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JMRR

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JOURNAL OF MEDICAL RESIDENT RESEARCH

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JMRR
JOURNAL OF MEDICAL RESIDENT RESEARCH

GUIDE FOR AUTHORS

The **Journal of Medical Resident Research** (JMRR), previously called *Revista do Médico Residente* (RMR), is an official scientific publication of the Regional Council of Medicine of the State of São Paulo (Cremesp), focused on the publication of medical articles by medical scientists, who are at the begining of their careers. Its main objective is to disseminate medical-scientific knowledge, especially among doctors in training and residency programs.

To this end, contributions of this target audience in technical, ethical, bioethical and deontological articles are encouraged.

Each manuscript, in English and/or Portuguese, must clearly indicate an objective or hypothesis; the design and methods, including the characteristics of the institution where the research took place, criteria for the selection and exclusion of participants, and data sources; essential points of the interventions and analyses; main results of the study and its limitations; "discussion" section that interacts with the scientific literature; and conclusions.

Except when explicitly indicated, JMRR complies with rules and similar standards in the area, such as the Brazilian Federal Law Nº 6,932, of July 7, 1981, which provides for the activities of medical residents; those of the National Medical Residency Committee; and CNS Resolution Nº 466/12, of the Brazilian National Health Council (CNS), which establishes guidelines for research involving human beings.

For the preparation/submission of articles, authors are suggested to follow the standards of the EQUATOR Reporting Guidelines (Enhancing the Quality and Transparency Of Health Research), an organization that brings together researchers, editors of medical journals, reviewers, developers of guidelines on scientific texts, among others.

Other recommendations also include those of the International Committee of Medical Journal Editors, a group of editors of medical journals and related organizations that work together; the Committee on Publication Ethics (COPE); the Council of Science Editors (CSE); and the World Association of Medical Editors (WAME).

These standards aim to improve the quality of research, journals and medical science in general;

In addition to EQUATOR, the following are mentioned in this Guide:

CONSORT – *Consolidated of Reporting Trials*
MOOSE – *Meta-analyses Of Observational Studies in Epidemiology*
PRISMA – *Preferred Reporting Items for Systematic Reviews and Meta-Analyses*
STARD – *Standards for Reporting of Diagnostic Accuracy Studies*
ARRIVE – *Animal Research: Reporting of In Vivo Experiments*

After all the stages of preparation, realization and concretization of the final version have been completed, the manuscripts must be submitted to **jmrr@cremesp.org.br**.

BRIEF INDEX OF TERMS

For better understanding and standardization, some terms mentioned in this **Guide for Authors** are presented below:

Case-control studies – Study design in which participants are selected from those who have a certain disease (cases) and those who do not (controls) to compare the odds of exposure to a particular variable between groups.

Cohort studies – Observational surveys in which individuals are classified or selected according to exposure status, and the incidence of a disease or condition is compared.

Experimental study (intervention) – One in which the researcher, in an intentional and controlled way, manipulates the exposure factor (intervention) to investigate its effects. They investigate hypotheses previously made, or look for factors that contribute to the onset of a certain disease.

Clinical trial – Experimental study with human volunteers, used to evaluate the safety and efficacy of treatments or interventions against diseases and health conditions of any nature and determine the pharmacological and pharmacokinetic and pharmacodynamic effects of new therapies.

Randomized clinical trial – In general, it is a clinical trial that compares two or more interventions, which are controlled by the researchers and applied randomly to a group of participants.

Quasi-experimental study – A study

that does not contemplate all the characteristics of a "true" experiment, as a complete experimental control is not always possible, especially with regard to the randomization and application of the intervention.

Observational study – Conducted without the action of the investigator, who simply observes and measures the object of study (patients, the characteristics of the disease, etc.), without intervening or modifying any aspect being studied.

Prevalence or cross-sectional study – The measurement of the risk factors and the analyzed outcome occur concomitantly, not allowing inferring what came first (exposure or outcome).

Keywords – Section of the scientific article composed of three or four words, used for indexing it in databases. (Bireme Health Descriptors are suggested).

Qualitative research – It does not stick to numerical representativeness: in this approach, researchers seek to explain the reason for things, working with the universe of meanings, motives, aspirations, beliefs, values and attitudes.

Quantitative research – Its results can be quantified. As the samples are generally large and considered "representative", the statistically significant results are taken as if they constitute a real picture of the entire target population.

Abstract – Its main purpose is to provide an overview of the research. To this end, the objective, method, results and conclusions must be highlighted. Abstracts are classified in *Structured* – formed by "strata", i.e., items or sections –, each preceded by a subtitle, and *Unstructured* – presents information in running text, usually in a single paragraph. (See more about the topic in Requirements for the Preparation and Submission of Articles > Structure).

Case report and series – Corresponds to the detailed description of clinical cases, containing important characteristics about the signs, symptoms, and other characteristics of the patient, the therapeutic procedures used, as well as the outcome. *Case reports* usually comprise no more than three cases, while case series comprise three to ten cases.

Systematic review with meta-analysis – The object of analysis are not the study participants, but previous studies on a particular research object. *Meta-analysis* is understood as a statistical technique that is especially suitable for combining results from different independent studies, identifying and comparing, for example, the risks involved in two different treatments.

ARTICLE CATEGORIES

1. ORIGINAL RESEARCH

1.1 Original Articles

Usually include experimental, quasi-experimental or observational studies, program evaluations, randomized clinical trials, intervention studies, cohort studies, case-control studies, epidemiological studies, other observational studies, cost-effectiveness analyses, decision-making analyses, screening studies, and diagnostic tests. See specific guidelines for each type of study on the EQUATOR website.

Each article should contain its objectives and hypotheses, designs and methods, results, discussion and conclusions, which should be as timely and current as possible. A clear explanation of the methods and results is essential to make it easier to review the articles and to ensure the replicability of the results.

Original articles also involve theoretical essays (critiques and formulation of relevant theoretical knowledge), focused on the presentation and discussion of methodological aspects and techniques used in medical research.

Requirements:

- Maximum of 3,000 words
- Maximum of five tables and/or figures
- Structured abstract with no more than 350 words
- Up to 60 references
- Keywords

1.1.1. Clinical trials or studies

Any research project with participation of human beings inserted in groups for intervention and comparison, aiming to study the cause-effect relationship and the health outcome.

Interventions include (but are not limited to) experiments with drugs, surgical procedures, equipment, behavioral treatments, educational programs, dietary interventions, quality of life improvements, changes in the care process, and the like.

Articles that present partial or integral results of clinical trials must be accompanied by the number and the agency of registration, as recommended by the Latin American and Caribbean Center on Health Sciences Information (BIREME); the Pan American Health Organization (PAHO); the World Health Organization (on the Register of Clinical Trials to be published based on WHO guidelines); and the International Committee of Medical Journal Editors (ICMJE).

Requirements:

- Maximum of 3,000 words
- Maximum of five tables and/or figures, including a CONSORT flowchart
- Structured abstract with no more than 350 words
- Keywords
- Registration number of the Clinical Trials in a database (e.g., clinicaltrials.gov)
- CONSORT checklist
- In accordance with EQUATOR guidelines
- Up to 60 references

1.2 Special Articles

1.2.1. Methodological Articles

These articles feature new, improved, or noteworthy comments on techniques or methods deemed as relevant to basic, clinical, or treatment studies.

Requirements:

- Maximum of 2,000 words
- Maximum of two tables and/or figures
- Structured abstract with no more than 350 words
- Up to 30 references

1.2.2. Short communications

Short reports of findings of interest, but which do not include a more comprehensive analysis and discussion.

Requirements:

- Maximum of 1,200 words
- Maximum of three tables and/or figures
- Structured abstract with no more than 250 words
- Keywords
- Up to 15 references
- In accordance with EQUATOR guidelines

2. EDUCATION AND LITERATURE REVIEW

2.1 Systematic Reviews (without meta-analyses)

It aims to answer a specific question

by synthesizing results from original quantitative or qualitative studies, according to PRISMA guidelines, with evaluation of the scientific literature and data sources on a clinical topic, emphasizing factors such as cause, diagnosis, prognosis, therapy or prevention, and describing in detail the process of searching for original studies; the inclusion criteria; and how the results of these studies were synthesized.

Requirements:

• Maximum of 3,500 words

• Maximum of five tables and/or figures, including a PRISMA diagram

• Structured abstract with no more than 350 words

• Up to 100 references

• Keywords

• In accordance with PRISMA guidelines and submitted to the PRISMA Checklist

2.2 Narrative review

Up-to-date review on a topic of interest from the perspective of renowned experts, which addresses an issue that is relevant to clinical practice.

It may include (but does not require) a systematic review of the literature.

Conclusions can be based on recent evidence and guidelines, with an emphasis on factors such as cause, diagnosis, prognosis, therapy or prevention.

Requirements:

• Between 2,000-3,500 words

• Maximum of five tables and/or figures

• Structured abstract

• Up to 100 references

• Keywords

2.3 Meta-analyses

Systematic and critical evaluations of the literature and data sources, referring to clinical topics, with emphasis on factors such as cause, diagnosis, prognosis, therapy or prevention.

In research with meta-analysis, a statistical technique is adopted to quantitatively combine the results of more than one study into a single total estimate.

For each specific type of article or data source, the methodology, population, intervention, exposure and tests must be described.

They must be submitted to the PRISMA checklist, and present the PRISMA flowchart used for the selection of articles. Authors of meta-analyses of observational studies should submit them to the MOOSE checklist and follow EQUATOR guidelines.

Requirements:

• Maximum of 3,500 words

• Maximum of five tables and/or figures, including a PRISMA diagram

• Structured abstract with no more than 350 words

• Keywords

• In accordance with EQUATOR guidelines, especially PRISMA and MOOSE

• Up to 100 references

3. OPINIONS

3.1 Editorial

Article presenting JMRR's opinion on a given subject, reflecting the point of view of the majority of the editorial board and the journal's administrative body – therefore, it is not signed by a particular editor. In essence, it is an opinionated and objective report on a specific article – or a review of some relevant articles – in the issue of the journal in question.

Doctors who are not involved in the journal's editorial board and administrative staff may be invited by the editors to write it, depending on the subject at hand.

3.2 Letter to the Editor

Related to the methods used to obtain or interpret data presented in an article published in the latest issues of JMRR. It may perform a new analysis of these data based on other scientific articles and/or methods and/or journals. It can also include a case report that is capable of illustrating new information.

When justified, a response from the author(s) of the study in question is requested.

Requirements (Letter to the Editor) :

• Maximum of 400 words

• Maximum of three authors

• Up to five references (one of which must be the article in question)

Requirements (Response from the author(s):

• Maximum of 500 words

• Up to six references

3.3 Point of view

External manuscript that is well-focused, academic and clearly presented, generally not linked to a specific article. It can address any important topic in Medicine, Medical Residency, Research, New Discoveries, Public Health, Prevention, Ethics and Bioethics, and Health Policies or Standards.

Requirements:

• Maximum of 1,200 words (or 1,000 if accompanied by a small table or figure)

• Maximum of three authors, with no more than two affiliations per author

• Up to seven references

REQUIREMENTS FOR THE PREPARATION AND SUBMISSION OF ARTICLES

1. PREPARATION

1.1 Structure

The structure of an original article or a review consists of pre-textual, textual and post-textual elements.

The **mandatory structural elements** are the *Title, Abstract and Submission and Approval Dates.* Title and Abstract in other language(s) are optional.

The **textual elements** are mandatory, and correspond to the elements usually standardized in scientific articles, as follows: *Title, Name of authors, Keywords, Abstract, Introduction, Materials and Methods, Results, Discussion, Conclusions and Bibliographic References.*

As for the **post-textual elements**, the References are mandatory, whereas the *Glossary, Appendix, Annex,* and *Acknowledgments* are optional.

It is recommended that the Abstract highlights the objective, method, results and conclusions of the document; that it is written in the active voice, third person singular; and that it is composed of a sequence of concise, affirmative sentences, in a single paragraph. The first sentence should be significant, explaining the main theme, followed by information about the research category (case study, analysis of the situation, etc.)

It is also suggested that the *Introduction* provides a brief narrative, indicating the objectives/hypotheses of the current study. It should not include the results. As for the *Materials and Methods* section, it must include enough details to allow other researchers to disseminate and/or replicate the study.

Attention: The maximum word limits of articles submitted to JMRR exclude Abstracts, Tables and Figures.

1.2 Formatting

The *Title* of the article and the subtitle (if any) must appear on the title page, in Portuguese or English, and be typographically differentiated or separated by a colon. Including the title in another language just below the original title is optional; additionally, centering it at the top of the title page and writing it in bold is recommended.

The name of the *Authors* must be inserted directly: first name (abbreviated or not) and last name, and it is suggested that they are written in full, each separated by a comma, in the same way as the names of the *Institutions.*

If there is more than one author, the names can be written on the same line, separated by commas, or on different lines. A succinct resume of each author must be included, with corporate association and contact address.

The *Keywords* must appear just below the abstract, preceded by the term "Keywords". Each of them must be separated and finalized by a period.

It is suggested adopting the Health Descriptors of the Latin American and Caribbean Center on Health Sciences Information (Bireme), which correspond to a translation of the Medical Subject Headings (MeSH) of the U.S National Library of Medicine, used by databases such as Scielo, Lilacs, VHL, MEDLINE and Pub Med.

These descriptors contain terms in English, Portuguese and Spanish.

JMRR recommends the articles to be arranged in a *Single Column*, in an *A4 Sheet, Portrait Format.* Font: Times New Roman, with the title in 14 pt; the subtitles and body text in 12 pt; the abstract in 11 pt; and citations with more than three lines in 10 pt, with four cm indentation from the left margin.

Additionally, 1.5 spacing and justified alignment should be used for paragraphs in the text, marked with a 1.5 indentation. There must be no blank line between paragraphs.

Page numbers need to be inserted in the upper right margin, with the exception of the first. Margins: left and top: three cm / right and bottom: two cm (do not include frames).

It is also recommended to start all sections on separate pages and divide the sections and subsections by assigning them Arabic numerals, aligning the section code with the left margin, preceding the title and separated from it by a space. Numbering should be progressive up to the quinary section, e.g.:

Primary section "1"
Secondary section "1.1"
Tertiary section "1.1.1"
Quaternary section "1.1.1.1"
Quinary section "1.1.1.1.1".

1. 3 Bibliographical references and citations

References are a a standardized set of essential elements that allow identifying or locating a document or part of it, published in different platforms or formats.

They must be presented in a standardized manner, according to the guidelines of specific organizations. Complementary elements can be added, whenever necessary, to facilitate the identification of the document.

The extraction of text citations from other studies can be done directly (literal transcription) and indirectly (paraphrase), duly documented with the name of the author of the original source.

JMRR adopts the standards established by the International Committee of Medical Journal Editors (ICMJE, which adopts **Vancouver**). These standards govern all citations in the body text.

For example, in articles written by between **one and six authors**, the references will obey the following form:

Author AA, Author BB, Author CC, Author DD. Title of the article. Short name of the journal. Publication date YYYY ddd; issue number: page numbers.

João GR, Maria JC, Antônio LC. Como resistir a um assédio moral durante a fase de internato. Rev. bioet. 2018 Dez; 54(1):111-4.

Articles with more than six authors are referenced as follows:

Author AA, Author BB, Author CC, Author DD, Author EE, Author FF, et al. Title of the article. Short name of the journal. Publication date YYYY ddd; issue number: page numbers.

João GR, Maria JC, Antônio LC, Joaquim KK,Rita OPG, Clara BO, *et al*. Relação do preceptor com os residentes e seus conflitos éticos. Saúde Soc. 2017 Jun; 200(6): 869-75

* Learn more about the Vancouver standard at Samples of Formatted References for Authors of Journal Articles, NIH U.S. National Library of Medicine

1.4 Figures and tables

In general, figures and tables are the fastest way to communicate large amounts of information, which would be complicated to explain in text.

Figures are ideal for displaying images, data graphs and layouts.

Images can help achieve the precision needed for a scientific manuscript: when choosing, the author must make sure to include scale bars, highlight important items, and identify the meaning of the different colors and symbols used.

Data graphs demonstrate the functional or statistical relationship between two or more items. In them, the axes must be highlighted, as well as the units for quantities, the curves, and the data sets, with legible font and size.

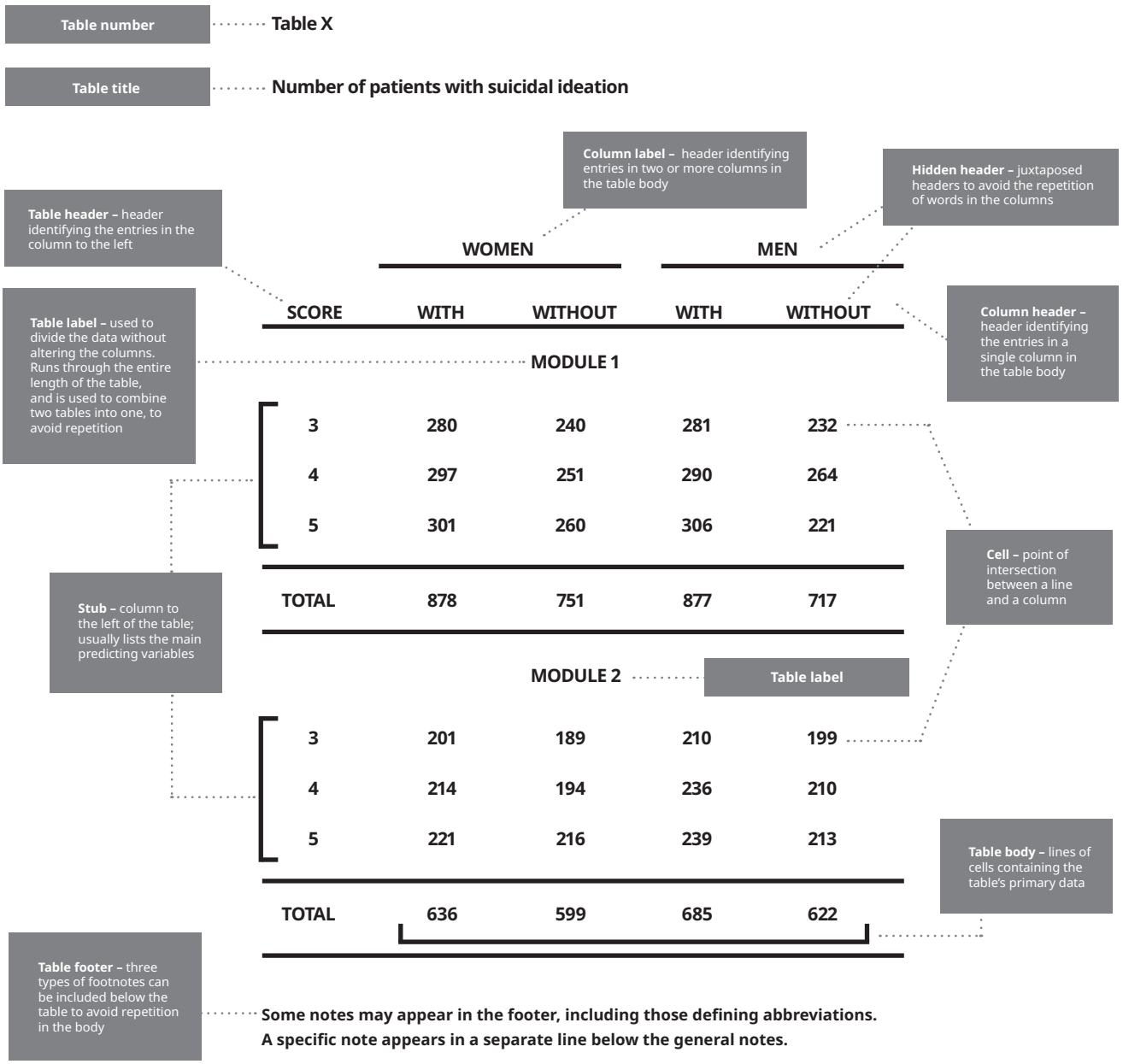
As for **schemes**, they correspond to the visual representation of abstract or immaterial concepts that relate to each other, forming a symbolic figure. Scientific and/or material schemes are used for investigative and theoretical purposes, and respond to a demonstrative or hypothetical objective to theorize about some aspect of science or logic.

Tables represent an objective way of presenting large amounts of data and communicating the results of studies. Thus, among other requirements, they must have clear and concise legends; data divided into categories; sufficient spacing between columns and rows; specification of units; and legible font and size.

Additionally, they must be cited in the text and numbered consecutively (i.e., 1, 2, 3) in the order in which they are mentioned, and must be provided in an editable format (Word or Excel). They can be included at the end of the manuscript's file or sent individually, but not both.

When the researcher plans to include tables in the manuscript, s/he must determine: 1) the details necessary for readers to understand the discussion; 2) a sufficient set of statistics that is capable of supporting the inferential methods used; 3) how to define it so that it can be understood in isolation.

For the preparation of tables, try to limit their content to essential materials: those with excess information become less effective. Although supplementary



tables may be longer and more detailed than text tables, their role is to be directly and clearly related to the content and to be an integral part of the text.

The basic components of the table prototype are shown above, including the technical terms, the location of the items, and the definition of each element.

The layout must be logical and easily understandable to the reader. Table entries with data comparisons must be close to each other. Following this principle, in general, different indices (e.g., means, standard deviations, sample sizes) have to be segregated into different parts or lines.

Tables are designed to show something specific. For example, those with the purpose of communicating quantitative information will be effective only when they seem obvious to the reader at a glance. The same data can be organized in different ways, in order to emphasize the different characteristics of each datum.

An informational table complements the text, rather than duplicating it, leading readers to what to look for: if it is necessary to search for each item in the text, then the table will be unnecessary. Likewise, if additional tables are included in supplementary online files, they must be mentioned briefly in the article's printed version. Additionally, tables designated as "supplementary materials" must be accompanied by sufficient information to be understood by themselves.

Expressions such as "the table above", "below", or "the table on p. 45" should be avoided, because the tables' placement is not defined until the layout has been designed.

Following the logic of objectivity, authors may consider combining tables with repeated data. In general, identical columns and rows do not appear in two or more tables in the same article. The presentation of all tables in the manuscript should be consistent to facilitate comparisons, using similar formats and titles and the same terminology (e.g., response time or reaction time – not both).

Examples of figures and tables can be obtained in the manual of the Public Health School of the University of São Paulo (FSP-USP). Another suggestion is the Manual of the American Psychological Association.

2. SUBMISSION

Before submitting an article, all authors must have approved the final version to be submitted. The full manuscript or data must not have been previously published (except in summary or pre-printed form) or be currently under evaluation for publication elsewhere.

All manuscripts must be sent to jmrr@cremesp.org.br, indicating a valid email address of all authors.

To ensure transparency, the authors are expected to declare other articles that have used the same dataset or sample, in addition to identifying tables, figures and/or data that have been published in another journal, being responsible for obtaining permission from the copyright owner(s) if they decide to reproduce and/or modify any previously published material.

At the end of the submission, the person designated in the system as the "corresponding author" (responsible for the intermediation with the editorial team of JMRR) will receive an email notification stating that the text was received by the Editorial Office. If this does not happen, it means that there was a problem during the submission process, which should be informed to JMRR. Any manuscripts that do not comply with these guidelines will be returned to the author for correction.

Once processed, the submission will receive a number. Throughout the process, the status of the article will be available to the corresponding author, who is allowed to upload the entire submission (except the cover letter) in a single file when sending it, with numbered pages, in Word or PDF.

Tables and figures can be placed in the body of the manuscript or presented separately at the end. The authors must ensure that all elements are clearly legible to editors and reviewers.

EDITORIAL POLICIES

Authorship

To qualify as an "author", the individual must have participated sufficiently in the study, assuming public responsibility for all or part of the content after it has been submitted, approved and published. "Participating" here means making substantial intellectual contributions to the study, in the form of: 1) conception and design and/or acquisition of data and/or data analysis; and 2) writing of the article and/or critical review in search of important intellectual content.

All individuals who meet the criteria for authorship must be nominated as "authors". If the authorship is being assigned to a group, all of its members must meet the criteria described above.

Additionally, being an author also means agreeing to answer questions pertaining to the completeness of the article so that issues related to the accuracy or integrity of any part of it may be properly investigated and resolved.

Any changes in authorship after the initial submission, such as additions, exclusions, and reordering, must be approved in writing by the group, which may indicate the contribution of each author at the end of the article if they so wish.

When approving and finalizing the submission of a manuscript, JMRR assumes its recognition and acceptance, committing itself to reviewing and correcting the articles and ensuring that all individuals who meet the criteria for authorship are included on the title page, as well as that the submitted version is the one approved by all.

Disclosure of Financial Interests and Potential Conflicts of Interest

JMRR requires the authors of any type of articles to fully disclose possible conflicts of interest, including financial ones, in addition to specifying their nature. This is the responsibility of the entire group, under penalty of the article being returned, delaying the evaluation process.

Disclosure includes direct or indirect financial or personal relationships, as well as interests and affiliations that are relevant to the subject of the manuscript established in the last two years, or even those expected in the foreseeable future. It also covers (but is not limited to) grants or funding, affiliations, intellectual property/patents (in preparation, filed or granted), inventions, remuneration, consultancy and royalties.

Financial: financing and other payments, goods and services received or expected by the authors related to the subject of the study, or granted by an organization with an interest in the results.

Affiliations: being an employee, on the advisory board or a member of an organization with an interest in the results.

Intellectual property: patents or trademarks owned by someone or his/her organization.

Personal: friends, family, relationships and other close personal connections.

Ideological: beliefs or activism, for example, political or religious, that are relevant to the study.

Academic: competitors or someone whose study is criticized.

If an author has "nothing to declare", this should be made explicit.

The sources of financing, such as research grants from private and public institutions (development agencies), must be indicated at the end of the article.

Ethical Considerations

The authors should consider all ethical issues that are relevant to their research.

For example, in the Materials and Methods section, the institutional and/or licensing committee that approved the experiment(s) should be identified, confirming that the study was carried out in accordance with the relevant guidelines and regulations.

Studies involving human subjects must include detailed information about the informed consent process, including the method(s) used to assess the participants' ability to consent, the protection criteria included in the study, and relevant follow-up data, when available.

Among the ethical guidelines, JMRR follows those established by the Ministry of Health of Brazil, through the CEP/CONEP system (CNS Resolution Nº 466/12), and the International Committee of Medical Journal Editors, although it reserves the right to take alternative actions if necessary, including contacting the

authors' institution, funding agency, or other appropriate research authority.

Studies involving human beings must be submitted to the Research Ethics Committees (CEPs) of the institution where they will be carried out, and if necessary, to the National Research Ethics Commission (CONEP), through the "Plataforma Brasil", an electronic system created by the Federal Government of Brazil to systematize the receipt of research projects by CEPs across the country. When analyzing and deciding, the CEP/CONEP system becomes co-responsible for ensuring the protection of the participants.

When reporting experiments on animals, the authors should indicate that the institutional and national guidelines for the care and use of laboratory animals, such as ARRIVE, have been followed.

JMRR takes its responsibility for scientific integrity seriously, and will verify any allegations of misconduct, such as plagiarism, duplicate submission or publication, fabrication or falsification of data, unethical treatment of research subjects, authorship disputes, and undisclosed conflicts of interest.

Any corrections to the literature will be treated on a case-by-case basis, through errata or retractions.

Peer review

All submissions, with the exception of editorials, comments and correspondence, will be subject to peer review or refereeing, a process used in the publication of scientific articles that consists in passing them on to the evaluation of one or more more specialists with an advanced degree and expert level of knowledge on the subject addressed by the author.

These evaluators are supposed to make comments and suggest revisions, with the aim of contributing to the quality of the publication. JMRR excludes reviewers who work at the same institution or with any other conflicts of interest. The identity of the individual reviewers remains confidential to all parties except JMRR's scientific and technical editors.

Submission processing

After the article has been submitted, it is previously analyzed by the editors of JMRR. If approved, it is passed on to external reviewers, after which the editorial decision and the reviewers' suggestions/corrections will be sent by email to the corresponding author.

In case the opinion of the reviewers differs, the editors reserve the right to invite an additional reviewer. Opinions may decide for accepting or rejecting the study, and suggest small or major changes. Rejected studies may be resubmitted if the authors believe that an important reformulation has been carried out or new findings have been included, in which case they must resubmit the article, including a letter to the Editor-in-Chief, justifying the resubmission. It will be up to the editorial board to accept it or not.

In the final phase, the article will be submitted to proofreading, the author being responsible for making final changes as requested and approving the final version.

JMRR will guide authors who submit their articles in Portuguese on English translation services.

After final acceptance, the article will be published online, becoming citable through the number assigned to the digital object identifier (DOI). The final written version will be published according to the journal's periodicity, in an issue selected by the Editorial Board, which will also define its circulation.

The authors are responsible for carefully reviewing the entire article in relation to precision. Once a corrected article is published online, additional corrections cannot be made without an errata.

Registration of Clinical Trials

As a condition for publication, in accordance with ICMJE, JMRR requires prospective registration of all clinical trials. Therefore, the name of the study, the name of the repository and the registration number must be included at the end of the abstract.

Observational-only studies will not require registration.

Return of articles and printing policies

If the editors of JMRR consider that the study did not reach the degree of interest or quality expected and/or is not in accordance with the Journal's editorial and/or scientific standards, the manuscripts may be returned without undergoing an external revision. The editorial rejection has the purpose of speeding up the editorial process and allowing the articles to be reviewed and submitted to another scientific journal.

Returns at the discretion of the authors, in general, will not occur – exceptional cases will be assessed individually.

JMRR's cover art is chosen according to the relevance of one of the articles included in the current issue or images from the History of Medicine.

JMRR is an open-access journal, but every use of its content must include a complete citation.

JMRR
JOURNAL OF MEDICAL RESIDENT RESEARCH

SUMMARY

IN THIS ISSUE

Volume 1, Number 1, Apr-May-Jun 2021

This is a brief summary of the articles published in this volume of the *Journal of Medical Resident Research*

Medical students' perception of a trauma, resuscitation and emergency medicine interest group

Student interest groups are increasingly sought after by Brazilian medical students as extracurricular activities, however, few studies assess their impact on medical education. The research project that originated this manuscript came from the experience of the Trauma, Reanimation and Emergency Interest Group (LiTRE), a project of the Federal Fluminense University (UFF), and sought the self-evaluation of the participating students; the main factors that motivated them to participate in the group; and highlights the characteristics of the work made by LiTRE.

Assessment of Suicide Risk in Medical Students

Suicide is considered a serious public health problem. Suicidal ideation is highly prevalent among medical students, mostly affecting the age group between 20 and 29 years. The aim of this study was to understand the factors associated with the risk of suicide in a sample of students from a medical school in the countryside of the state of São Paulo. Among other points, the results showed a history of suicide in the family and diagnosis of mental disorders as associated factors with the risk of suicide.

A comparison between the use of suction drains and adhesive sutures in the correction of incisional hernias

This study sought to compare the incidence of postoperative complications in incisional hernioplasty surgeries according to the adjuvant method of synthesis used: quilting sutures or suction drains. The analysis was based on medical records of patients operated in a period of one year at Fundação Hospital Adriano Jorge (FHAJ) in Manaus, Amazonas. In this study, adhesive sutures were more effective in preventing postoperative complications, with a lower incidence of postoperative seroma and infection than that observed in patients managed with suction drains.

Bladder leiomyosarcoma: a case report

Leiomyosarcoma (LMS) is a malignant mesenchymal tumor originated from the smooth muscle of the bladder, being highly aggressive and associated with substantial morbidity and mortality, thus resulting in a poor prognosis if not treated early. This case report was motivated by the rarity of LMS and the reflection on the type of surgical approach suggested for treatment, which is not a consensus in the literature.

Profile of Patients Undergoing Surgical Treatment for Proximal Femoral Fractures and its Economic Impact on Public Health in the state of São Paulo

Over the last decades, the prevalence of fractures of the proximal extremity of the femur has increased significantly, being an external cause of morbidity and mortality among older patients. According to previous studies, these types of fractures represent 84% of the acute bone injuries observed in people over 60 years of age, being considered as a public health problem due to involving great medical and hospital expenses and having impact on the quality of life and health performance status of this population. Thus, it is crucial to outline the profile and statistics on this subject, contributing to initiatives aimed at health promotion and the prevention of these problems, reducing the financial impact on the health system.

JMRR
JOURNAL OF MEDICAL RESIDENT RESEARCH

EDITORIAL

A new project for the new generations

It is with great satisfaction that we present the first edition of the Journal of Medical Resident Research (JMRR), the first result of a project started in April 2019 by the Regional Council of Medicine of the State of São Paulo (Cremesp).

With the launch of this scientific journal, Cremesp seeks to fulfill its primary role of encouraging good medical prectice by fostering the production and dissemination of new scientific knowledge. Thus, it complies with Law Nº 3,268 of 1957, which created the Medical Councils, attributing to them, among other functions, the promotion of a perfect technical and moral performance of physians, the prestige and good concept of the profession and of those who practice it.

When drafting the JMRR, the editors imbued themselves with the values of the renowned project developed by the Regional Council of Medicine of the State of Paraná (CRM-PR) in the past, the *Revista do Médico Residente* (RMR). This mission, transmitted to us by CRM-PR – and which we hope to honor – represented not only an ambitious goal, but also a great learning experience in the field of scientific publishing. At first, we changed the name of the publication, aiming at international audiences and future indexing in important scientific databases, since we consider that, despite edited in a Regional Council, the JMRR disseminates a universal language: Science.

At the heart of the project are the physicians at the beginning of their academic careers. This occurs because, despite accepting the submission of articles by authors of the most varied levels of experience, JMRR opens space for younger colleagues to publish their first articles for international academic audiences, something that often seems distant for those who are beginning their careers. The maintenance of academic rigor is guaranteed with the collaboration of scientific reviewers, who accepted the challenge of providing suggestions and corrections in manuscripts submitted to a new journal, in a constructive way and aimed at improving the articles.

Cremesp commitment to excellence in medicine required delivering a quality publication to the scientific community, without disregarding its main proposal of encouraging the academic production of new authors from all over the country. This challenge motivates our editorial staff, which presents here the first edition of JMRR with great pleasure.

To our readers, we wish you a good reading. We also invite our young researchers and other interested parties to submit the results of their studies to the JMRR.

Douglas Kamei, Edoardo Filippo de Queiroz Vattimo, Gabriel Liguori
Editors of the Journal of Medical Resident Research

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JMRR
JOURNAL OF MEDICAL RESIDENT RESEARCH

EDITORIAL

A Journal for the Medical Resident

"The doctor's best tool is to sit down and listen to the patient."
(Gregório Marañon)

It is an honor and delight to welcome the first issue of the Journal of Medical Resident Research (JMMR), a scientific publication by the Regional Council of Medicine of the State of São Paulo.

Physicians undergoing their residency in their various specialty programs, their preceptors, mentors, and medical students now have another high-profile vehicle to publish their research papers on, one with an outstanding body of editors and reviewers.

Patients are the *raison d'être* of the progress of Medicine, while physicians are the vectors for the implementation of the theoretical and practical knowledge in treatment and clinical care. The patients will be the statistics and the results of scientific works in their great range of presentation modalities; however, the interpersonal humanization of Medicine must be present in both the discussion and conclusion.

A physician's first contact with their patients should always be a handshake and calling them by their name. It is known that Medicine's greatest invention is the relationship with patients.

The art of healing requires a relationship based on equality – a key element in the patient-physician relationship – and mutual respect. The patient wants to be recognized as a human being and not as a clinical case.

We must congratulate the concretization of the continuation of scientific publications of a Journal destined to resident physicians in Brazil, in the person of Dr. Edoardo Vattimo, a competent adviser and the entire Board of Directors of Cremesp, in addition to the dedicated and persistent Dr. Douglas Kamei, who did not allow the Journal of the Medical Resident (RMR in portuguese) to die. This team of editors also counted on the important collaboration of the experienced, albeit young, Dr. Gabriel Liguori, who was crucial in expanding the horizons of this project.

Professor Dr. João Carlos Simões
Editor Emeritus of JMRR

Full Professor of Oncology at Faculdade Evangélica Mackenzie do Paraná (FEMPAR)

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JMRR
JOURNAL OF MEDICAL RESIDENT RESEARCH

EDITORIAL

Encouraging Science

Considering my experience as coordinator of the Medical Residency at the São Paulo State Health Department—an instance in which I have been participating for over 30 years—, as well as my emphasis on looking toward Medical Education, I can only be proud of the fact that the medical board over which I preside is launching its first scientific journal, aimed, in essence, at physicians at the beginning of their careers: the Journal of Medical Resident Research (JMRR).

The JMRR, which derives from a fruitful journal published in the past by the Regional Council of Medicine of the State of Paraná (CRM-PR) and, later, by the National Association of Medical Residents (ANMR), accepts and encourages manuscripts from all colleagues willing to add knowledge and academic experience to our profession, in technical, ethical, bioethical, and deontological fields. On the other hand, it favors doctors still in training, without assuming the prejudice that lack of experience means absence of knowledge, since they provide us with enthusiasm and bold points of view, typical of this phase.

In this first edition, for example, among other manuscripts, we see the efforts of authors that seek to understand the motivation of their peers to join an student interest group, adopted today in Brazil as a complementary activity in the medical course. In other article, we see the intricacies of suicidal ideation among students, a serious matter to be understood and faced. In the sample of participants in this research, for example, almost 22% were at risk of taking their own life.

When dealing with themes like these while also implementing a new concept of publication in Cremesp, characteristic of university and graduate environments, the Council accepted the great challenge of entering the world of scientific publishing, which is kept alive by selfless researchers and by dedicated reviewers, without whom quality Science cannot be done anywhere.

It is not a simple path, as it has a different – but not less relevant – depth and specificity, as compared to the day-to-day clinical practice in the office, hospital, emergency wards, ICU, and primary care settings. However, facing the challenges of scientific research is essential to enable new discoveries that, in turn, can affect the clinical practice.

Undoubtedly, the Council has the privilege of embracing the idea, supporting it and taking it forward, encouraging those who are interested in sharing their studies to use this medium provided by Cremesp, which, if it is up to dedication, will, and care, will be soon indexed in the best scientific databases.

Let's get to work!

Irene Abramovich
President of Cremesp

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MEDICAL STUDENTS' PERCEPTION OF A TRAUMA, RESUSCITATION AND EMERGENCY MEDICINE INTEREST GROUP

Avaliação da liga de trauma, reanimação e emergência na percepção dos estudantes

Luiz Paulo Junqueira Rigolon[1] | Luciana Thurler Tedeschi[1] | Flávio de Oliveira Mendes[1] | André Borges de Freitas Dupim[1] | Luiza Vettorazzo Amaral[1] | Mateus Mendes Oroski[1] | Ronielly Pereira Bozzi[1] | Annelise Passos Bispos Wanderley[1] | Janaína Amaral Guimarães[1] | José Carlos Vieira Trugilho[2]

[1] Physician from Universidade Federal Fluminense

[2] Coordinating Professor of the Trauma, Resuscitation and Emergency Medicine Interest Group at Universidade Federal Fluminense

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ABSTRACT

Objectives: This study aims to identify participants satisfaction level in interest groups of medical students known as “Ligas Acadêmicas” (Portuguese term for "academic leagues"), in this case, the Trauma, Resuscitation and Emergency Medicine Interest Group at the Federal Fluminense University (UFF); the main factors that motivated students to participate in the group; and the importance attributed to this activity, and to the medical course itself. **Methods:** A survey was applied to a sample of 38 medical students, mainly female (52.63%). The average rate of participation was 78.2% (± 13.4). In a general subjective evaluation, a score from 0 to 100 was applied about satisfaction with the group and the course. **Results:** The main reason for participating in the group was to improve knowledge on trauma and emergency, while interested in research and extension.**Conclusion:** The results therefore reinforce the essential role of the interest group as an extracurricular activity, addressing issues relevant to the education of academics through specific didactic methods.

Keywords: Medical education, Medical students, Teaching.

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INTRODUCTION

Currently, medical student interest groups, known in Brazil as "Ligas Acadêmicas" (Portuguese for "Academic Leagues") are among the most sought after extracurricular activities by Brazilian medical students[1], showing an undeniable numerical increase[2,3]. In the context of medical training in Brazil, these extracurricular interest groups are formed by students from different graduate programs in healthcare and coordinated by professionals of the teaching institution or hospital. Their main objective is to complement students' medical education, deepening the knowledge in subjects from the course's traditional curriculum[4]. This strategy has been increasing in importance and gaining space within the university environment due to its potential to contribute to medical education[5].

The current curriculum of the medical course at the *Universidade Federal Fluminense* (UFF) does not have a mandatory rotation in Emergency Medicine and teaching of this specialty is, therefore, restricted to elective courses scattered throughout the medical curriculum, which provide a fragmented training[6]. In addition, the *Hospital Universitário Antônio Pedro*, a teaching hospital linked to UFF, operates in a referral system, so the experience with trauma and emergency situations is limited.

The Trauma, Resuscitation and Emergency Medicine Interest Group (LiTRE, in Portuguese) is a UFF project that integrates graduate students in the healthcare field, mentored by professors and attending professionals, whose mission is to stimulate the study of medical emergencies and trauma in UFF's academic community. Its activities encompass three areas — pre-hospital, emergency and in-hospital — and aim to offer better training to students and quality service to society. Linked to the Department of General and Specialized Surgery at the UFF School of Medicine, LiTRE annually renews its student body through a selection process, after a symposium with speakers from renowned institutions. At that time, its board of directors, made up mainly of participants of the group who stood out during the previous year, is also renewed. The project's initial aim is to contribute to traditional education, providing theoretical and practical activities, promoting the contact of participants with medical practice and with patients, carrying out scientific work and providing greater integration with society, through extension projects in the community setting, such as "LiTRE-Saúde" and "LiTRE-Educa".

Despite a large number of student interest groups in Brazil, there are few studies that describe this type of extracurricular activity[7-9], and show their participants' satisfaction or their scientific output[4,7,10]. Therefore, it is necessary to evaluate these initiatives in order to identify the positive and negative aspects of their work, as well as the way they operate and function, always aiming at better performance and service in their next years of operation.

Hence, the objective of this study was to assess the satisfaction of the participants of the group during the year of activities. Objectively, the research aimed to promote a self-assessment by the participating students, to assess the main factors that motivated them to participate in the interest group and to highlight the characteristics of the work by LiTRE.

METHODS

This is a quantitative, survey-type study, with a sample of participants from LiTRE, all medical students from UFF and over 18 years old. The research was carried out at the School of Medicine of UFF.

A questionnaire developed by the authors was applied, composed of two parts, with a total of 20 questions. The first six questions correspond to the self-assessment of the group's participants and their respective participation in the activities, elaborated from a questionnaire obtained from the UFF's institutional evaluation system[11]. The other fourteen questions seek to understand the purpose of LiTRE's work, encompassing the role of its directors, its characteristics, importance within university education and a general subjective assessment by assigning a grade from 0 to 100, in addition to open space for additional comments. The questionnaire applied was the same for the three areas of the group (pre-hospital, emergency, and in-hospital) and data collection took place in June 2017, at the end of the activities, with the assistance of the directors of LiTRE. Students who abandoned the group's activities or who refused to answer the questionnaire were excluded.

The data were tabulated in Excel® 2016. Subsequently, for the descriptive statistical analysis and verification of the hypotheses elaborated, Epi Info 7.2.1.0 for Windows software was used. Fisher's exact test and chi-square test were used to analyze associations. In all analyses, a significance level of 5% and a 95% confidence interval were considered.

The project was approved by the Research Ethics Committee of Hospital Universitário Antônio Pedro/School of Medicine, under CAAE 63085516.8.0000.5243 and protocol nº 1.950.150. All participants were informed about the study and consented to participate by signing a term.

RESULTS

The study sample consisted of 38 students (76% response rate), with an average age of 23.4 years (± 2.96), twenty (52.63%) being female. Participants were enrolled from the fifth to the 11th period of medical school (Figure 1). Sixteen (42.11%) participants corresponded to the pre-hospital field, fourteen (36.84%) to the emergency field and eight (21.05%) to the in-hospital field.

Twelve participants (24%), seven males and five females, were excluded from the study, eight refused to participate and four abandoned the group during the year. By segment, four were from the pre-hospital field, six from the emergency field and two from the in-hospital field. By period, four were academics from the fifth period, six from the sixth period and two from the ninth period.

Regarding the participants' self-assessment, 23 (60.53%) members answered positively to all questions, which are reproduced in Table 1 along with the number of respondents of each individual question.

The students were asked at two moments about their interest in acting in the trauma and emergency field: in the period before they began participating in LiTRE and after one year of participation. Nine (23.68%) participants of the group changed their opinion after one year, of which five became interested and four lost interest, resulting in 33 (86.84%) interested medical students after the end of activities.

The performance of the directors was assessed in relation to the mastery of content, extra-class availability, use of acces-

sible language and responsibility for class schedules, and 36 (94.74%) participants answered positively to the questions that addressed this item. Specifically, in relation to the structure of the classes, they were asked about the order of presentation of the contents, the use of teaching methods and resources, the workload, and its importance for training. Regarding these questions, 32 (84.21%) study participants agreed partially or totally. All members of the sample agreed that the group is important to education, totally (n = 36) or partially (n = 2).

In the question related to the reasons that led them to participate in LiTRE, which allowed multiple responses, the most chosen option was "Improving knowledge about trauma and emergency", followed by "Interest in rotations" and "Interest in practical classes" (Figure 2). The sixth period was considered as a cut-off point for evaluating the reasons in two moments: in the first and second half of the medical course. Thus, by stratifying the sample into two groups, different results were found: among students below the seventh period (n = 18), 94.44% were interested in practical classes, while among those in the seventh period or above (n = 20), 65% chose this option (p = 0.031). The same difference between the initial and final periods of the medical course occurred in relation to the option "The medical course does not address this topic", an option chosen by 88.89% of the medical students below the seventh period, as opposed to 60% of students in the seventh period or above (p = 0.047). Twenty-eight (73.68%) students mentioned more than four reasons among the seven listed. Regardless of the period, the least chosen option was interest in research and extension.

In a general subjective assessment of LiTRE attributed by the students themselves, with a score from 0 to 100, the interest group obtained an average of 91.1 ($\pm$ 7.6). The grades ranged from 70 to 100, with 90 being the most frequent (Table 1). Of the 36 who believe that they have obtained an adequate training and answered positively to all questions about the directors, 31 (86.11%) evaluated the group with a score greater than or equal to 90. In terms of satisfaction, thirty-five academics (92.11%) said they were satisfied with LiTRE and this assessment is correlated with the good grade attributed ($\geq$ 90) by 88.57% of them (p = 0.0041). The question about the importance of the LiTRE for medical education also correlates with a score greater than or equal to 90, being attributed by 86.11% of those who fully agree with this question (p = 0.029).

FIGURE 1 - Absolute distribution of the sample in relation to the period in the medical course.

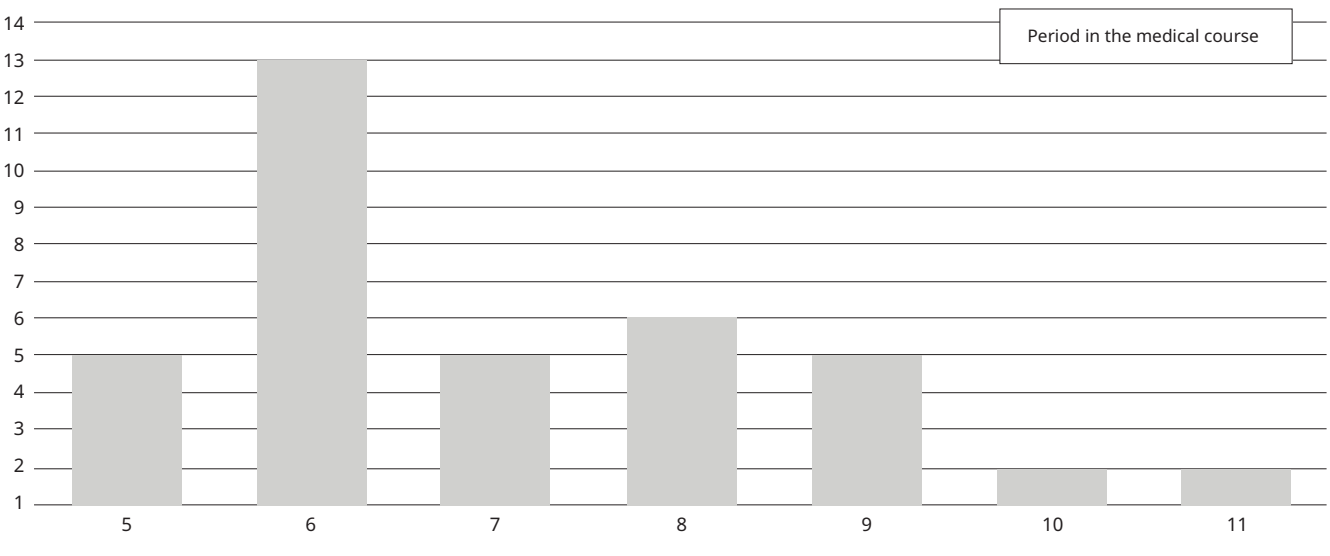
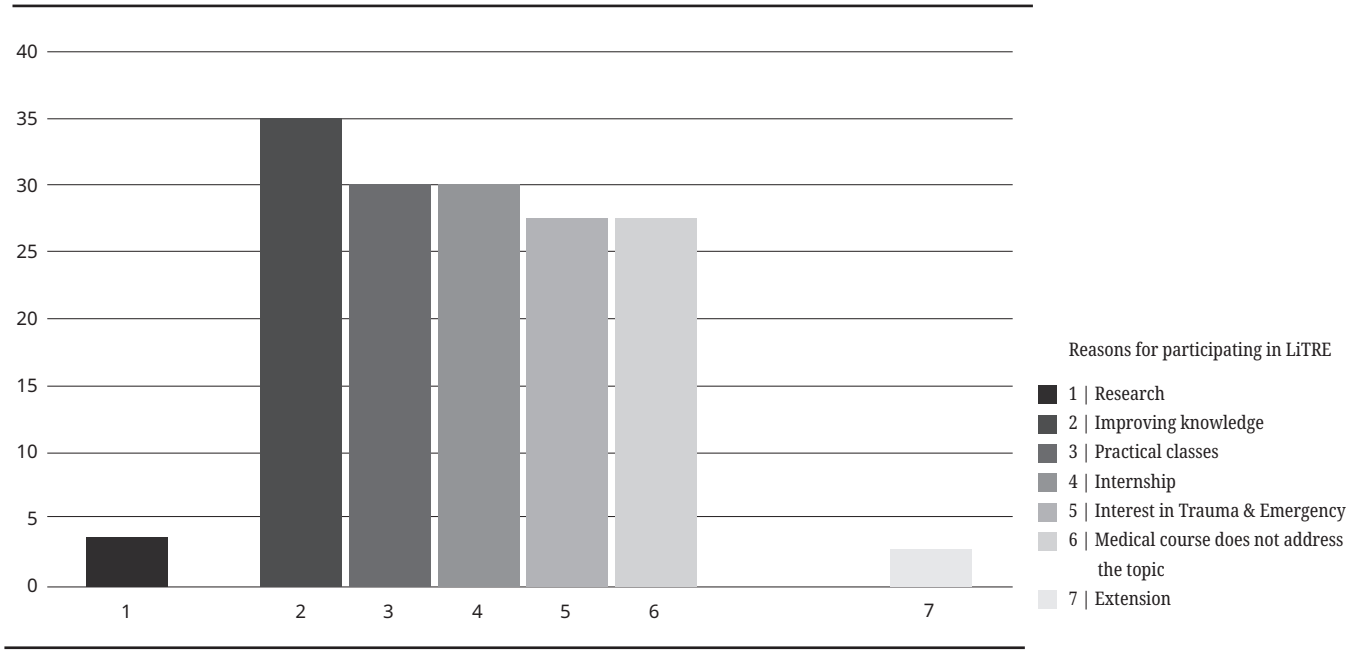


TABLE 1 - Questions and frequency of responses in the self-assessment domain.

QUESTIONS	RESULTS (ABSOLUTE)	PERCENTAGE
I was assiduous and punctual	30	78,95%
I had the necessary knowledge to complete the course	33	86,84%
I had the necessary material resources to carry out the activities	35	92,11%
I performed academic tasks with dedication	38	100%
I identified with the course	38	100%
I got a good academic performance	37	97,37%

FIGURE 2 - Absolute distribution of reasons for participating in LiTRE.



The average number of absences during the group's activities was 3.5 (± 1.6), with an average frequency of 78.20% (± 13.4). When stratifying the grade attributed to LiTRE by frequency in class, of the 29 (76.32%) participants of the group with a attendance rate greater than or equal to 75%, 26 (89.66%) reported a score greater than or equal to 90 (p = 0.04).

Thirteen group participants made open comments at the end of the questionnaire, of which six suggested more practical classes.

DISCUSSION

The main outcome found by this study was the predominance of a score greater than or equal to 90 attributed by LiTRE participants, a result of the good performance of the group directors, of the student's learning and achievements, of the perceived importance for medical education and, consequently, of their satisfaction with the group. It is important to note that all medical students agreed that the project is important for their training, portraying the awareness of the need to expand knowledge on the topic, as well as the work done by the group.

Participating students stated that they carry out the activities with dedication, possess the necessary knowledge on the subject, are assiduous in the activities and identify with the project. All of these variables work as counterparts provided by students in the face of the professional training task developed by LiTRE. This way, the work becomes bidirectional.

In a similar study[4], questionnaires were applied to assess student satisfaction, positive and negative points, and learning, one year after the activities of the Bahia Plastic Surgery Interest Group began. An interesting result obtained in this study was the growing number of students interested in working in the field, going from 28.60%, before activities, to 78.60%, after one year. Likewise, there was an increase in five students who were previously uninterested and changed their opinion after participating in the activities of the group. Under these circumstances, interest groups act as guides and advisers on future specialization countless times, so that contact with the profession's daily practice and routine can reaffirm the desire or, equally, cause a change in the students' opinion, as happened with the four who lost interest in working in this segment. For these, LiTRE, in addition to the content provided, was able to determine the direction of the choice of residency, bringing them closer to the reality of what they do or do not want to accomplish when they graduate.

Despite the National Curricular Guidelines for Medical Courses, the large time load allotted during medical training for the teaching of trauma and emergency is often not effectively used, hampering the training of future professionals[12]. In the meantime, it is not uncommon for student interest groups to emerge in Brazil, out of spontaneous demand from students, as a means of complementing their training. This circumstance provides a differential between students who seek extracurricular activities in relation to those who do not engage in them[13]. This statement is in line with the results obtained in the present study, because, among the most cited reasons for participating in LiTRE, is the fact that the medical course does not address the topic in its traditional curriculum, in addition to the possibility of rotations and practical classes. Frequently, the trauma and emergency field is not addressed in a broad and effective way[13], generating a large gap in medical training, mainly because the emergency is one of the main fields of activity of newly

graduated doctors in Brazil. However, it is noteworthy that it is not up to the student interest group to fill such gaps, but rather to deepen the topics of interest through the use of different didactic methods. Deficits in medical education and training must be promptly diagnosed by educators and coordinators in order to be met through curricular changes.

It is interesting to note that students in the second half of the course showed less interest in practical classes and less complaints about the medical course not addressing the topic. A probable factor for this is the so-called "parallel curriculum", defined as the set of extracurricular activities developed by the students during their medical training[14]. The number of students who adhere to this "parallel" medical training increases progressively starting from the fifth period, with a peak in the tenth period, in which 94.7% of students have some type of extracurricular activity[15]. Such practice brings students from more advanced periods closer to the trauma and emergency field, and may be an explanation for the change in motivation to participate in the group between the initial and final periods.

Although LiTRE has active research and extension projects, such as those aimed at teaching routine emergencies to public school students (LiTRE-Educa) and the general population (LiTRE Saúde), our study revealed a small number of medical students reporting interest in these activities. This is in line with the national casuistry in Brazil, since student interest groups, lacking the necessary guidance, tend to carry out activities of an essentially curricular nature, reducing the time allotted and adequate planning for extension projects[16]. The results of this study indicate the need to stimulate such requirements, in order to reach the main objectives of student interest groups (teaching, research and extension), as presented by other groups, such as the Head and Neck Surgery Interest Group of the Universidade Federal do Ceará, which has seen great growth in the scope of research, teaching and extension, with an increase in the number of published manuscripts, and oral and poster presentations, in the period from 2007 to 2013[17].

Other activity that needs improvement, as requested by the students, is practical training. Despite being extremely necessary for the technical training of future professionals, there are still major limitations, especially the lack of resources, since most of them require simulators with high costs.

Thus, the results show the satisfaction of the medical students and the good performance of LiTRE in relation to its commitments, complementing the training of future professionals in the field. Improving knowledge and interest in practical classes and rotations were the main reasons that led students to participate in the group. Currently, LiTRE is well evaluated, which is a great motivation to continue the work and effort to complement the traditional curriculum of medical school.

This study has some limitations, among them, the small sample size, due to the restricted number of participants of the group and the rate of non-response by some of its members. It would be interesting to carry out subsequent studies, as it would allow the evaluation of interventions carried out from the flaws identified in previous questionnaires, seeking to establish better strategies for future activities.

In addition, a national survey on trauma and emergency interest groups would be valuable, which could, for example, define the more specific role of these groups, with their regional peculiarities and performance in relation to the other groups in Brazil, enabling an exchange of information and experiences.

CONCLUSION

The data reinforce the hypothesis that LiTRE is an extracurricular activity addressing relevant topics, which are essential for the medical training, with effective didactic methods, adequate workload and efficient learning environment. In general, the group was well regarded in relation to its directors and the projects' performance characteristics. In addition, the self-assessment with reasons for participating in the group, intention to act in the trauma field, and the grade assigned, reported by the vast majority of students, reflected the sample's satisfaction.

The positive assessment of LiTRE as an essential extracurricular activity reinforces the need to maintain and encourage additional strategies to improve the training in Emergency Medicine and Trauma in the traditional medical curriculum.

DISCLOSURES

There is no conflict of interests to declare.

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INFORMATION ABOUT THE ARTICLE

Universidade Federal Fluminense, Niterói, RJ, Brasil

Mailing address:
Avenida Visconde de Albuquerque 1228, 304
CEP: 22450-000 – Rio de Janeiro, RJ, Brasil

Corresponding author:
Luciana Thurler Tedeshi
tedeschi.luciana@gmail.com

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EVALUATION OF SUICIDE RISK IN MEDICAL STUDENTS

Avaliação do risco de suicídio em acadêmicos de medicina

Edy Alyson Ribeiro[1] | Vinicius César Queiroz Bisetto[2] | Douglas Otomo Duarte[1] |

Maria José Caetano Ferreira Damaceno[2] | Lilian Dias dos Santos Alves[2]

[1] Medical student from Fundação Educacional do Município de Assis

[2] Professor of the medical course of Fundação Educacional do Município de Assis

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ABSTRACT

Objectives: Suicide is considered a serious public health problem and especially affects medical students, who present a high prevalence of suicidal ideation, of approximately 11.1%. The aim of this study is to evaluate the risk of suicide in medical students from a University in an inland city of the State of São Paulo, Brazil. **Methods:** This is a cross-sectional study carried out with 169 medical students from stages I, II, III and V of the medical course. Two questionnaires were employed: the module C of the Mini International Neuropsychiatric Interview (MINI), in which the risk of suicide was classified as "low" or "moderate/high"; and a survey with 23 questions about clinical and demographic factors potentially associated with suicide risk. A preliminary exploratory analysis was carried out to investigate this association and a subsequent logistic regression was employed to perform a multivariate analysis. **Results:** of the students who responded to the MINI questionnaire, 131 (77.5%) showed a low risk of suicide and 37 (21.9%), a moderate/high risk. The variables that were associated with suicide risk were: family history of suicide (RR= 5.90; p=0.001) and the diagnosis of mental disorders (RR=3.96; p= 0.004). Alcohol consumption was associated with suicide risk in the preliminary bivariate analysis (RR=4; p=0.046), but this association did not remain significant in the final model of the multivariate analysis (RR=3.54; p=0.059). **Conclusion:** The results showed that a family history of suicide and the diagnosis of mental disorders were associated with suicide risk and can be used to identify students at risk, as well as to guide preventive strategies for its prevention in Medical Schools.

Keywords: Medical Students; Suicide Attempt; Mental Health; Medical Education; Psychiatric Graduation Scales.

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INTRODUCTION

Suicide is considered a public health problem by the Pan American Health Organization (PAHO/WHO)[1], with 800,000 cases every year, equivalent to 1.4% of the total deaths in the world[1]. In Brazil, 55,649 deaths from suicide were reported between 2011 and 2015, representing an average incidence of 5.5 cases per 100,000 inhabitants per year[2]. Between 2011 and 2016, 48,204 cases were reported, 69% in women and 31% in men, predominantly in the age group of 20 to 29 years (27.4%)[2].

In a meta-analysis carried out by Rotenstein *et al.*[3] in 2016, the overall average prevalence of suicidal ideation in medical students was 11.1%. In addition, stress, changes in the students' psychological and physical well-being and the prevalence of depressive and anxiety disorders, as well as of the consumption of alcohol, tobacco and other psychoactive substances increase during academic life[4-5].

According to a cross-sectional Brazilian study, composed of a sample of 4,840 medical students, 432 (8.94%) participants showed suicide ideation or attempt. Of these, 346 (80%) were women, 299 (69.2%) were heterosexual, 423 (97.9%) had no children, 193 had poor sleep (44.6%), 305 did not perform any physical activity (70.6 %), 130 (30%) reported a fair family relationship and 162 (37.5%) had good contact with friends[6].

The risk for suicide is associated with modifiable and non-modifiable factors such as: male gender, adult age, marital status, low income, homosexuality, family history of suicide, alcohol and tobacco consumption, diagnosis of mental disorders - such as mood disorders - in addition to other factors that are very common during student life, such as bullying and poor sleep quality[1,4,6-9].

These findings justify the importance of research on suicide among medical students, since many can be avoided. It is worth mentioning that the prevalence of suicidal ideation among medical students is higher than that of doctors and nurses[10].

Therefore, this study aims to assess the suicide risk among medical students and identify possible risk factors in this population, in order to better understand this issue and to promote measures to identify individuals at risk.

MATERIALS AND METHODS

This is a quantitative cross-sectional study carried out with medical students. Data collection took place between August and September 2018, at a University in an inland city of the state of São Paulo, Brazil, which had 193 enrolled medical students from the first to the fifth semester. The study included all male and female medical students 18 years or older who were enrolled in semesters I, II, III and V of the medical course, by the first semester of 2018, and who agreed to answer the questionnaires. Students not present at the time of the interview were excluded. As students are admitted to this Medical School biannualy, there is a class for each semester of the year. However, this did not apply to semester IV, which was not included in the sample, since new students were admitted only once that year.

The survey presented two self-administered questionnaires. The first instrument was the module C of the validated and structured Mini International Neuropsychiatric Interview (MINI), used to assess suicide risk, classifying it as "low" (score 1-5), "moderate" (score 6-9) and "high" (score $\geq$ 10)[11-12]. For data analysis, in this study, the scores were classified as absence of risk (equivalent to "low") and presence of risk (equivalent to "moderate" and "high" risk). Thus, the sum of six 6 or more points in the questionnaire represented a risk of suicide for the purposes of this study[11-12].

The second questionnaire was developed by the authors from a literature review and contained 23 questions about the following variables: sex/gender, age, marital status, race/ethnicity, religion, occupation, income, cohabitation, family structure, alcoholism, smoking, use of illicit drugs, diagnoses of mental illness, use of medications and history of suicide attempts by family members and friends[4,6-9,13]. Initially, a pilot questionnaire was applied to 34 students of Stage III of the medical course, who were included in the sample after the method fulfilled the expectations of the researchers, demonstrating its applicability in other students.

The study was approved by the Research Ethics Committee (protocol no. 2.746/18), according to Resolution 466/2012 of the Brazilian Health Council. Before the application of the questionnaires, all participants signed the Informed Consent form, which explained the nature and objectives of the research. The questionnaires were applied during curricular activities, at the institution's physical facilities, and lasted 15 minutes.

Initially, we employed the Chi-square test to perform a preliminary exploratory analysis, testing the association of the following categorical variables with the outcome (presence or absence of suicide risk): sex, family history of suicide, diagnosis of mental disorders, smoking, alcohol consumption, consumption of illicit drugs and religion, In this analysis, the significance level was set at 5%.

In a second moment, we employed a stepwise logistic regression to perform a multivariate analysis, using the forward method for variable selection. Therefore, each variable was introduced in the model one by one, starting from the variable that showed the strongest association with the outcome, in the bivariate analysis. Only statistically significant variables remained in the final model, at a significance level of 5%. The analyses were conducted using the SPSS statistical software in version 20.0 (IBM Corp, NY, United States of America).

RESULTS

Of the 193 enrolled medical students, the final sample was composed of 169 students (87.5%) that met the inclusion criteria. One student refused to answer the MINI, but answered the second questionnaire.

The students were predominantly female (120 or 71.0%), and all identified with their biological gender. A higher prevalence of white students was evidenced (154 or 91.1%); 103 students (60.9%) lived with someone and 161 (95.3%) were single. The mean age was 21.36 years (2.929 standard deviation).

Regarding the socioeconomic aspect, 65 (38.5%) had a family income of 5 to 10 Brazilian minimum wages. As for the declared religion, 135 (79.9%) stated that they have a religion, while 108 (63.9%) declared to be Catholics. As for the family environment, 143 (84.6%) students belonged to a traditional family, whose parents are not divorced, and 163 (96.4%) students did not have children. Regarding drug use: 136 (80.5%) drank alcoholic beverages, 20 (11.8%) smoked

TABLE 1 - Analysis of socioeconomic, demographic and clinical data of 169 medical students. Medical School of an inland city of the state of São Paulo, Brazil, 2018.

VARIABLE	MEAN	STANDARD DEVIATION
AGE	21,36	2,929
	FREQUENCY (N)	**PERCENTAGE (%)**
Sex	-	-
Female	120	71
Male	49	29
Race	-	-
White	154	91,1
Brown	8	4,7
Yellow	4	2,3
Black	3	1,7
Marital Status	-	-
Not Married	161	95,3
Married	8	4,7
Use of Alcohol	-	-
Yes	136	80,5
No	33	19,5
Smoking	-	-
Yes	20	11,8
No	149	88,1
Use of Illicit Drugs		
Yes	20	11,8
No	149	88,1
Religion	-	-
Yes	135	79,9
No	34	20,1
Type of Religion	-	-
Catholic	108	63,9
Protestant	20	11,8
Spiritist	3	1,7
Buddhist	2	1,1
Seicho-No-Ie	1	0,5
Umbanda	1	0,5
Does not have a religion	34	20,1
Family Structure	-	-
Integrated	143	84,6
Disintegrated	26	15,4
Income	-	-
0 to 1 minimum wages	0	0
2 to 4 minimum wages	5	2,9
5 to 10 minimum wages	65	38,5
10 to 20 minimum wages	44	26
More than 20	32	18.9
Not informed	23	13.6
Living with	-	-
Alone	66	39.1
Other people	103	60.9
Has Children?	-	-
No	163	96.4
Yes	6	3.5
Identifies with Biological Gender	-	-
Yes	169	100
No	0	0
Diagnosis of Mental Disorders	-	-
Yes	27	15.4
No	142	84
Main Disorders	-	-
Anxiety	16	9.4
Depression	7	4.1
Treatment	-	-
Yes	19	12.2
No	8	4.7

TABLE 2 - Suicide risk among 169 medical students assessed by the MINI. Medical School of an inland city of the state of São Paulo, Brazil, 2018.

M.I.N.I	FREQUENCY (N)	PERCENTAGE (%)
Low	131	77,5
Moderate	22	13,0
High	15	8,9
Did not respond	1	0,6
Total	169	100,0

TABLE 3 - Bivariate analysis of conditions related to suicide risk in medical students at a medical school of an inland city of the state of São Paulo, Brazil, 2018.

		BIVARIATE ANALYSIS *		MULTIVARIATE ANALYSIS	
VARIABLE	**N**	**RR****	**P**	**RR****	**P**
Sex	-	-	-	-	-
Female	119	1,307	0,253	-	-
Family history of suicide	14	10,57	0,014	5,9	0,001
Diagnosis of mental disorders	27	9,83	0,002	3,96	0,004
Smoking	20	0,652	0,419	-	-
Alcohol consumption	136	4	0,046	3,54	0,059
Consumption of illicit drugs	20	0,841	0,359	-	-
Religion	135	0,458	0,498	-	-

* Chi-square test; **Relative Risk

and 20 (11.8%) used other types of drugs.

According to the answers, 14 (8.3%) students had a history of suicide in the family and 27 (15.4%) mentioned having a diagnosis of mental disorders. Of these students, 16 (9.4% of the total sample) had Generalized Anxiety Disorder (GAD). Of the students who had a diagnosis, only 19 (70.3%) underwent treatment, including psychotherapy and/or pharmacological treatment. Table 1 represents the clinical and demographic data of the sample.

In the results obtained after the application of the MINI, we identified 15 (8.9%) students with high suicide risk, considering that 1 (0.6%) student did not respond to this questionnaire. Table 2 presents the results of the MINI questionnaire.

In the bivariate analysis, an association was observed between "suicide risk"/"diagnosis of mental disorders" (p= 0.002); "family history of suicide" (p= 0.014)/"alcohol use" (p= 0.046). In the multivariate analysis, an association was identified between "suicide risk"/"diagnosis of mental disorders" (p= 0.004); "risk of suicide/family history of suicide" (p= 0.001) (see Table 3).

DISCUSSION

The present study showed that 37 (21.9%) students had a moderate/high risk of suicide, according to module C of the MINI questionnaire, a value that exceeds the one found in the systematic review by Rotenstein *et al.*[3], of 11.1%. This fact can be justified by the use of different instruments for data collection and by the difference of sample size between the studies, which was considerably larger in the systematic review[14].

In our study, the following factors showed a significant association with suicide risk: family history of suicide (RR= 5.90; p= 0.001) and the diagnosis of mental disorders (RR= 3.96; p= 0.004). These findings corroborate the international literature[15], and the main explanations are the cognitive distortion seen in mental disorders[16-17] and associated genetic factors[16-18]. Accordingly, Bachmann *et al.*[13] reported that mental disorders, observed in 15.4% of our sample, are present in 60-98% of suicide cases. In addition, the presence of these diagnoses increases the risk of suicide by 10% in the general population[13].

In the present study, 14 (8.3%) students reported a positive history of suicide in the family, which had a statistically significant association with suicide risk in the sample (RR= 5.90; p= 0.001). This result is in line with a cross-sectional study carried out with 637 students, whi-

ch reported a history of suicide attempts of family members as a factor associated with increased risk of suicidal ideation[19]. These findings are compatible with the results of a longitudinal study by Oppenheimer *et al.*[18], which showed a complex and still poorly understood mechanism of transmission of suicide risk from parents to their children. This study suggests that children, in addition to inheriting neurocognitive alterations, problems of emotional regulation and other neurobiological deficits from their parents, may be exposed to a stressful family environment, due to high levels of conflict between family members. Therefore, their vulnerability to suicidal behaviors increases[18].

Our results showed that 136 (80.5%) students consumed alcoholic beverages at least once during the medical course. This value is similar to results reported in previous studies[20]. In particular, of the students who had a moderate/high risk of suicide (37), 34 (91.8%) drank alcohol at least once a month. A meta-analysis suggested that the use of high doses of alcohol is associated with an increased risk of suicide attempts and with decompensations of underlying mental disorders[20]. However, although the bivariate analysis showed an association of alcohol consumption and suicide risk, this finding did not remain statistically significant when the interaction of other variables was considered in the final model, after multivariate analysis (p= 0.059). This finding, which goes against the literature[19], may be explained by the fact that we did not control, in our sample, factors such as differences in doses and patterns of alcohol consumption, which may vary between participants, as well as compared to the samples of other studies[19-21]. For instance, a cross-sectional study reported that students with alcohol abuse and/or dependence had twice the risk of suicidal ideation when compared to those who consume alcohol moderately[19].

Moreover, we observed in this study that, of the 27 (15.4%) students who presented a mental disorder, 16 (59.2%) declared to have GAD. A meta-analysis showed that stress and anxiety are associated with the competitiveness of medical school and with the onset of depression and suicidal ideation[6]. Corroborating this fact, a Brazilian study showed that the prevalence of anxiety and depression in medical students is associated with a high number of study hours, a high course load, feeling insecure regarding one's professional life, being too hard on oneself and the close contact with several diseases[22].

According to Bailey *et al.*[23], among medical students, women had a higher rate of suicide ideation and attempt when compared to men. In our study, we found a great number of women (120, 71%) with these symptoms, but there was no significant association between females and a higher risk of suicide (RR= 1.307; p= 0.253). Regarding the relationship between suicide and religion, we observed that 135 (79.9%) students claimed to have some religion, but the association of religiousness with the risk of suicide was not statistically significant (RR= 0.458; p= 0.498) in this sample. However, in an international systematic review, religious affiliation is a protective factor against attempted and completed suicides, but it does not interfere with suicidal ideation[24].

Only 20 (11.8%) students reported tobacco use, similarly to the values found in the literature[25]. In this context, a cross-sectional observational study pointed out that, although 48.4% of the participating students had ever smoked, only 12% consumed tobacco frequentely[25]. Although tobacco is a risk factor for suicide according to some studies in the literature[9,25], there was no association between suicide risk and smoking in our sample (RR= 0.652; p= 0.419).

This study has some limitations, such as its cross-sectional design, which does not make it possible to identify causal factors. Another limitation is the difficult generalization of the results, as it was carried out in a private Medical located in the interior of the state of São Paulo and has a small sample of individuals evaluated, as it was a course that started a few years ago. There was also no verification of family history of mental disorders among medical students, which could be associated with the risk of suicide.

Despite these limitations, the findings we report are relevant and need to be further investigated and considered by other medical schools, as it deepens the knowledge on the factors related to the risk of suicide. Moreover, the findings of this study can contribute to the improvement of mental health indicators among medical students, by guiding awareness campaigns of the community and programs to support and educate students regarding mental health implemented by the Medical School and associated healthcare services. When designing these preventive programs and interventions, it is important to identify students most likely to present an increased risk of suicide in a timely manner. This can be done by screening risk factors, by providing proper psychiatric and psychological care and by performing a close follow-up of these students, aiming to fully address their needs[13,26].

CONCLUSION

This study analyzed the relationship between demographic and clinical factors and suicide risk among medical students. In this study, suicide risk, according to the score obtained after the application of the MINI questionnaire, presented an association with the diagnosis of mental disorders and with a family history of suicide. No association was found between suicide risk and religion, use of tobacco, alcohol and illicit drugs. Thus, a family history of suicide and the diagnosis of mental disorders can guide prevention strategies in Medical Schools. We suggest that universities and government agencies responsible for medical education implement measures aiming to promote the quality of life of students. We advise the competent authorities to identify family history of suicide, as well as to prioritize the diagnosis and early treatment of mental disorders, among medical students, in order to reduce the suicide risk of this population.

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DISCLOSURES

There is no conflict of interests to declare.

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INFORMATION ABOUT THE ARTICLE

Fundação Educacional do Município de Assis

Mailing address:
Avenida Getúlio Vargas, 1200
CEP: 19807-130 – Assis, SP, Brasil

Corresponding author:
Dra. Lilian Dias dos Santos Alves
lili_soprano@hotmail.com

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A COMPARISON BETWEEN THE USE OF SUCTION DRAINS AND ADHESIVE SUTURES IN THE CORRECTION OF INCISIONAL HERNIAS

Comparação entre o uso de drenos suctores e suturas de adesão na correção de hérnias incisionais

Maria Luiza Marialva Rodrigues[1] | Sergio Antonio Saldanha Rodrigues Filho[2]

[1] Medical Student at the School of Health Sciences, State University of Amazonas

[2] Attending Physician and Mentor of the Internship in Surgical Clinic at the State University of Amazonas and Surgeon at Fundação Hospital Adriano Jorge

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ABSTRACT

Objective: To evaluate the level of postoperative complications in incisional hernia repairs according to the adjuvant method of wound closure used: adhesive suture or suction drains. **Methods:** This is a retrospective study that compared the outcomes of patients who were submitted to incisional hernia repairs using drains or adhesive suture as adjuvant methods of wound closure. **Results:** of the 75 patients who underwent surgery, 26 were submitted to adhesive sutures, and 8% developed seromas and infections, compared to 45% ($p = 0.0013$) and 32% ($p = 0.0013$), respectively, in the drain group. **Conclusion:** adhesive sutures were more effective in preventing postoperative complications of incisional hernia repairs than suction drains, leading to lower morbidity rates and greater patient comfort.

Keywords: Incisional Hernia, Suction, Seroma, Postoperative Complications, Abdominal Wound Closure Techniques.

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INTRODUCTION

Incisional hernias are defined as defects in the abdominal wall adjacent to postoperative scars, which are noticeable or palpable in the clinical or imaging examinations[1]. They occur in 11% of the laparotomy procedures and present several risk factors for their formation, such as malnutrition, obesity, and smoking. They appear, on average, five years after the surgery[2], but they also occur after laparoscopy procedures in up to 2.8% of the cases, with possible higher incidence due to underdiagnosis, as most cases are asymptomatic[3]. Incisional hernias can be classified according to different aspects, such as size, level of contamination, presence of comorbidities and location on the abdominal wall[2,4,5].

Seromas are one of the most common complications after incisional hernia repairs and occur after a major skin and subcutaneous tissue detachment, performed in order to release fascial flaps, or after surgical correction of major skin defects. These situations create room for the tissue fluids to accumulate, overcoming its reabsorption potential. Besides, there are other risks associated with major tissue detachments, such as surgical site infections and hematomas[2,6]. In the case of incisional hernia repairs, in which prostheses are used to reinforce the abdominal wall, the onset of infections may lead to catastrophic outcomes[2,3,6]. Therefore, the prevention of such complications should be a major surgical objective, but the frequent use of drains may increase the risk of such infections[7,8].

Similarly to hernia repairs, the detachments performed in abdominoplasty

procedures are a matter of great concern regarding the onset of postoperative collections, thus stimulating the idealization of techniques such as adhesive sutures, which aim to prevent the formation of dead spaces and reduce the risks of complications[9,10]. Bercial (2012) compared the use of abdominal drains, adhesive sutures and fibrin glue in 43 female patients who underwent conventional abdominoplasty, and did not find statistical differences in the volume of seromas presented in the two first techniques, which suggested the same efficacy for suction drains and adhesive sutures[11]. However, prophylactic drains can be sources of retrograde bacterial migration, may cause local inflammation and prolonged time of use[12]. From the point of view of the patient, drains may lead to more scars, pain, and discomfort, especially during its manipulation, which can be inconvenient[13]. On the other hand, the evolution and standardization of the techniques of adhesive sutures, such as the Progressive Tension Suture[10], improved the functional and aesthetic outcomes of abdominoplasty procedures, which gave room to the possibility of extrapolating the concept in other surgeries with large detachments, such as incisional hernia repairs[14].

Therefore, this study aims at comparing outcomes between the use of suction drains and adhesive sutures regarding postoperative complications, the need for antibiotic therapy and readmission in the follow-up of these patients, in order to investigate the hypothesis that the use of adhesive sutures is equally or more efficient than the use of drains, without the morbidity rates related to the latter.

METHODS

This is a retrospective study based on medical records of patients who underwent surgery to treat incisional hernias from January 2017 to January 2018, at the Fundação Hospital Adriano Jorge (FHAJ), in Manaus, Amazonas, Brazil.

We assessed two groups of patients: those submitted to surgical wound closure with suction drains, and those who received adhesive sutures. We analyzed rates of local complication, outpatient and inpatient reinterventions and readmissions, as well as the need for antibiotic therapy; eventually, comparing these outcomes in both groups.

The adhesive suture technique used was based on that described by Pollock[10] (progressive tension sutures), with the following modifications: lines of continuous 2-0 polyglactin sutures were employed instead of the interrupted 0-0 polyglactin sutures described by that author, in order to reduce the duration of this stage of the surgery. The dermal-fat flaps were attached to the deep fascia, placing the lines of sutures from the most distant point of dissection to the surgical incision, approximately four centimeters apart from each another, always in the craniocaudal direction of the abdomen. The flaps were brought to the incision by the assistant surgeon, so that the sutures could reduce the final tension on the surgery wound. Finally, excess skin that was necessary for the wound closure, without tension of the incision, was excised.

We used 4.8-caliber suction drains, placed by counterincision in the gap between the dermal-fat flap and the aponeurosis of the abdominal muscles, fixated caudally to the incision with 3-0 nylon sutures.

Sample size was estimated considering the mean number of laparotomy procedures carried out at FHAJ, which is 120 per month, and the percentage of incisional hernias resulting from these procedures, estimated at 11% in a study by Speranzini *et al.*[2]. A 95% confidence interval was established, as well as a significance level of 5%, resulting in a minimum sample size of 67 patients according to the statistical parameters and to the formula presented below, described by Fonseca *et al.*[15]:

$$n = \frac{Z^2.\hat{p}.\hat{q}.N}{d^2.(N-1) + Z^2.\hat{p}.\hat{q}}$$

In which:

N: mean number of laparotomy procedures performed in FHAJ each month;
$\hat{p}$: percentage of incisional hernias as a result of laparotomy procedures;
$\hat{q}$: percentage of other occurrences caused by laparotomy procedures;
Z: critical value corresponding to the 95% confidence interval (1.96);
d: level of significance (5%)

Data were gathered from medical records using a spreadsheet created for this type of document analysis, compiling the information that was essential for the objectives of this study.

We included only patients whose prior authorization letters, operation notes or notes of outpatient consultations showed incisional hernia repair, in a primary or secondary aspect, from January 2017 to 2018.

Patients aged less than 18 years were excluded from the study, as well as cases of recurrence or those submitted to both techniques evaluated in this study at the same surgical stage. Moreover, we excluded patients whose medical records were incomplete or showed the non-attendance of the patient in postoperative follow-up appointments.

The collected data were grouped in contingency tables, with Microsoft® Office Excel 2013. We divided the groups of patients who were submitted to adhesive sutures or suction drains in the vertical axis of the spreadsheet. In the horizontal axis, patients were distributed according to sex, age group, presence of complications (seroma, infection, hematoma), need for antibiotic therapy, need for outpatient surgical reintervention, need for inpatient surgical reintervention and need for readmission.

Fisher's Exact Test and Student's t-test for independent variables were used for significance analyses. When applicable, the following were calculated: odds ratio, confidence intervals and relative risk reduction.

The study was evaluated and authorized by the Research Ethics Committee - CEP/FHAJ – as required by Resolution n. 466/12 of the Brazilian National Health Council (CNS), which establishes the guidelines for human subjects research in Brazil (CAAE 89676918.6.0000.0007).

RESULTS

From January 2017 to January 2018, 75 patients underwent surgery due to abdominal incisional hernia. However, applying the exclusion criteria, 73 patients remained in the study, which determined an adequate sample size. These hernias were located mostly in the midline, resulting from incisions in the upper abdomen or extending from the xiphoid process to the pubic symphysis. Of note,

five hernias resulted from Pfannenstiel incisions, four of these performed during childbirth, and one for cystolithotomy.

In total, 26 patients were submitted to wound closure employing adhesive sutures, whereas 47 used suction drains. Of the total, 27 patients were male, and seven of these were submitted to adhesive sutures; of the 46 women, 19 had them as a technique of wound closure. Most patients were in their fifth and sixth decades of life.

For hernia defect correction, we used onlay polypropylene mesh in 20 of the 26 cases submitted to wound closure with adhesive sutures, and, in 42 of the 47 patients who received suction drains. In the eleven cases in which the polypropylene mesh was not used, we used meshes composed of polypropylene (parietal side) and polytetrafluorethylene (PTFE) on the visceral side. These cases comprised hernias resulting from midline incisions extending from the xiphoid process to the pubic symphysis, with defects of more than ten centimeters in width. For these patients, we used the component separation technique, placing the mesh in the closure of the posterior layer, as demonstrated in the study by Winder *et al.* (2018)[16]. The anterior abdominal aponeuroses were sutured in the midline, which led to the conclusion of the closure according to the previously described distribution.

In the postoperative period, all analyzed patients reported having used an abdominal binder for at least 30 days after the surgical procedure.

There were no reports of necrosis of the skin flaps or of the neo-umbilicoplasty in the analyzed sample. It is worth to mention there is no consistency in reports about the techniques used for neo-umbilicoplasty or skin flaps used for the closure of cases in which there has been loss of abdominal domain.

The mean time of hospitalization for patients who received adhesive sutures was 2.4 days, whereas in the group with suction drains, it was 5.8 days (p=0.0020; 95%CI 11.71-56.29). Most patients with drains remained hospitalized until their removal and the output in the 24 hours before it was between 32 and 96ml.

As for the complications related to surgery, 23 patients presented with seroma; five, with hematoma; and 23, with surgical site infection (none classified as cavity infection / peritonitis). We considered only complications reported in medical records and/or in notes related to surgical procedures (puncture/aspiration of collections, opening of surgery stitches, among others) performed during the same hospitalization period or in postoperative appointments up to 90 days after hospital discharge.

Of the 23 reported seromas, only two occurred in the adhesive suture group. The five reported hematomas occurred in patients with suction drains. Regarding the surgical site infections, two occurred in the adhesive suture group, one of these was considered a complication from the seroma that had been previously reported. The other 21 were observed in the drain group, being that two of these were described as complications from the reported hematomas, whereas four, as complications from seromas.

In total, antibiotic therapy was necessary for 23 patients (two from the adhesive suture group, and 21 from the drain group), all with favorable outcomes, without associated deaths. The antibiotics varied from cephalexin, in the outpatient setting, to more robust ones, such as meropenem and vancomycin, in the intensive care unit.

As for the need for readmission, a patient from the adhesive suture group needed to be readmitted to treat an episode of reinfection of the surgical site. The report describes the opening of the stitches to drain fluid and for the daily irrigation of the wound with saline solution, associated with intravenous antibiotic therapy for ten days. In the drain group, there were five readmissions: one due to loculated voluminous seroma on the 15th postoperative day, that needed ultrasound-guided aspiration and hospitalization for one day, without new reports of complications during the follow-up period; one due to hematoma, refractory to the opening of isolated surgical stitches in the outpatient setting, followed by cauterization of the bleeding vessel in the operating room, and hospitalization for two days; and three due to infection in the surgical site: one was handled by the opening of surgical stitches and intravenous antibiotic therapy, whereas the other two needed removal of the polypropylene mesh, irrigation of the abdominal wall with saline solution and intravenous antibiotic therapy. Of these patients, the first was hospitalized for seven days, and the other two, for 12 and 6 days, respectively.

Finally, as to the need for new surgeries, three new procedures were performed in the adhesive suture group: one aspiration of the seroma and two openings of surgical stitches for fluid drainage, associated with irrigation of the wound with saline solution. For one of the patients with seroma, expected management was indicated, and the fluid collection was no longer perceived during the follow-up appointment on the 90th postoperative day. In the "drain" group, among the 21 patients with seroma, three needed ultrasound-guided aspiration, one of these being readmitted, whereas the other 18 were submitted to drainage by opening the stitches in the outpatient setting. Also in this group, of the five hematomas, one needed cauterization of the bleeding vessel in the operating room, and the others were submitted to drainage by opening the surgical stitches in the outpatient setting. Finally, of the 21 surgical site infections in this group, 19 were handled with the opening of surgical stitches and drainage, one of these in the inpatient setting, whereas two needed to remove the mesh and to irrigate the abdominal wall with saline solution in the operating room.

After the analysis of the data, only the onset of seroma and the need for antibiotic therapy showed statistically significant differences in favor of the use of adhesive sutures, as observed in Table 1.

DISCUSSION

Incisional hernia repair is a complex procedure, with high rates of recurrence and locoregional complications[17,18], reaching up to 32% in some cases, as described in the literature[19]. In our sample, there were complications in 50.6% of the patients, which is high in comparison to other studies[6,17,20]. This fact can be partially attributed to the routine use of mesh[21,22,23] and the level of complexity of the hernias referred to surgery in the study site[6], which is a reference center in the region for the tertiary treatment of this pathology.

Among the local complications, seroma is one of the most common ones, followed by hematomas and infec-

TABLE 1 - Comparison between the incidence of complications in the adhesive suture group and the drain group.

CHARACTERISTICS	SUTURES		DRAINS		TOTAL	RRR#	*p**	*CI 95%°*
	n	%	n	%				
Seroma								
Yes	2	7,7	21	44,7	23	82,8%	0,0013	0,02-0,49
No	24	92,3	26	55,3	50			
Hematoma								
Yes	0	0,0	5	10,6	5	100%	0,1533	-
No	26	100,0	42	89,4	68			
Need for antibiotics								
Yes	2	7,7	21	44,7	23	82,8%	0,0013	0,02-0,49
No	24	92,3	26	55,3	50			
Readmissions								
Yes	1	3,8	5	10,6	6	64,0%	0,4118	0,04-3,04
No	25	96,2	42	89,4	67			
Reinterventions$^{\Delta}$								
Yes	3	11,5	6	12,8	9	11,0%	1,0000	0,02-3,9
No	24	88,5	41	87,2	64			

Relative Risk Reduction

* P-values are significant if <.05 (5%)

° 95% Confidence Interval

$^{\Delta}$Excluding cases in which only simple opening of stitches in the outpatient setting were needed for fluid drainage

tions[3,7,24]. In this study, the incidence of seroma (22.7%) was compatible with that of other studies[3,21,24,25]. However, the statistically significant difference we found in favor of adhesive sutures suggests them as a better alternative in this sample.

Besides, in the incidence of surgical site infections, there was also a significant difference, once again, favoring the adhesive suture group, similarly to what is observed in abdominoplasty procedures, for example, in which detachment is also frequent[8,25,26]. Moreover, there is evidence showing that drains can have the opposite effect, that is, may even increase the risk of surgical site infection[17].

Concerning the prevention of hematomas, even though there was no occurrence in the adhesive suture group, the lack of statistical significance, in comparison to the drain group, suggests an equivalence between the techniques, as also observed in the study by Seretis *et al.*[26].

It is important to mention that, as observed in other studies[6,7,26], the total time of hospitalization was shorter for patients who used adhesive sutures, in comparison to those who used suction drains, which possibly reduces costs. Even if only the duration of the first hospitalization was analyzed in this study, this difference was significant and may have an impact if applied on a large-scale.

However, as limitations of this study, it is necessary to mention there were cases of complications handled conservatively. Besides, no routine diagnostic imaging was performed to detect collections postoperatively. This may lead to the underdiagnosis of these complications, despite being rational from the clinical care point of view. Therefore, it is important to mention that the data regarding the complications are only related to the clinical diagnosis based on the morbidity caused to the patients, which may underestimate the real prevalence of complications in both groups. Besides, the variety in the presentation of incisional hernias as to size, shape, time of evolution, position on the abdominal wall and factors related to their onset can change the evolution and outcome of the incisional hernia repair, regardless of the adjuvant technique used for wound closure. Therefore, it is necessary to perform other studies and further analyses of the presented findings.

CONCLUSION

In this study, the adhesive sutures were more efficient to prevent postoperative complications after incisional hernia repair, with lower rates of seroma and postoperative infections than those patients handled with suction drains. Considering the reduction in the number of scars, the discomfort inherent to the presence of a drain and the negative consequences that may come from maintaining it, it is possible to suggest that the use of adhesive sutures is equivalent to or better than the use of suction drains in the wound clousure of incisional hernia repairs, and can be a substitute for them.

DISCLOSURES

There is no conflict of interests to declare.

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INFORMATION ABOUT THE ARTICLE

Fundação Hospital Adriano Jorge

Mailing address:
Avenida Carvalho Leal, 1778,
CEP: 69065-001 – Manaus, AM, Brasil

Corresponding author:
Sergio Antonio Saldanha Rodrigues Filho
drsergiorodrigues@gmail.com

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JMRR

LEIOMYOSARCOMA OF THE URINARY BLADDER: A CASE REPORT

Leiomiossarcoma de bexiga: um relato de caso

Amanda da Silva Anjos[3] | Filipe Vieira Kwiatkowski[1] | Rafael Vieira Kwiatkowski[1] | Diego Carvalho Duarte Mari[1] | Brenno Giovanni Hernando Vidotti[2] | Maikele Ertel[2] | John Carlos Claros Terraza[2] | Evelyn Carolina Suquebski Dib[3] |

[1] Medical Student at Faculdade Pequeno Príncipe

[2] Resident in Surgical Oncology at Hospital do Rocio

[3] Surgical oncologist at Hospital do Rocio

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ABSTRACT

Objectives: To describe a case of urinary bladder leiomyosarcoma (LMS), a rare malignant mesenchymal tumor. Less than 1% of primary bladder tumors are LMS, and only 200 cases have been reported in the literature, since the first description by Gusshaver, a century ago. **Methods:** A radical cystoprostatectomy, using Bricker reconstruction and rectosigmoidectomy was performed. In the intraoperative period, an extensive and hypervascularized mass was found, involving the abdominal wall and compressing the ureters and iliac arteries bilaterally. Resection of the extensive bladder and prostate lesion was permormed in monobloc. The resected material was sent to anatomopathological analysis, which characterized a pleomorphic sarcoma fusiform cell type with necrosis, measuring 30x25x13 cm. After immunohistochemistry, a grade I (stage II in the TNM classification) leiomyosarcoma was evidenced. **Results:** The patient remained hospitalized for 15 days in the Intensive Care Unit (ICU) after acute renal failure after surgery, requiring dialysis. He had a good evolution in the postoperative period, despite maintaining dialysis for chronic renal failure. On the 22nd postoperative day, he was constipated, but with a functioning Bricker and with no particularities in the surgical wound. **Conclusion:** Although the therapeutic approach to bladder LMS is not a consensus in the literature, a more radical treatment can be justified in the situation of an aggressive tumor, which often has a poor prognosis.

Keywords: bladder neoplasm, cystectomy, neobladder, leiomyosarcoma

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INTRODUCTION

Leiomyosarcoma (LMS) of the urinary bladder is a malignant mesenchymal tumor that originates from smooth muscle cells of the bladder. LMS of the urinary bladder is rare – less than 1% of all primary bladder tumors[1]. They are highly aggressive tumors that have been associated with substantial morbidity and mortality, which confers poor prognosis to these tumors if they are not treated early. There have been about 200 cases reported in the literature since Gusshaver first described it a century ago[2].

The following case report was performed due to the small incidence of LMS in the urinary bladder and by the surgical approach used in the treatment, considering there is no consensus in the literature about the therapeutic management of this kind of tumor.

CASE REPORT

N.C., 43 years-old, male, white, Brazilian, referred to the Oncology Service of Hospital do Rocio due to the presence of a pelvic mass associated with abdominal pain, weak urine stream, chronic kidney failure, and hematochezia. The patient had undergone transurethral resection (TUR) six years before due to vesical leiomyosarcoma, in another service and had not continued his follow-up. He had not performed adjuvant radiation therapy back then. He had undergone a new TUR in another service about two months before the appointment in our service. The histopathological examination of the resected lesion in the bladder neck showed no histological abnormalities that could suggest malignancy.

The patient had no family history of cancer. He used to work as a metallurgist and reported exposure to heavy metals, with a history of alcoholism, smoking and high blood pressure. Previous colonoscopies showed voluminous hemorrhoids.

During the appointment, the patient was alert and oriented, appeared moderately ill, presented a mild conjunctival pallor, but no scleral icterus. Physical examination showed a globose and soft abdomen, presenting a pelvic mass of around 20 cm, which was palpable at the umbilical scar. Lab exams evidenced creatinine of 4.31 mg/dL (reference value: 1.5 mg/L).

The pelvic and upper abdominal magnetic resonance imaging (MRI) previously performed in another service showed an expansive and lobulated lesion, with partially defined limits, located in the pelvic cavity with its center in the anterior extraperitoneal space, without a cleavage plane with the prostate and compressing the bladder, reducing its capacity. It extended upwards to the upper abdomen by bulging out anteriorly and arching the rectus abdominis muscles, but without signs of infiltration. Posteriorly, it extended to the rectum bilaterally, compressing the mesorectal fascia. Laterally, it occupied the obturator region and surrounded the peripheral region of the prostate and seminal vesicles. Was asymmetric and presented a larger volume to the left of the midline, compressing the left external iliac vein. The lesion was hypointense in T1 and showed heterogeneous signal characteristics and contrast enhancement in T2, presenting multiple nonenhancing hypointense areas in its interior, which are compatible with necrosis. The lesion measured around 23.3 x 17.8 x 13.2 mm. There was no compression of the pyelocalyceal system.

Contrast-enhanced computed tomography (CT) of the abdomen was performed around one month and a half after the abdomen and pelvis MRI, showing a large pelvic lesion invading the bladder, prostate and rectum with compression of the pyelocalyceal system that measured 14x20 cm. Contrast-enhanced CT of the chest was within the normality parameters.

The proposed surgical treatment comprised a radical cystoprostatectomy and reconstruction with the creation of an ileal conduit. In the intraoperative period, we found an extensive hypervascularized mass in the bladder, involving the abdominal wall and compressing the ureters and iliac arteries bilaterally. Monobloc resection of the lesion was performed together with segmental resection of the rectus abdominis muscle and primary closure without the need of reconstruction using meshes and/or patches. The compression of ureters was extrinsic, i.e. they were not invaded as the iliac arteries, therefore it was not necessary to use grafts for reconstruction. Lymphadenectomy was not performed. The ureters presented proper length for the ileal conduit construction, and segment of around 20 cm of terminal ileum was used for this purpose. The ureters were catheterized with a 16 FR nasogastric tube, which was exteriorized through the stoma and removed after 21 days.

The surgical procedure lasted around two hours with an estimated bleeding volume of 1 L, needing transfusion of one concentrate of red blood cells. The use of vasoactive drugs was not necessary.

The histopathological analysis revealed a pleomorphic sarcoma fusiform cell type with necrosis, measuring 30x25x13 cm and weighing 4.4 kg that was infiltrating the vesical wall externally. The mitotic index was seven mitoses per 20 high power fields. The prostate, the seminal vesicles and the vas deferens were free of tumor cells. The material was sent for immunohistochemical analysis that showed grade 1 LMS, stage II, in the TNM staging classification.

The patient remained hospitalized for 15 days in the Intensive Care Unit due to the development of acute-on-chronic kidney disease after surgery, which required dialysis (Clavien-Dindo IVa complication, according to the classification of surgical complications by Dindo *et al.*)[3]. Improved in the postoperative period, despite maintaining the chronic kidney disease requiring dialysis. By the 22nd postoperative day, the patient was still constipated, but presented functioning Bricker and no particularities in the operatory wound.

Was then referred to chemotherapy and adjuvant radiation therapy, which began three months after surgery. The chemotherapy plan was three cycles of 75 mg/m^2 cisplatin and 175 mg/m^2 paclitaxel.

Around seven months and a half after surgery, a large incisional hernia was found (Clavien-Dindo IIIa complication, according to the classification of surgical complications by Dindo *et al.*)[3] and, therefore, expectant therapeutic management was chosen.

DISCUSSION

LMS is a malignant mesenchymal tumor that presents controversies regarding the epidemiological profile of its patients. In a study carried out by Yamada *et al.*, this tumor is more prevalent in the male gender (56% vs 44%), in middle-aged patients or in the elderly, with a mean age at diagnosis of 65[1,4,5]. However,

in a review carried out by Ribeiro *et al.*, similar to the study by Yun Fei Xu *et al.*, LMS of the urinary bladder presents a higher incidence in women of reproductive age, which may suggest the hypothesis that hormones can have a role in the tumor pathophysiology[6,7]. A series of cases by Rodriguez *et al.* describes that the incidence of LMS in the urinary bladder is around 0.23 cases to every 1 million residents, thus reinforcing its rarity[8].

Several risk factors have been suggested for the development of LMS, the main ones include mutation of the retinoblastoma gene, systemic chemotherapy with cyclophosphamide and pelvic radiation therapy[2,9].

Common clinical manifestations of LMS include dysuria, massive hematuria and/or abdominal pain. Hematuria is usually painless and is the most common symptom (affects around 80% of patients)[2], followed by urinary frequency and dysuria, abdominal mass, and suprapubic discomfort[6]. There may be obstructive symptoms, depending on the size of the tumor[5,10,11]. The most common locations of the LMS of the urinary bladder are the dome (50%) and the lateral walls (25%), and it is relatively rare in the vesical trigone. Most of these tumors are restricted to the submucosa, and a few of them affect the muscularis propria, extend beyond the vesical wall or are multifocal[7].

Less than 15% of LMS are identified in the early stages (T1)[11]. The diagnosis usually occurs in the advanced stage: 50% of the patients already present a locally advanced disease or distant metastases. This happens because more than 60% of the tumors show aggressive characteristics and usually metastasize early[6]. The most common distant metastases sites are lung, liver, bones and brain[7]. Prognosis in these cases is very poor, especially in areas with poorly differentiated histology and previous non-surgical treatment[8]. In an analysis of 35 patients with LMS of the urinary bladder by Rosser *et al.*, the overall survival rate in five years was 62%[10]. Another study carried out by Rodríguez *et al.* showed a mean overall survival rate of 46 months, with a 47% survival rate in five years, which dropped to 35% in ten years[8].

TUR is essential for the diagnosis and staging of bladder tumors, considering it allows the determination of the histological type, lesion depth, and histological grade. In addition, it is curative for tumors invading the lamina propria (sub-epithelial connective tissue), which correspond to T1a stage tumors[12].

There is no consensus about the treatment for LMS, but aggressive surgery has been the most commonly employed treatment. The gold-standard surgical technique involves en bloc resection of the bladder together with the prostate and seminal vesicles in men. In women, bloc resection of the bladder with the uterus, uterine cervix, and vaginal vault in women, associated with bilateral pelvic lymphadenectomy. The removal of the urachus and peri-vesical fat that involves the upper vesical dome is also recommended. Patients with locally advanced disease may benefit from neoadjuvant chemotherapy[2,7]. The counterpoint of the aggressive surgical approach resides in the probable loss of vesical function and subsequent loss of quality of life[6].

Radical cystectomy is the surgical procedure of choice for treating invasive tumors of the bladder. The most common indication for this procedure is a muscle-invasive bladder tumor (T2 or more) without evidence of distant metastases[13]. In general, this includes resection of margins free of tumor invasion measuring around two to three cm and is followed by adjuvant radiation therapy and chemotherapy[14].

It is also necessary to reconstruct the bladder for maintenance of urinary function. Reconstructions can be classified in internal or external and continent or incontinent. The two main techniques include the Bricker ileal conduit and Studer neobladder. Studer neobladder technique involves the creation of a continent orthotopic bladder using a portion of the ileum and provides more quality of life for the patient, considering it is more similar to the regular micturition physiology[15]. Bricker ileal conduit technique, on the other hand, uses a segment of the ileum, to which ureters are anastomosed to create a urinary diversion to an incontinent stoma[16]. During preoperative planning, the reconstruction technique (Bricker or Studer) to be performed is chosen, which depends on factors such as patient's age, clinical condition, oncological condition, preoperative continence, adjuvant treatment need, patient and surgeon's preference[13]. However, the choice may change according to the intraoperative conditions.

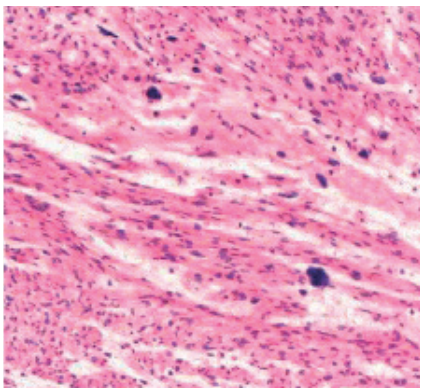
Partial cystectomy is considered an alternative procedure to radical cystectomy, given it presents benefits such as the preservation of the bladder's function and lower morbidity to the patient[14]. It is generally indicated for young patients with small-sized tumors. To be eligible for partial cystectomy, the patient must have a T1 (tumor involving the lamina propria) or T2 (tumor invading the muscularis propria) tumor, comprised of small masses (smaller than four centimeters) at stages one or two in the Memorial Sloan-Kettering Staging System for Soft Tissue Sarcomas (reproducted in Table 1)[17]. Moreover, these tumors shall not be located on the neck or trigone of the bladder[7].

Partial cystectomy has been associated with higher rates of tumoral recur-

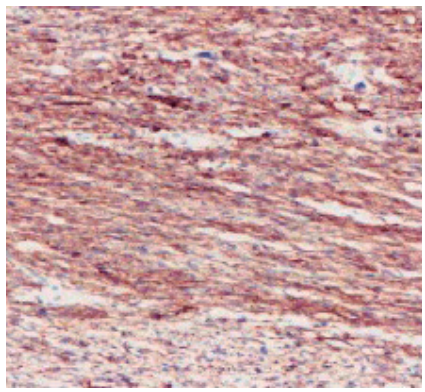
TABLE 1 - Memorial Sloan-Kettering Staging System for Soft Tissue Sarcomas.

PROGNOSIS	FAVORABLE	UNFAVORABLE
Size (cm)	Smaller than five centimeters	Bigger than five centimeters
Invasion depth	Superficial	Profound
Histological grade	Low	High

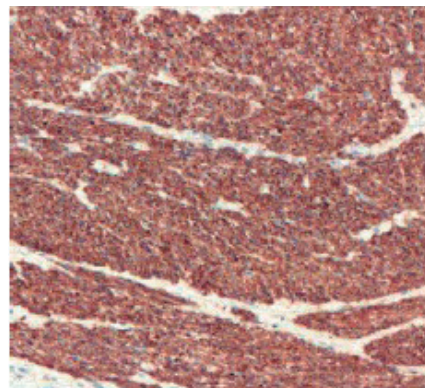
Stage 0: tumors that present three favorable signs; stage 1: two favorable signs; stage 2: one unfavorable sign or one favorable sign and two unfavorable signs; stage 3: three unfavorable signs; stage 4: presence of distant metastases. Source: modified from Aljabab, A, S. *et al.*[17]



CELLS DISPOSED IN FASCICLES (A)



DESMIN (B)



CALDESMON EXPRESSION (C)

The images above are part of the medical record of the case report. Pleomorphic sarcoma fusiform cell type constituted by cells disposed in fascicles and showing moderate nuclear pleomorphism (A). The mitotic index is 6 per 10 high-power fields. Immunohistochemistry was positive for desmin (B), Caldesmon (C) and 1A4 expression.

TABLE 2 - Transcription of the conclusion of anatomopathological report

ANTIBODIES	RESULTS
Desmin (intermediate muscle cell filament)	Positive
Caldesmon	Positive
Smooth muscle actin	Positive
Protein s-100	Negative
cd117 - gene kit product	Negative
mdm2	Negative

rence that varies between 40 and 80%, based on a series of case reports. However, overall survival is equivalent when compared to radical cystectomy[12]. Strander *et al.*[18] and Cumplido *et al.*[19] reported that adjuvant radiation therapy with or without associated adjuvant chemotherapy after partial cystectomy is capable of improving the LMS of the urinary bladder prognosis.

The overall local recurrence rates vary between 16 and 34% in 38 months, and most of them occur in the pelvis[2,6]. In this scenario, the treatment is based on systemic chemotherapy, associated or not with external pelvic radiation therapy[2].

Patients with a locally advanced disease may benefit from neoadjuvant chemotherapy, and the main drugs employed include doxorubicin, ifosfamide, cisplatin, adriamycin, and vincristine[12].

The best prognostic factor is the presence of free surgical margins. Other favorable prognostic factors, based on the study carried out at the Memorial Sloan-Kettering Cancer Center, include tumor size < five centimeters, low histological grade, and bladder or para-testicular tumor location[2,17,20].

Strict follow-up with CT of the abdomen and pelvis, chest X-rays and cystoscopy (in cases where the patient underwent partial cystectomy) are very important, especially in the first postoperative year, in order to early diagnose tumoral recurrences and distant metastases early[7,14]. However, one of the limitations of this study was the impossibility of including the patient's preoperative abdominal CT due to internal problems of the service where the patient was operated.

CONCLUSION

Although the LMS of the urinary bladder therapeutic approach is not a consensus in the literature, choosing an aggressive treatment modality may be justifiable, because this tumor is aggressive and has a poor prognosis. Nonetheless, less aggressive modalities are becoming more viable, considering they can improve patients' quality of life with the same survival rate in comparison with a more aggressive treatment. Therefore, LMS of the urinary bladder is a rare tumor, and long-term studies are required in order to compare the efficacy of the surgical resection modalities and the benefit of adjuvant therapies in its treatment.

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INFORMATION ABOUT THE ARTICLE

Faculdades Pequeno Príncipe

Mailing address:
Avenida Iguaçu, 333
CEP: 80230-020 – Curitiba, PR, Brasil

Corresponding author:
Amanda da Silva Anjos
anjosacademico@outlook.com

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PROFILE OF PATIENTS UNDERGOING SURGERY FOR PROXIMAL FEMORAL FRACTURES AND ITS ECONOMIC IMPACT ON PUBLIC HEALTH IN THE STATE OF SÃO PAULO

Perfil dos pacientes submetidos ao tratamento cirúrgico para fraturas do fêmur proximal e seu impacto econômico na saúde pública do estado de São Paulo

João Henrique Almeida Costa[1] | Isaías Duarte Mesquita Júnior[1] | Gustavo Gonçalves Arliani[2] | Carlos De Nigris González[3] | Edmilson da Silva Reis[3] | Gustavo Trigueiro[3] | Gabriel Ferraz Ferreira[3] |

[1] Medical Resident of Orthopedics and Traumatology. Instituto Prevent Sênior, São Paulo, Brazil

[2] Program director of the Orthopedic Surgery Residency Program. Instituto Prevent Sênior, São Paulo, Brazil

[3] Orthopedic surgeon. Preceptor of the Orthopedic Surgery Residency Program. Hospital Sancta Maggiore Mooca, São Paulo, Brazil

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ABSTRACT

Objectives: To identify and evaluate the epidemiological profile of patients that underwent surgery for proximal femoral fractures and to analyze data regarding their hospitalization, such as length of hospital stay and costs, in public hospitals in the State of São Paulo, Brazil. **Methods:** This is a retrospective and descriptive population study, which included patients hospitalized with proximal femoral fractures that underwent surgery from April 2018 to March 2019, in hospitals belonging to the Brazilian Public Health System (SUS), in the State of São Paulo, Brazil. We analyzed the Prior Authorization Letters registered in the Hospital Information System of the Brazilian Public Health System (SIHSUS). The DATASUS tabwin32.exe software, developed by the Brazilian Ministry of Health, was employed for data gathering. **Results:** We found a total of 10,118 surgical procedures for proximal femoral fractures, with a predominance of the trochanteric region, with 63.69%; female sex, with 58.69% and white race, with 68.65%. Regarding the age groups, 38.8% of patients were older than 80 years. Most patients (18.33%) came from the state of São Paulo capital, where most of the surgical procedures were performed (4.95%), followed by the city of Ribeirão Preto (2.12%). Most patients (41.76%) stayed in the hospital for four to seven days and the majority did not need to be transferred to an Intensive Care Unit. Among the outcomes at hospital discharge, 65.96% showed clinical improvement, while 4.17% died. The mean cost of each surgical procedure was BRL 2,355.63, while the total amount spent on surgeries for intertrochanteric fractures corresponded to 68.3% of the total expense on surgeries for femoral fractures, which reached BRL 23,834,300.58. **Conclusion:** Proximal femoral fractures should be monitored by health authorities given their great impact on the health of the elderly, in addition to the costs involved. The implementation of interventions aimed at preventing these injuries can result in the reduction of their negative impact. Orthopedic care services should optimize the care for these patients, who present long hospital stays, which can increase their morbidity and mortality.

Keywords: Proximal femoral fractures. Elderly. Epidemiology. Brazilian Unified Health System.

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INTRODUCTION

The incidence of proximal femoral fractures significantly increased in the last decades and is an important external cause of death and morbidity, especially in the elderly[1,2,3]. These fractures are associated with low-energy trauma, such as fall of own height[1,4,5,6], and increase in incidence as age progresses[7].

This type of fracture represents 84% of the acute bone lesions observed in people older than 60 and is considered a public health issue, involving excessive medical and hospital expenses. Moreover, it results in family and social problems in this population[3,4], causing impacts on quality of life and functional status. 41.8% of these patients die in up to two years[8]. In the study carried out by Guerra *et al.*[9], the mortality rate of patients undergoing surgical procedures for proximal femoral fractures was 23.6% and the main comorbidities associated with this outcome were anemia and dementia.

Proximal femoral fractures are divided according to the local anatomy. The most important types are: femoral transcervical fracture, intertrochanteric fracture and subtrochanteric fracture[8]. Surgery is indicated in most cases, whereas non-surgical treatment is reserved for patients who have incomplete fractures with no deviation, on a case-by-case basis, or when there are no clinical conditions for the procedure[10,11]. A period between 24 and 48 hours after the fracture is ideal for the surgical procedure, considering the patient's general health condition[12,13,14,15,16,17].

Several studies point out advanced age, male gender, physical condition, and treatment delay as risk factors for increased mortality in these patients[14,18,19]. Presence of ambulatory disability before the fracture, cognitive impairments, a second fracture, poor functional status at hospital discharge, lack of vitamin D replacement, bisphosphonates use are associated with poor outcomes and increased risk of fractures[18,20,21].

Studies on the economic impact of hip fractures in elderly patients in Brazil are still scant. Oliveira *et al.*[22] carried out a study on the epidemiology and costs of hip fractures in the elderly population in the State of Paraná, Brazil, identifying 11,226 fractures in the year 2012, 66.8% of which were seen in women. The rate of mortality during hospitalization reached 5.9% in this study and was higher in males, in patients older than 80 years and in black Asians ethnicities. The authors also reported a total expenditure of BRL 29,393,442.78 with surgeries for proximal femoral fractures, with an average cost per hospitalization of BRL 2,618.34.

Hence, in this study, we aim to identify and evaluate the epidemiological profile of patients with proximal femoral fractures. We also report the data regarding their hospitalization, such as length of hospital stay and costs, in public hospitals in the State of São Paulo, Brazil.

METHODS

This is a retrospective and descriptive population study, which included patients hospitalized with proximal femoral fractures that underwent surgery from April 2018 to March 2019, in hospitals belonging to the Brazilian Public Health System (SUS) in the State of São Paulo, Brazil.

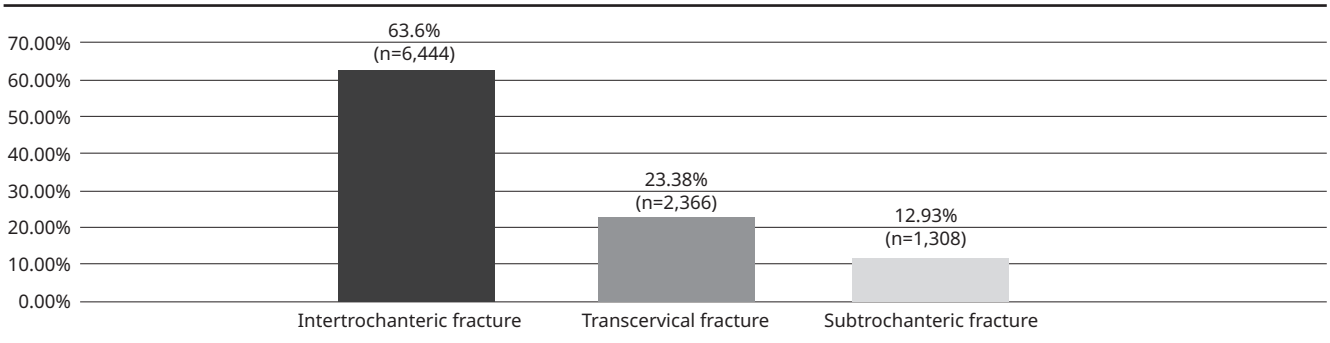
The variables included were: type of fracture, gender, ethnicity, age, place of origin and of hospitalization, length of hospital stay, need for Intensive Care Unit (ICU) admission, reasons for hospital discharge, and costs per surgical procedure. Cases of pathological fractures of the femur were removed from the study. Prior Authorization Letters (AIH) registered at the Hospital Information System of the Brazilian Public Health System (SIHSUS) were analyzed. The DATASUS (SUS database) tabwin32.exe software, developed by the Brazilian Ministry of Health, was employed for data gathering. The DATASUS provides relevant data for the implementation of public health policies, such as access to health services, quality of care, morbidities, information about public health care, the register of hospital and outpatient services, demographic and socioeconomic data as well as information about healthcare funding and costs.

RESULTS

A total of 10,118 surgical procedures were performed for the treatment of proximal femoral fractures, the majority of which (63.6%) were located in the intertrochanteric region (Figure 1).

The incidence was higher in female patients, who corresponded to 58.69% (n = 5,938) of the sample. Regarding ethnicity, there was a predominance of white patients, who represented 68.65% (n = 6,946) of the sample, followed by *pardos* (Brazilian terminology for a person of mixed ethnic ancestry), with 17.32% (n = 1,727). Regarding the age group, 38.8% of the patients were over 80 years old (n = 3,934), while 23.29% were between 70 and 79 years old (n = 2,421) and 15.36%, between 60 and 69 years old (n = 1,555).

FIGURE 1 - Distribution of surgical procedures performed for the treatment of proximal femoral fractures, according to their type, between April 2018 and March 2019



Most patients (1,855 or 18.33%) came from the state of São Paulo's capital, where most of the surgical procedures were performed (501 or 4.95%), followed by the city of Ribeirão Preto (214 or 2.12%) and by the city of Presidente Prudente (210 or 2.08%).

As for the length of hospital stay, most patients (4,244 or 41.76%) stayed in the hospital for four to seven days, whereas 2,640 patients (26.09%) stayed for eight to 14 days (Figure 2).

Most patients (6,583 or 65.06%) did not require admission in the ICU (Figure 3). Regarding the reasons for hospital discharge, 6,674 (65.96%) of the patients were discharged after clinical improvement, 1,793 (17.72%) were discharged with scheduled appointments for follow-up and 422 (4.17%) died.

The average total cost per procedure during the period of reference was BRL 2,355.63. Among the types of fractures, the surgery of the intertrochanteric fractures presented the highest total value of hospital fees (hospital and professional services fees), according to the SUS fee schedule, reproduced in Table 1. Thereby, the surgeries for intertrochanteric fractures corresponded to 68.3% (BRL 16,279,415.02) of the total expenditure on surgeries for proximal femoral fractures, which reached BRL 23,834,300.58 during the reference period. The expenditure on

FIGURE 2 - Distribution of the length of hospital stay, from April 2018 to March 2019.

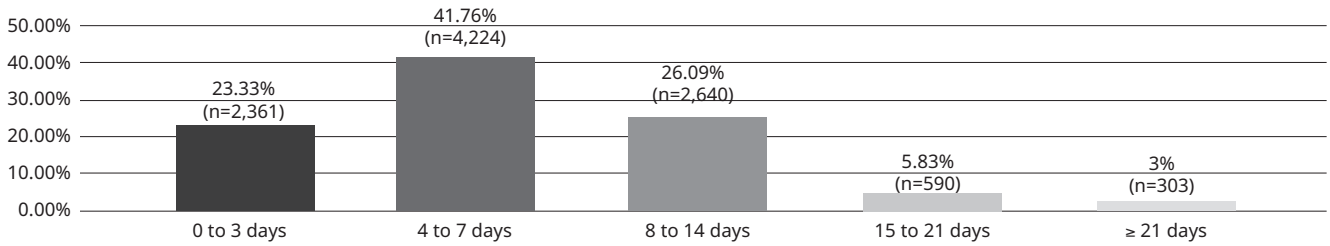


FIGURE 3 - Need for ICU admission in the postoperative period of patients undergoing surgical treatment for proximal femoral fractures, from April 2018 to March 2019.

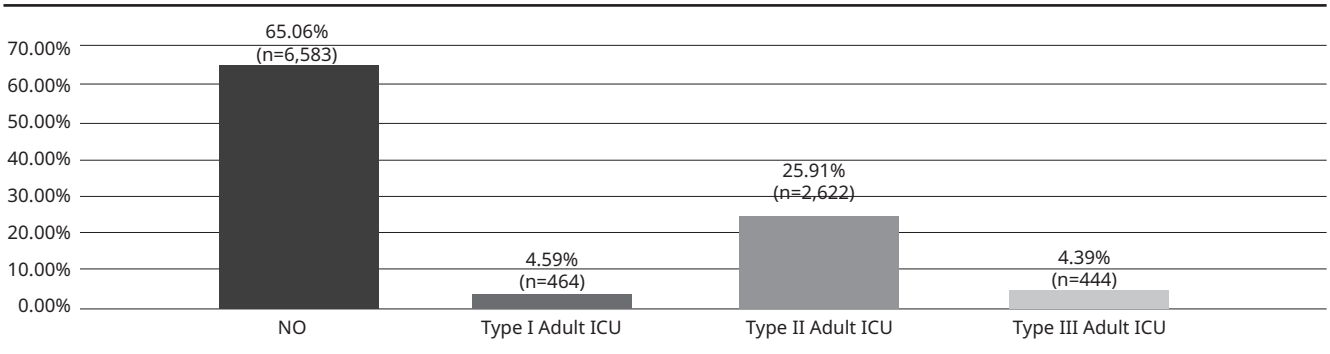


TABLE 1 - Fees per surgical procedure for proximal femoral fractures according to the SUS fee schedule - Exercise from April/2018 to March/2019. SUS Table.

PROCEDURE CODE - SUS FEE SCHEDULE	PROCEDURE TYPE	HOSPITAL SERVICE FEE	PROFESSIONAL SERVICE FEE	HOSPITAL TOTAL FEE
04.08.05.063-2	Surgical treatment of intertrochanteric fracture	BRL 725.17	BRL 247.80	BRL 972.97
04.08.05.048-9	Surgical treatment of proximal femoral transcervical fracture/physeal lesion	BRL 715.22	BRL 246.63	BRL 961.85
04.08.05.061-6	Surgical treatment of subtrochanteric fracture	BRL 534.15	BRL 225.27	BRL 759.42

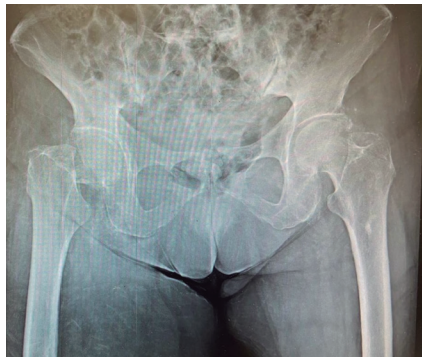
surgeries of femoral transcervical fractures, on the other hand, corresponded to BRL 4,673,704.04 (19.6% of the total), followed by the expenditure on surgeries for subtrochanteric fractures, which totaled BRL 2,881,181.52 (12% of the total).

DISCUSSION

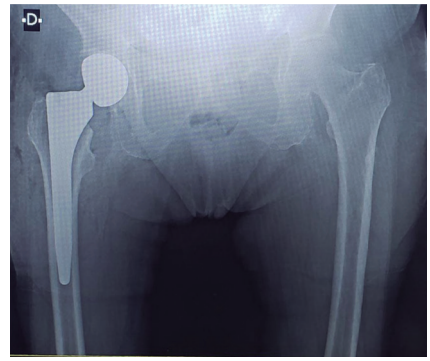
In this study, important clinical and epidemiological characteristics of proximal femoral fractures could be observed. Regarding the classification according to the anatomical location, intertrochanteric fractures corresponded to more than 60% of all fractures in this study, a value slightly higher than those observed in some studies in the literature[3,21], which varied between 45% and 50.4%. The predominance of patients older than 80 years found in this study is in accordance with the literature[13,24], as reported by authors who observed mean ages ranging from 78.2 to 79 years[6,23]. Since these fractures are caused by low-energy traumas and are associated with the longevity of the population, an increase in their incidence is expected[7], especially in Brazil, as the Brazilian population is aging rapidly.

Regarding gender and ethnicity, female and white patients predominated in our sample, a finding also in line with those reported in the literature, which describes an incidence of two to eight times higher in women[18,19,20,24]. Factors such as greater exposure to domestic activities, higher prevalence of osteoarthritis, deficits in anthropometric indices, genetic factors and the diagnosis of osteoporosis were pointed out as contributing to the greater vulnerability of women to proximal femoral fractures[21,22,23].

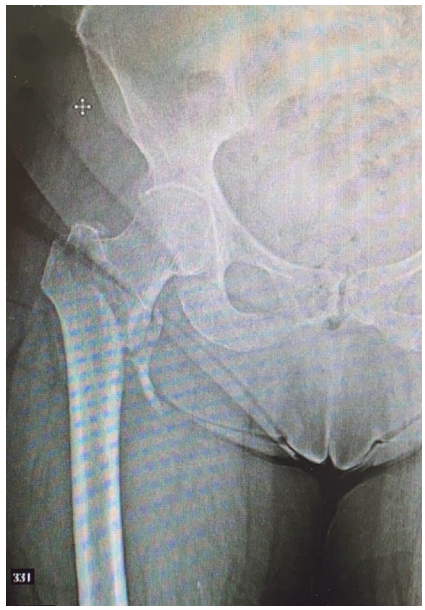
As for the length of hospital stay, the majority of patients of our sample remained hospitalized for four to seven days. Astur *et al.*[2], in turn, reported hospital stays ranging from one to 101 days, in a hospital in São Paulo, whereas 53.2% of patients remained hospitalized for a period longer than seven days. In this study, the average length of hospital stay was 10.7 days, while other studies reported averages of up to 13.5 days[20,24]. This prolonged length of hospital stay can be attributed to factors such as the delay in performing surgery, social issues, poor public health management, as well as low resource availability due to public health underfunding.



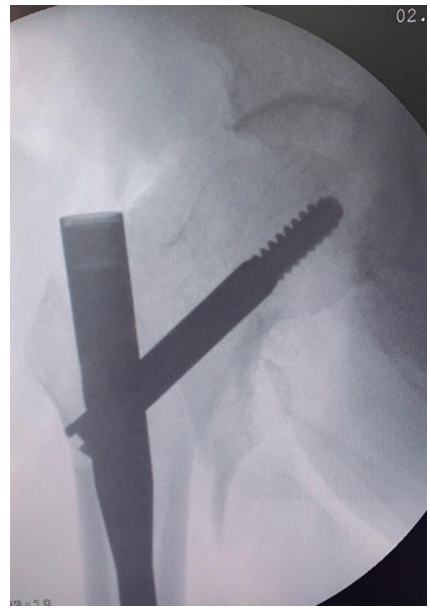
93-year-old patient. Preoperative X-ray: fracture of the right femoral neck



93-year-old patient. Postoperative X-ray: partial right hip arthroplasty

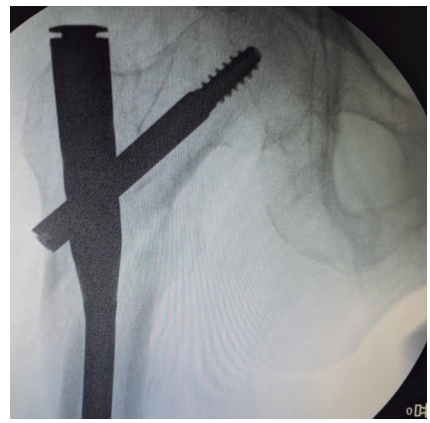


Preoperative X-ray: intertrochanteric fracture of the right femur



Postoperative X-ray: osteosynthesis of proximal femur using Proximal Femoral Nail (PFN)

Preoperative 90-year-old patient: subtrochanteric fracture of the right femur



90-year-old patient, postoperative X-ray: osteosynthesis of proximal femur using long proximal femoral nail

Regarding the need for intensive care, most patients did not need an ICU referral, probably because there were no complications during the intraoperative period or because the majority were not critically ill before surgery. However, in the postoperative period, 30.5% of patients needed a referral to a type I or II ICU (according to the Brazilian classification system). In its Ordinance Nº. 3,432, of August, 12, 1998, the Brazilian Ministry of Health established minimum requirements for the accreditation of ICU beds and criteria for their classification. Thus, the ICUs accredited after the publication of this ordinance, having fulfilled the required criteria for the care of critically ill patients, were classified as type II or III, according to their complexity. In turn, the ICUs previously accredited, that is, without going through the requirements established by the Ministerial ordinance, were classified as type I[25]. Consequently, of the patients who required ICU in our sample, about 87% were referred to ICU beds that presented the complexity required by the Ministry of Health for the delivery of proper intensive care, that is, types II and III ICUs.

At hospital discharge, most patients presented favorable clinical outcomes after surgical correction and less than 5% of patients died. Although in-hospital mortality rates present great variability in the literature, Brazilian studies in the states of Rio Grande do Sul and Rio de Janeiro reported rates of 5.55% and 8.9%, respectively[8,18]. In the state of São Paulo, in a high complexity service, in-hospital mortality rate reached 7.1%[20]. International studies, on the other hand, reported rates of 4.5% in Denmark[3] and 2.7% to 4.5% in the United States[3,26], values that are closer to the rate we report in this study. Risk factors for in-hospital mortality reported in the literature were: shock, presence of heart disease and diabetes mellitus[26]. Moreover, the delay in performing surgery represents an important risk factor for mortality and complications, which is potentially modifiable[26]. This fact represents a warning about the excessive delay in performing surgery in the Brazilian public health system, which may explain the higher mortality rates observed in Brazil. While the literature indicates 12, 24 or 48 hours as an ideal waiting time, depending on the clinical condition of the patient, in general, patients from the Brazilian public health system waited for an average of 7 days for surgery[20].

As for the expenditure of the Brazilian public health system, a survey carried out between 2008 and 2016, pointed out that the total cost of hospitalizations for hip fractures totaled BRL 810,774,576, or an yearly average of BRL 90,000,000. In the same period, these expenditures increased by 120%, with an expected additional increase of 74% between 2016 and 2026. Furthermore, it is estimated that the total expenditure of SUS with hip fractures will reach an accumulated total of BRL 2.5 billion between 2008 and 2026[27]. The same authors reported an average cost per procedure of BRL 2,207[26]. for the entire Brazilian territory, while a value of BRL 2,198.50 was observed in the Federal District, in the same period[27]. A study carried out in the state of Paraná, on the other hand, reported, in a similar period (2010-2014), an average cost of BRL 2,618.34 per hospital stay[28]. Thus, the value of BRL 2,355.63 observed in our sample, in the state of São Paulo, is at an intermediate level between the national average and the highest values reported in the state of Paraná. The findings demonstrate that, despite the variability costs present across the country, hospital care for proximal femoral fractures has a major economic impact on the system. Due to the epidemiological characteristics of the disease, with the increase in life expectancy of the Brazilian population, an increase in the number of hospitalizations for proximal femoral fractures is expected, contributing to the increase of the financial burden of the Brazilian public health system.

Despite providing an overview of proximal femoral fractures in the state of São Paulo, Brazil, this study has important limitations. First, it is a descriptive study and, therefore, possible variables that could be associated with the data presented, such as risk factors for in-hospital mortality and longer hospital stay were not analyzed. However, it is worth noting that the necessary data for this type of analysis should be retrospectively obtained from individual medical records, as it is not available in the database we used, SIHSUS. If performed, this type of analysis would hardly encompass the sample size we analyzed in this study, that is, all surgical procedures for proximal femoral fractures performed in the State of São Paulo. In addition, we also point out as limitations of this study the lack of technical details regarding the surgeries performed, as well as details about the follow-up of these patients. These observations highlight the importance of improving and unifying the repositories of clinical data of SUS, as it happens in other foreign public health systems, especially in Scandinavian countries.

Nevertheless, the results we report in this study represent an alert for health authorities, due to the great impact of proximal femoral fractures on the health of the elderly and because of their important economic impact, resulting both from health care costs and from the disability caused by these fractures. Thus, it is essential to outline the demographic profile and statistics of hospitalizations of patients with proximal femoral fractures, so that the planning of novel public policies aimed at promoting health and preventing these injuries may be improved.

CONCLUSION

Most of the patients in this study were over 80 years old and female, which is a finding consistent with the epidemiological characteristics of proximal femoral fractures. The surgeries were concentrated in the capital of the State of São Paulo, which has a greater number of institutions with specialized services, necessary for this type of medical assistance, in addition to greater population demand. The hospital mortality rate observed in the sample was lower than that reported in other studies conducted in Brazil, but higher than that observed in developed countries. This finding must be analyzed in light of other factors, such as the time required to perform surgery, which is high in the Brazilian public health system, resulting in an important negative impact in terms of public health. Regarding the economic impact, the costs of proximal femoral fractures are high for the system and their tendency is to increase with the aging of the Brazilian population. In this scenario, it is essential that authorities institute public policies that improve the clinical outcomes and mitigate the financial impact of this disease.

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There is no conflict of interests to declare.

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INFORMATION ABOUT THE ARTICLE

Instituto Prevent Senior

Mailing address:
Rua Casa do Ator, 1060
CEP: 04546-030 – São Paulo, SP, Brasil

Corresponding author:
João Henrique Almeida Costa
joao_hen@hotmail.com

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