire responses on the difficulties of early patient mobilization. In addition, an analysis of the medical records of 21 patients who remained in the intensive medical-surgical or cardiac care unit for more than three days between April 2011 to April 2012 and May 2012 to May 2013 was performed, totaling 364 and 542 physiotherapeutic evaluations, respectively. The barriers of early mobilization, the protocol used for mobilization, and the team's view on the subject were evaluated. The analysis of the data from this study allowed us to conclude that the practice of early mobilization in ICU is feasible. However, for this practice to take place safely, it is imperative that physiotherapists plan the sessions, taking into account the constraints of each patient, such as the use of mechanical ventilation and continuous dialysis. It was also concluded that most patients were able to participate in at least a few sessions, with postural changes, wandering small distances, transferring from bed to chair, causing them to progress and to tolerate the proposed activities.

Perme et al.[18] performed an observational study for eight weeks in 35 patients of the Cardiovascular ICU, older than eighteen years, who met the criteria to start physical therapy, verifying the agreement, feasibility and clinical use of the Perme de Mobilization Scale in ICU. The authors concluded that the presented scale is a tool developed to measure the mobility situation of the patient beginning with the ability to follow commands and terminating with the distance covered in two minutes. Presuming the preliminary data, they suggest that the scale may be considered a valid, reliable tool with acceptable clinical use, considering that it is used as an algorithm for progression of

the patient's activities in place of measuring their state of mobility.

Hodgson et al.[19] conducted a clinical evaluation study which observed the influence of early mobilization on reducing the time the patient received mechanical ventilation through the techniques applied to the patient during intensive care unit admission. After the analysis of three randomized trials, it was possible to establish the incidence of new technologies in the early mobilization of patients. A cycloergometer, transcutaneous electrical muscle stimulation, video therapies and technological aids made especially for the patient were used. Even with so many technologies allied to the practice of early mobilization, it is possible to perceive some barriers to its implementation. Examples of these are: inadequate staff to administer physical therapy, lack of equipment, concern with patient safety and physiological stability, sedation and mechanical ventilation, presence of catheters and probes, and scarcity of data on clinical and economic efficacy assessment in order to Convince doctors to apply the method.

DISCUSSION

Severely ill patients who remain in bed for days or weeks have a great chance of suffering complications such as atrophy and muscular and skeletal weakness, as well as other organic consequences associated with immobility. Muscle weakness is recognized in ICU patients who are able to survive the acute phase of critical illness. According to literature, this weakness occurs in 25% to 60% of patients who recover their consciousness after a week of mechanical ventilation, and may have repercussions for months or years after hospital discharge, with impairment of daily activities, quality Life and reintegration of the patient into society[8].

Early mobilization, though intuitively useful and physiologically logical, can be a complex therapy with a great deal of effort. This therapy becomes even more challenging considering that there are barriers that prevent its use in a more constant way[19]. Despite these barriers, studies have argued that early mobilization may reduce the harmful effects of prolonged bed rest[8].

Considering the above, this study intended to verify the influence of early mobilization on critical adult patients. The results revealed that many studies have pointed to the importance of mobilization.

The cohort study conducted by Hodgson C et al.[2], found that 84% of patients on mechanical ventilation received early mobilization. The practice of mobilization was associated with an increase in muscle strength at ICU discharge, positively influencing patient discharge and survival 90 days post-discharge. These results confirm the studies of Jolley SE et al.[12] and Chawla et al.[16], who verified that the team is well informed about the potential benefits of mobilization, including reducing the time spent on mechanical ventilation and maintaining muscle strength. According to these studies, mobilization is a safe and viable technique for patient recovery.

This research pointed out that early mobilization offers benefits, but, on the other hand, it still faces certain difficulties such as seizures related to lack of personnel, displacement of tubes and catheters, patient safety, degree of sedation, time available.

The study by Harris CL et al.[17] encountered difficulties similar to those of this research. However, a relevant result of this study showed the ability of the critically ill patient to participate in some sessions, sitting at the bedside or standing beside the bed. In addition, it also showed that the patient was able to transfer to a bed Chair or wander through some sessions, surprisingly. This

demonstrates that if the patient has enough time to adapt to the changes, he will become more tolerant of activities, thus speeding up his recovery process.

Perme C et al.[18] claim that the patient mobility situation can be evaluated by the Score Perme UTI Mobility assessment tool, which describes the patient's mobilization capacity, selects the ideal activity level and provides a reliable evaluation of the patient's mobility in the ICU. Nevertheless, according to Meyer MJ et al.[13], the condition for the patient to reach maximum levels of mobility, is to establish goals for the evolution of this patient with the human and material resources already available in the institution. In addition, it is necessary to guarantee safety and functionality to the patient, based on three fundamental characteristics: (1) simplicity, (2) focus of clinical staff and (3) use of resources already available.

Zomorodi M et al.[14] conducted a pilot study with three patients and discovered that these patients were able to walk satisfactorily using the tracheostomy or portable mechanical ventilator maintaining stable vital signs immediately after 15 minutes of activity. This fact indicated the safety of early mobilization and pointed out - in the final analysis of the patients - the reduction of mechanical ventilation time as well as of ICU stay.

The study by Leditschke AI et al.[15] demonstrated that mobilization is a safe practice, contemplating that only two adverse events occurred during early mobilization, requiring that the patient returned to bed. Considering that both episodes involved hypotension, it was pointed out that the limitation for the mobilization was the fact that the patient presented great respiratory instability.

Morris PE et al.[10] observed that patients receiving early mobilization had fewer hospital readmissions or death. This fact - although not entirely clear - reduces potential exposure to damage and debilitation, as it is associated with a decrease in the length of hospital stay.

CONCLUSION

Considering the literature, early mobilization is a safe and viable technique capable of reducing hospitalization time, mechanical ventilation, as well as of muscle weakness in the ICU. Even knowing the benefits of early mobilization, the professionals involved in the research pointed out the lack of professionals and the fear of disconnecting tubes and catheters as the main limiting factors of the technique.

In view of the above, it is suggested the need to seek new studies on the subject. It is also necessary that the ICU team be trained in order to mobilize the critical patient in a safe and effective way, allowing the patient to benefit from this technique developed by the physiotherapist.

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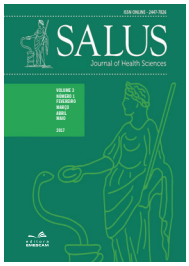

ORIGINAL ARTICLE

Regular physical activity improves lung function and muscle strength of respiratory wheelchair

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Keywords

Respiratory Function Tests; Swimming; Sedentary Lifestyle

Abstract

The objective of this study is to analyze the influence of physical activity under Pulmonary Function and Respiratory Muscular Strength in sedentary, practicing basketball and swimmers, comparing predicted values with those performed. For this, the method used was a cross-sectional, prospective, comparative study, in which 15 wheelchair users were evaluated, five swimming practitioners, five basketball practitioners and five sedentary workers. The evaluation form, pulmonary function test (spirometry) and respiratory muscle strength test (manovacuometry) were used. The results of the research indicate that the sedentary group presented a statistically significant difference ($p < 0.05$) between the predicted and realized values for: Vital Capacity (CV), Forced Vital Capacity (FVC), and Inspiratory and Maximum Expiratory (Pimax and Pemax). In the swimming and basketball groups there was a significant difference ($p < 0.05$) only for the PeMáx variable. From the study, it was concluded that sedentary individuals presented values below predicted, generating a greater number of variables with significant differences. Considering these results, it is argued that the practice of regular physical activity positively affects pulmonary function and respiratory muscle strength in wheelchair users.

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INTRODUCTION

Extensive studies reveal that the practice of physical activity improves the functionality and quality of life of people with physical disabilities, thus promoting disease prevention and health maintenance. The paradesporto (a sport modified or created to serve people with disabilities) is indicated from the initial phase, as it acts as a cooperator in the rehabilitation process. This professional works not only for the therapeutic benefits, but also for the psychological and social results[1].

The regular sports practice positively collaborates to the functions of the organism, improving aerobic capacity and pulmonary mechanics. On the other hand, sedentarism contributes to the reduction of pulmonary volumes, mainly the reduction of the volume of expiratory reserve, forced expiratory volume in the first second (FEV1), forced vital capacity (FVC)[2].

Studies indicate that, in Brazil, 56% of women and 37% of men are sedentary. These statistics not only affect the reduction of respiratory pressures, but also counteract the practice of physical activity, linked to the prevention of comorbidities[1,3].

When compared with swimming athletes, sedentary individuals present significant differences of PiMáx and PeMáx. This occurs because the respiratory system changes in response to exercise, due to the increased diffusion capacity of the membrane and the blood volume in the capillaries[4].

The factors that contribute to pulmonary function are the thoracic and abdominal musculature, and the posture of the individual. It is already known that the posture affects the activity of the abdominal muscles that are also active in the exercises and the expiration[5,6].

The capacity of respiratory muscles reduction in generating force can directly influence the performance of the physical activity, contributing to a mechanical restriction of the pulmonary ventilation. Corroborating this, a study shows that respiratory muscle weakness led to a decrease in vital capacity (CV)[7].

People who used bronchodilators and practiced swimming twice a week for 6 months, had a significant increase in FEV1, FVC, and peak expiratory flow (PEF) parameters. On the other hand, for those who only used this medication, the significant change occurred only in VEF_1[8].

Two very efficient methods for checking lung capacity are spirometry and manovacuometry. These methods consist of non-invasive tests that measure pulmonary volumes and capacities and respiratory muscle strength respectively, serving to analyze both functional capacity and physical performance[9].

Thus, as the benefits related to the practice of physical activity by wheelchair users are poorly described and understood in the literature, the justification for this study is based on the importance of encouraging physical activity to sedentary wheelchair users, as well as on the interest in inserting evaluative methods

of pulmonary function and respiratory muscle strength in adapted sport, contributing to better performance of athletes in training and competitions.

The aim of the study is to analyze the influence of physical activity on Pulmonary Function and Respiratory Muscular Strength, comparing the predicted and realized values in practicing and non-practicing physical exercisers.

METHOD

This is a cross-sectional, prospective, comparative study in which 15 wheelchair users were evaluated, 5 swimming parathletes, 5 basketball players and 5 sedentary ones. The research was conducted with athletes enrolled in the Training Center of Clube Álvares Cabral and of the Rehabilitation and

Sports Institute for Physical Disabilities of Espírito Santo by signature of the Letter of Consent.

It were included individuals of both genders, aged between 18 and 45 years, restricted to the wheelchair, practicing or not regular physical activity, who are over 6 months in the modality, and who agreeded to sign the Free and Informed Consent Term .

Those who had cardiovascular or cardiorespiratory changes were excluded; Presence of postural changes such as severe kyphoscoliosis; Motor and cognitive alterations that made it impossible to perform tests and smokers.

To begin with, an interview was held in which the participants completed an evaluation form prepared by the researchers. The data collected were: personal data (name, gender, race and age), life habits (alcoholism and smoking), clinical data (type of disability, time of use of a wheelchair, associated conditions, time of practice Sport and training volume) and physical examination (height measurement by means of the wingspan), in order to characterize the profile of the sample.

Shortly thereafter, the evaluation protocol was used to obtain the respiratory variables in relation to lung function (volumes and capacities) and respiratory muscle strength (inspiratory and expiratory).

The pulmonary function evaluation was carried out to identify the tidal volume (CV), CV, FEV1 and FVC, and the FEV1 / FVC ratio. For this purpose, we used a New Diagnostic Design spirometer and Easyon-PC model. The test was performed according to the Guidelines for Pulmonary Function Tests of 2002[10].

In order to obtain the values of respiratory muscle strength, it was decided to use inspiratory (PiMáx) and expiratory (PEmax) pressures by means of a WIKA manovacuometer and model 611.10.063. The values were obtained from the Residual Volume (VR) and Total Pulmonary Capacity (CPT), and the highest values were considered for analysis. The expected maximum respiratory pressures were calculated using the equations proposed by Neder[11].

Statistical analysis was carried out in the SPSS version 23 program. As a result of the number of observations, non-parametric Mann-Whitney test-based statistics were applied, considering levels of significance $p < 0.05$. In the descriptive analysis, the variables with normal distribution were presented by mean and standard deviation, the ordinal or asymmetric by median, maximum and minimum, being the nominal ones represented with frequency and percentage.

RESULTS

The sample was composed of 15 (fifteen) participants, of whom 4 (four) were female and 11 (eleven) were male. The profile of the individuals evaluated can be seen in table 1, where it is possible to observe that the sedentary group, because it presents a higher prevalence of low lesions, (7 individuals), so they should not have respiratory damages related to the type of injury. In contrast, when compared with the group of athletes, these sedentary individuals presented greater respiratory compromise.

With regard to the time of use of wheelchair, the practitioners of physical activity presented more average time in the seated posture, but presented higher average performance in the respiratory system than the sedentary ones.

Table 1 – Sample characterization

	N = 15	Practitioners of physical activity (N=10)	Sedentary (N=5)
Age (mean ±SD) in years	32,1 (± 6,94)	34,7 (± 6,76)	27 (± 4)
Height (mean ±SD) in meters	1,64 (± 0,09)	1,68 (± 0,09)	161 (± 0,06)
Smoking N (%)			
Smoker	0 (0%)	0 (0%)	0 (0%)
Ex-smoker	7 (46,7%)	5 (50%)	2 (40%)
Smoking time (mean ± SD) in years	4,20 (± 5,35)	9,25 (± 4,57)	0,8 (± 1,78)
Drinking N (%)			
Drinker	4 (26,7%)	3 (30%)	1 (20%)
Ex-drinker	11 (73,3%)	3 (30%)	1 (20%)
Type of Injury N (%)			
Tetraparesis	3 (20%)	3 (30%)	0 (0%)
Paraparesis	5 (33,3%)	0 (0%)	5 (100%)
Paraplegia	7 (46,7%)	7 (70%)	0 (0%)
Wheelchair usage time median (min -max) in months	144 (7 - 360)	174 (26 – 360)	20 (7 – 144)
Exercise time median (min -max) in months	50 (0 - 144)	72 (20 – 144)	–
Training Duration median (min - max) hours/week	9 (0 - 12)	9 (4 – 12)	–

The predicted and performed values of lung function and respiratory muscle strength variables within each group are listed in table 2. In the swimming and basketball groups, the Wilcoxon test pointed out a significant difference particularly for the PeMáx variables ($p < 0.05$) between the predicted and the performed, and in the sedentary group the same test indicated significant difference CV, FVC, PiMax and PeMax ($p < 0.05$).

Table 2 – Pulmonary Function and Respiratory Muscular Strength

	SWIMMING		BASKETBALL		SEDENTARIES	
Variables	**Projected**	**Achieved**	**Projected**	**Achieved**	**Projected**	**Achieved**
CV (L)	0 ± 0	0,86 ± 0,30	0 ± 0	1,17 ± 0,80	0 ± 0	0,86 ± 0,26
VC (L)	3,82 ± 0,68	3,76 ± 1,12	4,41 ± 0,96	3,07 ± 1,01	4,31 ± 0,43	2,77 ± 0,91*
IC (L)	2,89 ± 0,69	2,66 ± 0,77	3,26 ± 0,97	2,52 ± 0,69	3,05 ± 0,45	2,02 ± 0,71
FVC (L)	4,10 ± 0,80	3,8 ± 1,23	4,41 ± 0,96	3,17 ± 1,01	4,31 ± 0,43	2,76 ± 0,92*
FEV_1 (L)	3,21 ± 0,53	3,11 ± 0,87	3,75 ± 0,80	2,53 ± 0,97	3,71 ± 0,36	2,38 ± 1,07
FEV_1/FVC	0,83 ± 0,01	0,83 ± 0,05	0,85 ± 0,02	0,79 ± 0,11	0,86 ± 0,01	0,84 ± 0,16
PiMax	139 ± 23,24	102 ± 26,83	134 ± 21,55	94 ± 36,47	147 ± 3,13	96 ± 25,10*
PeMax	150 ± 26,37	97 ± 16,43*	144 ± 25,43	90 ± 20,00*	160 ± 3,50	66 ± 32,09*

IC = Inspiratory capacity ; VC = Vital capacity; FVC = Forced Vital Capacity ; PeMáx = Maximum Expiratory Pressure; PiMáx = Maximum Inspiratory Pr; CV = Current Volume ; FEV1 = Expiratory Volume in the First Minute. Data Expressed in Mean ± Standard Deviation. * $P<0.05$.

DISCUSSION

A study found that sedentary individuals present significant differences of PiMáx and PeMáx when compared with swimming athletes. This happens because the immersion of the thorax provides the combined effects of hydrostatic pressure, density and compressibility, potentiating the respiratory musculature[4].

This study found some differences in the values of the muscular strength of the sedentary ones compared with the swimmers. Nevertheless, no statistical difference was noticed.

Nevertheless, respiratory musculature weakness in spinal cord injured patients results in poor lung performance, directly influencing volumes and capacities[7].

Likewise, there was a significant reduction in the values of PiMáx and PeMáx in the sedentary group, demonstrating that the presence of respiratory muscle weakness, which leads to a considerable decrease in CV.

Paulo, Petrica and Martins (2013) found that sedentary lifestyle compromised pulmonary volumes and capacities, considering that inactivity may influence body composition and may possibly lead to decreased pulmonary complacency and increased airway resistance[2].

It was observed that there was a significant decrease in CV and FVC in the sedentary group, which represents important variables in relation to pulmonary function, corroborating with the study cited above.

The practice of regular physical activity over 6 months promotes expressive changes in parameters of FEV 1 and FVC[8].

The average time of sports practice among participants 'practitioners of physical activity' in the study was 6.4 years. Nonetheless, there were no significant differences in $FEV_1$and FVC values.

There are many factors that influence pulmonary function, altering diaphragmatic mechanics, and among them is the posture[5,6]. This study showed that the time of use of the wheelchair among physical activity practitioners was greater than that of the Sedentary group. Thus, it was observed that despite the respiratory mechanics being influenced, because of the posture adopted by the wheelchair, there were no significant losses in the pulmonary function of the athletes.

The level of injury establishes its type and severity, because the higher the lesion, the greater the motor and respiratory consequences[7]. Higher injury levels were found in the groups practicing physical activity, which could lead to a greater respiratory compromise. Nonetheless, we did not find great negative repercussions on pulmonary function when compared with the sedentary ones, who present lower injury levels and, nevertheless, a greater impairment of the pulmonary function. Therefore, we believe that sports practice provides better respiratory conditioning.

CONCLUSION

Participants of physical activity showed a better pulmonary performance when compared to the sedentary ones. Comparing the predicted and performed values within each group, sedentary individuals presented values below predicted values. Therefore, we conjecture that wheelchair users, who do not practice physical activity, have a loss of lung function, and may have repercussions with secondary affections due to sedentary lifestyle.

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REVISTA SALUS
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CASE REPORT

Subclavian steal syndrome after coronary artery bypass graft surgery

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Keywords

Subclavian Steal Syndrome; Angioplasty; Endovascular Procedures; Angina Pectoris; Myocardial evascularization.

Abstract

Introduction: subclavian theft syndrome (SBS) is related to subclavian artery stenosis. In patients who were previously submitted to myocardial revascularization (CABG) surgery with internal-coronary mammary graft, SBS may trigger anginal symptoms. **Case Report:** we report two cases of angina pectoris after CABG, associated with left upper limb pain on exertion. Patients were diagnosed with SBS and submitted to percutaneous transluminal angioplasty with stent implantation in the subclavian artery, evolving with clinical improvement. **Discussion:** the reported cases are unusual in clinical practice and demonstrate the efficacy and safety of interventional endovascular treatment in SBS.

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INTRODUCTION

Coronary artery bypass grafting (CABG) is an invasive treatment of coronary artery disease (CAD) with a high indication and a high success rate[1]. The use of the internal mammary artery (IMA) as a conduit for coronary grafting in CABG has an excellent long term patency, obtaining the best clinical results for the technique[2]. In some patients, subclavian artery stenosis proximal to the origin of the IMA graft may cause a blood flow theft phenomenon, leading to myocardial ischemia[3].

Subclavian Burglary Syndrome (SBS) is typically described when a subclavian artery stenosis proximal to the origin of the vertebral artery causes a retrograde flow in the ipsilateral vertebral artery[4]. The prevalence of significant left subclavian artery stenosis in referred patients For CRM is around 0.2% to 6.8%[5]. Thence, SBS is an uncommon cause of angina after CABG, secondary to decreased or retrograde blood flow, in patients with patent graft IMA in situ for Coronary artery[6].

Two cases of BSS have been reported in patients previously submitted to CABG, in whom interventional treatment was successfully performed.

CASE REPORT

CASE 1 - A 77-year-old male patient with a history of congestive heart failure of ischemic etiology, added to arterial hypertension and dyslipidemia. Underwent CABG with left IMA grafting for anterior descending artery for 9 years. He sought the cardiology outpatient clinic referring to dizziness, pain in the left upper limb and intermittent precordialgia that worsens the effort of the upper left limb. In continuous use of enalapril, spironolactone, acetylsalicylic acid, clopidogrel, isosorbide mononitrate and carverdilol.

A cardiac catheterization was performed with a post-revascularization graft study, in which the flow of the anterior descending artery to the left subclavian artery through the left IMA graft (Figures 1A and 1B) was noticed, as well as 90% stenosis in the proximal portion of the Left subclavian artery (Figure 1C).

The patient was submitted to elective percutaneous transluminal angioplasty of the left subclavian artery with self-expanding stent implantation on 11/11/2013, restoring her normal flow, with good angiographic result and elimination of vertebral theft and anterior descending mammary stealing (Figure 1D).

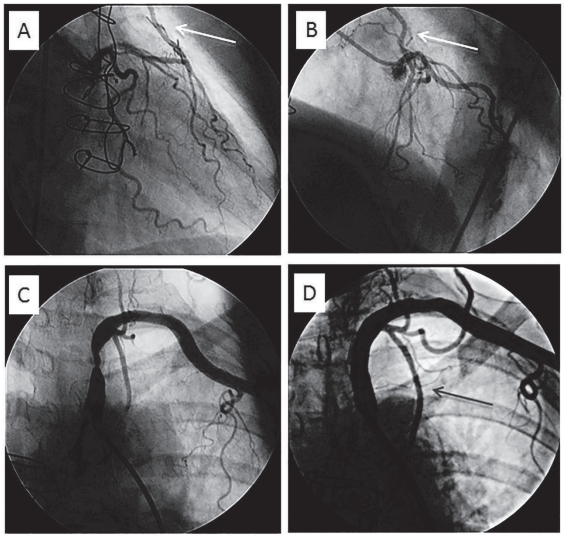

Figure 01

The patient progressed with complete improvement of symptoms during and after hospital discharge. Twenty days later, he was admitted to the emergency room with urinary tract infection and severe sepsis, with difficult to control organic dysfunctions. There was an evolution with progressive worsening of the condition, with septic shock of urinary focus refractory to the use of vasoactive drugs, leading to death three days after the hospital readmission.

CASE 2 - A 72-year-old female patient with a history of hypertension and type 2 diabetes mellitus who underwent CABG for 7 years with left IMA graft for the anterior descending artery. She reports a stable

angina, with worsening in the last month associated with frequent syncopes. She had typical chest pain triggered by exertion with the left upper limb. On domicile, she makes use of acetylsalicylic acid, losartan, atenolol, NPH insulin, omeprazole and clonazepam on domicile.

Cardiac catheterization exhibited an inversion of the left coronary artery flow through the left IMA graft with the anterior descending artery (retrograde coronary-subclavian flow) (Figure 2A). Selective angiography of the left subclavian artery illustrates 95% stenosis in the proximal portion of this vessel (Figure 2B).

Percutaneous transluminal angioplasty of the left subclavian artery with balloon-expandable stent implantation was performed on its proximal third on 1/16/2014, with success (figures 2C and 2D). The patient demonstrated good clinical evolution and complete improvement of the symptoms after the procedure. The observed clinical result persisted at the 1 year follow up, with good tolerance to the efforts.

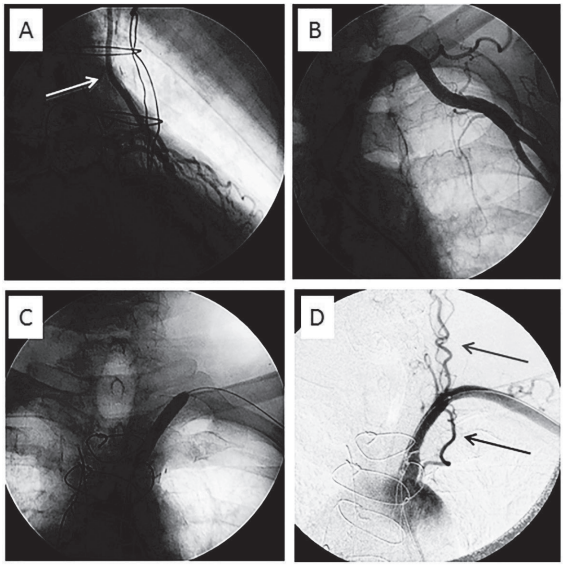

Figure 02

DISCUSSION

SBS refers to a pathological situation in which, as a result of a stenosis or occlusion of the proximal subclavian artery, retrograde flow occurs through the vertebral artery which causes insufficient cerebral perfusion and subsequently transient neurologic symptoms on account of cerebral ischemia[7]. Due to the vertebrobasilar circulation is a closed hydraulic system, the difference in pressure leads to reversal of the flow, pulling the blood from the contralateral vertebral artery to the basilar artery and then to the ipsilateral vertebral artery, "stealing" the flow of cerebral circulation[8].

Coronary-subclavian steal syndrome, a variant of SBS, is an uncommon complication of CABG when an IMA graft is used. This syndrome is distinguished by the retrograde flow of the graft into the subclavian artery to perfuse the distal end when a severe proximal stenosis is present in the subclavian artery. Accordingly, a coronary steal phenomenon may develop, in which the myocardium perfused by the graft may become ischemic, regardless of the patency of the graft vessels[9].

This phenomenon is usually caused by atherosclerosis. As most patients are asymptomatic, it presents as an incidental finding. Nonetheless, symptomatic patients usually present neurological symptoms, such as dizziness, hearing loss or syncope (vertebrobasilar insufficiency), or upper limb claudication, anginal symptoms, ischemic heart disease and heart failure, and the occurrence of infarction is uncommon acute myocardial infarction[10]. Physicians need a high degree of clinical suspicion to perform the diagnosis of this phenomenon, considering that the atypical presentations of this entity represent a challenge for the medical class[8].

The genuine prevalence of SBS is still unidentified. Even though estimated between 0.6% and 6%, there is some controversy, since up to 80% of patients with this phenomenon are asymptomatic. Most of patients with symptoms have simultaneous cerebrovascular lesions[8]. Other confounding factors include failure of non-invasive diagnostic methods, lack of comprehension about the problem, and

attribution of symptoms to other causes[11]. The SBS incidence in patients already undergoing CABG Was described between 0.1 and 3.4%[6].

The noninvasive diagnostic method of choice for subclavian artery stenosis is the detection of an ankle-brachial index (ABI), increased at rest or after an exercise test[12]. ABI is calculated as the ratio of systolic blood pressure measured at the ankle And of the measurement in the brachial artery. The cuff of the sphygmomanometer is placed just above the ankle and a doppler instrument is used to gauge the pressure of the anterior and posterior tibial arteries on each foot. Then, the highest systolic pressure of the ankle is divided by the highest systolic pressure of the arm. In a regular test, the ITB value is greater than 1.0[13].

The discrepancy in systolic pressure of 10 mmHg or more between the arms, as well as reduced ABI, is correlated with peripheral vascular disease, with low sensitivity but high specificity. Some experts consider these discrepancies in systolic blood pressure to be 15mmHg or higher[12].

In order to obtain diagnostic confirmation of BSS, numerous imaging tools can be used to detect stenosis and notice reverse flow in the vertebral artery. The carotid and vertebral ecodoppler is the most commonly used and usually the first diagnostic test, which can semi-quantify the subclavian artery stenosis and diagnose another extracranial obstructive carotid disease. Most recently, better quality images have been obtained with magnetic resonance angiography. Invasive cerebral angiography still is the gold standard method because of its high sensitivity and specificity[12]. Non-invasive functional tests, such as stress echocardiography and myocardial perfusion scintigraphy, may be useful for evaluating coronary-subclavian theft syndrome in patients with prior surgical myocardial revascularization[8].

Invasive treatment - surgical or percutaneous - for SBS is usually reserved for highly symptomatic patients and refractory to optimized clinical treatment. Therapeutic options include percutaneous transluminal angioplasty with stent implantation in the subclavian artery and surgical bypass of subclavian artery stenosis. Placement of the stent in the subclavian artery is commonly performed by the femoral artery, and is the method of choice by the reason of low mortality, shorter hospitalization time, and rapid recovery[8,14].

Percutaneous transluminal angioplasty of obstructive lesions of the proximal portion of the subclavian artery is not only an effective initial treatment but is also effective in the long term. Furthermore, clinically significant restenosis - the leading cause of therapeutic failure - can be treated with endovascular repeat procedures[15]. This minimally invasive treatment should be the first choice for the treatment of obstructive lesions of the proximal portion of the subclavian artery in which the technical applicability Is reasonable, with a good risk vs. risk ratio. Benefit ratio[16,17]. The success of the percutaneous approach can reach 90%, with a 5-year vascular patency index of up to 85% [14]. Nonetheless, there are no prospective studies that show the superiority of one treatment over another in cases of BSS. This way, the conduct of each case may be individualized.

Regardless of the percutaneous treatment it is extremely important to control the risk factors as part of the therapy for secondary prevention. Smoking cessation, lifestyle modification, antiplatelet therapy, blood pressure control, management of hyperlipidemia, and diabetes control play an important role in the management of BSH caused by atherosclerosis[8].

In the cases described here, patients presented typical anginal symptoms after physical activities which used the left upper limb and, in one case, vertebrobasilar symptoms such as syncope, vertigo

and headache were also present. SBS, a diagnosis rarely confirmed in our country, was considered as a diagnostic hypothesis only at the time of coronary angiography, being treated by a successful percutaneous intervention and low morbidity.

It is likely that the death observed in the first case had no direct relationship with the procedure performed or the patient's underlying disease. Even though no postmortem study was performed, the unfavorable outcome was due to septic shock of urinary focus, with severe organ dysfunctions and rapid clinical deterioration.

SBS is usually seen as a diagnostic challenge that may cause several symptoms and reduce quality of life. It is frequently observed in patients with advanced atherosclerosis, and may be satisfactorily treated by interventional techniques with stent implantation in the subclavian artery, capable of solving the flow reversal by coronary IMA grafting and reducing myocardial ischemia. The reported cases illustrate the technical feasibility and therapeutic success of this approach, as well as demonstrate the high risk profile for atherosclerotic diseases presented by these patients.

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