

Surgery course load in Brazilian medical schools

Carga horária de cirurgia em escolas médicas do Brasil

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ABSTRACT

Introduction: Surgery is an important curricular component of undergraduate medical courses. This study was conducted because the surgery course load in Brazilian medical has not been systematically explored at the national level.

Objective: To analyze the surgery course load in Brazilian medical schools.

Method: A cross-sectional, descriptive study was carried out with Brazilian medical schools acknowledged by the Ministry of Education, which had begun their activities prior to December 31, 2017 and, as of September 2018, had their curriculum matrix and/or political-pedagogical project with the surgery course load available on the internet. The variables studied were total medical curriculum course load and surgery course load before and during clerkship, as well as the schools' geographic region and fee status. Data analysis was performed using descriptive statistic Student t-test, analysis of variance, and Mann-Whitney U and Kruskal-Wallis tests, with the null hypothesis rejected for $p < .05$.

Results: The study included 205 of the country's 323 existing medical schools, of which 175 had available information on the surgery course load during the clerkship, 157 before the clerkship, and 129 had information on course load before and after the clerkship. The median total surgery course load in hours was 815.0 ($P_{25-75} = 677.5 - 992.0$; minimum = 340.0 h; maximum = 1,665.0), while the mean surgery course load before clerkship in hours was 268.7 (SD = 140.3; minimum = 32.0; maximum = 780.0), with no difference between geographic regions or fee status. During the clerkship, the median course load was 540.0 hours ($P_{25-75} = 400.0 - 712.0$; minimum = 170.0 h; maximum = 1,410.0), with no difference between geographic regions, but with higher values in medical schools with no tuition fees. Regarding the total curriculum course load, the mean percentage of the surgery course load before clerkship was 3.2% (SD = 1.7), the median percentage during the clerkship was 6.4% ($P_{25-75} = 5.0 - 8.2$), the median percentage of the total surgery course load was 6.4% ($P_{25-75} = 5.0 - 8.2$), and the median percentage of surgery course load (both periods) was 9.7% ($P_{25-75} = 8.3 - 11.8$ %).

Conclusions: Despite the considerable variation in the surgery course load limits, the median of total surgery and the mean of surgery course load before clerkship were similar across geographic regions and fee statuses. The median surgery course load during clerkship was also similar across regions but higher in tuition-free medical schools. The values found in this study can help schools' administrators to assess and plan the surgery course load in their institutions.

Key words: Medical Education; Surgery; Curriculum; Course load.

RESUMO

Introdução: A cirurgia é um importante componente dos currículos dos cursos de graduação em Medicina. Este estudo foi realizado por não se conhecer a carga horária de cirurgia nas escolas médicas brasileiras.

Objetivo: Analisar a carga horária de cirurgia de escolas médicas brasileiras.

Método: Este estudo foi transversal e descritivo, realizado em escolas médicas brasileiras reconhecidas pelo Ministério da Educação que iniciaram atividades até 31 de dezembro de 2017 e disponibilizavam matriz curricular e/ou projeto político-pedagógico com carga horária de cirurgia na internet até setembro de 2018. As variáveis estudadas foram carga horária total e de cirurgia antes do internato e durante esse período, região geográfica e gratuidade das escolas. Os dados foram analisados por meio de estatística descritiva, teste t de Student, análise de variância e testes U de Mann-Whitney e de Kruskal-Wallis, rejeitando-se a hipótese nula quando $p < 0,05$.

Resultados: Foram incluídas 205 das 323 escolas médicas existentes, das quais 175 disponibilizavam carga horária de cirurgia no internato; 157, antes do internato; e 129, disponibilizavam ambas as cargas horárias. A mediana da carga horária total de cirurgia foi de 815,0 horas ($P_{25-75} = 677,5 - 992,0$; limites: 340,0 - 1.665,0 horas), e a carga horária média antes do internato foi de 268,7 horas (desvio padrão = 140,3; limites: 32,0 - 780,0), ambas sem diferença estatística por região geográfica ou gratuidade da escola. A mediana da carga horária do internato foi de 540,0 horas ($P_{25-75} = 400,0 - 712,0$; limites: 170,0 - 1.410,0), sem diferença estatística por região geográfica, mas maior nas escolas gratuitas. Em relação à carga horária total do currículo do curso, a porcentagem média da carga horária de cirurgia antes do internato foi 3,2% (desvio padrão = 1,7); a porcentagem mediana da carga horária de cirurgia no internato, 6,4% ($P_{25-75} = 5,0 - 8,2$); e a porcentagem mediana da carga horária de ambos os períodos foi de 9,7% ($P_{25-75} = 8,3 - 11,8$).

Conclusões: Apesar da variação nos limites extremos da carga horária de cirurgia, a mediana de seu total e sua média antes do internato são semelhantes por região geográfica e gratuidade da escola, e sua mediana no internato é também semelhante por região, mas maior em escolas médicas gratuitas. Os valores encontrados neste estudo podem ajudar os gestores na avaliação e no planejamento da carga horária de cirurgia em suas escolas.

Palavras-chave: Educação Médica; Cirurgia, Currículo; Carga Horária.

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INTRODUCTION

Surgery is one of the major areas of medicine and is a component of the undergraduate medical curricula around the world¹. In the past, a newly trained doctor was expected to be able to perform surgeries. However, the current expectation is that time spent on learning the details of specialized surgical techniques will be a relatively minor part of the curriculum, with advanced training taking place during a residency in surgery¹⁻⁴.

Several factors have contributed to this change in medical education and other areas of knowledge. In the 1970s, Bohoslavsky pointed out inadequate features in the existing model of university education in most parts of the world. There was a discrepancy between educational organization and the productive structure that generated professionals whose training was not aligned with the country's needs. There was also the segmentation of knowledge into fragments due to an ideological inability to see a more integrated reality in its complexity, which resulted in the formation of specialists in fragments of reality. As a consequence, there was a significant schism between knowing and doing, cognition and action, and university and reality⁵.

In medical education, this fragmentation was exacerbated by the curricular reform proposed by Flexner in 1910⁶, which was adopted by a majority of medical schools. In parallel, the acceleration in knowledge production has resulted in a progressive increase in medical curricula course load (CL) and students' overburdening with theoretical concepts^{7,8}.

In this context, global movements have been organized to align medical training to students' learning needs and the population's individual and collective healthcare needs. Building strength through the 1970s and 1980s⁹, these processes led to a series of initiatives, with projects, recommendations, and guidelines to medical courses beginning in the 1990s, such as Tomorrow's Doctors in the UK^{10,11}, CanMEDS in Canada¹², Outcome-Based Education¹⁴ and the Bologna Process¹⁵ in Europe, and Core Entrustable Professional Activities for Entering Residency in the USA¹⁶. The recommendations comprised the inclusion in the mandatory curriculum only of content considered essential, content integration, and pedagogical approaches that bridged theory and practice and provided meaningful learning, focusing on the competencies required for the practice of future medical professionals^{17,18}.

In Brazil, a national movement to change medical education resulted in the formation of a commission consisting of various institutions involved in medical education, called the National Interinstitutional Commission for the Evaluation of Medical Education (CINAEM), to evaluate medical schools at the national level¹⁹. The findings of this evaluation supported the collective dialog on necessary changes in medical education

and resulted in the creation of the National Curricular Guidelines (NCG) for undergraduate medical programs in 2001²⁰, which were reviewed in 2014²¹. Among their several recommendations, the NCG state that physicians have an ethical, critical, humanistic, and reflective profile, with competence to act as a general practitioner, attending population's individual and collective healthcare needs^{20,21}.

Particularly concerning surgery, the NCG do not provide specific content on surgery teaching. However, they list key actions of individual healthcare needs, including raising diagnostic hypotheses based on clinical-epidemiological reasoning, identifying prevalent emergencies, and acting autonomously and competently in this context. In addition, the NCG establish that surgery is an essential clerkship component²¹. Therefore, it is expected that medical students develop clinical-surgical reasoning during their training, diagnose pathologies that may require surgical intervention, and acquire skills to perform basic surgical procedures required by a general medical practitioner, such as sutures, drainage, and punctures^{7,8}.

The surgery CL and content have been the subject of international debates and studies. In the United Kingdom, a consensus among surgeons on the surgery content of undergraduate medical curricula stated that the surgery CL in their medical schools' curricula was insufficient, and more time was needed to ensure that students who received training would be competent in basic surgical procedures^{22,23}. In the US, an additional concern regarding the surgery CL was the reduction in the number of doctors choosing careers in surgery following a 30% reduction in the mandatory surgery CL in medical school clerkships in the 1990s^{24,25}.

In Brazil, the NCG do not set out CL limits before the clerkship for surgery or any other area²¹. Although this allows medical schools greater flexibility when planning curricula, there is a risk of including too much or too little content in particular areas due to professors' and administrators' choices. As noted by Lima-Gonçalves, the CLs assigned to each subject are crucially important for the curricular structure; however, they have been used as a bargaining chip in curriculum development to ensure each discipline's representativeness, even though contents are not essential to medical training frequently²⁶.

National guidelines drawn up by the Cuban Ministry of Education require that country's medical schools train doctors to perform surgeries of prevalent pathologies in the population. To prepare students with the necessary skills, the guidelines establish a 514-hour CL before clerkship and a 416-hour CL during the clerkship, totaling a CL of 930.0 hours²⁷.

A study with 26 medical schools from 16 European countries found that the minimum CL dedicated to surgery was 90.0 hours in Brussels (Belgium), and the maximum was

590.0 hours in Athens (Greece)⁴. Another study with 16 medical schools from six countries in southeastern Europe found a surgery CL before clerkship between 180.0 hours in Osijek (Croatia) and 480.0 hours in Sofia (Bulgaria)²⁸.

A study including 153 US medical schools conducted by the Association of American Medical Colleges (AAMC) found that the mean surgery CL was 270.0 hours before the clerkship and 720.0 hours during the clerkship, for a mean total surgery CL of 990.0 hours²⁹.

In Brazil, the undergraduate medical course at the Federal University of Santa Catarina (UFSC) changed its curriculum in 2003 to align it with the NCG^{21,30}. The curriculum is integrated and divided into modules. Adult surgery is taught throughout the Adult Health Module and pediatric surgery in the Child Health Module. The medical course curriculum has 7,670.0 hours, with a total surgery CL of 968.0 hours, comprising 355.0 hours before the clerkship, which includes 90 hours of surgical techniques and experimental surgery (STES), and 613.0 hours during the clerkship.

The literature gap on the surgery CL in Brazilian medical schools, important part of undergraduate medical curricula, has led us to the following research question:

- “How has the surgery CL been distributed in Brazilian medical schools?”

To answer this question, this study was conducted with the **objective** of analyzing the surgery CL in Brazilian medical schools.

METHODS

Design and Ethical Principles

This study was cross-sectional and descriptive. The research project was not submitted to the ethics committee because the data used are in the public domain. There are no conflicts of interest.

Population and Sample

The universe comprised all 323 existing Brazilian medical schools until September 2018, acknowledged by the Ministry of Education (MEC) and listed as of September 2018 on the e-MEC website <http://emec.mec.gov.br>³¹. The inclusion criteria were having started academic activities before December 31, 2017 according to the e-MEC records, having a curriculum matrix or political-pedagogical project (PPP) available on the internet, and having information on the surgery CL.

Data Collection

The data were collected between March and September 2018, with the information available on the

official website of each institution listed on the e-MEC website³¹. In cases where we did not find the curriculum matrix or PPP on the official school website, we searched for them online with the terms “university name” and “medicine” and (“curricular matrix” or “political-pedagogical project” or “course pedagogical project”).

The variables collected were curriculum organization, the school’s geographic region, administrative affiliation, curriculum organization, total mandatory CL, and mandatory surgery CL before and during the clerkship. We included the surgery CL, the General Surgery discipline, as well as the disciplines listed in the National Commission of Medical Residency (CNRM) matrix of the general surgery medical residency programs and the basic surgery prerequisite program³². These subjects comprised digestive tract surgery, plastic surgery, head and neck surgery, oncological surgery, vascular surgery, thoracic surgery, pediatric surgery, cardiac surgery, colorectal surgery, and urology. In addition, we included subjects that were part of STES and outpatient surgery, which were clearly surgery-related subjects.

The CLs were standardized as “clock/hours”, corresponding to an actual 60-minute hour. When the school specified that the class duration was different from the clock/hour, that time was calculated for the corresponding time in an actual hour. Before the conversion, some schools had one hour of class corresponding to 60, 50, or 45 actual minutes.

Data Analysis

The data were entered into a database and analyzed with SPSS Statistics 26.0 Premium software.

Data analysis was performed using descriptive statistics, including absolute and relative frequency for categorical data, central tendency measures, mean, standard deviation (SD), and the 95% confidence interval (95%CI) for variables with a normal distribution. For variables with non-normal distribution, the median and the 25th and 75th percentiles (P_{25-75}) were calculated. The minimum and maximum values were also provided when considered appropriate. The normality of the distribution of continuous variables was assessed using the Kolmogorov–Smirnov test, with values of $p \geq .05$ interpreted as normally distributed. The Student t-test (t) and analysis of variance (F) were used to compare the scores of parametric continuous variables between two groups. The Mann–Whitney U (U) test was used to compare the scores of two non-parametric continuous variables, and the chi-square (χ^2) in the Kruskal–Wallis test was used for comparisons between more than two groups. Statistical test results (STR) are given with the degrees of freedom (df) in brackets.

The null hypothesis was rejected for $p < .05$.

RESULTS

Out of 323 existing Brazilian medical schools, 205 had some surgery CL available on the internet (63.5%). Among these schools, 175 provided information on the clerkship CL (85.4%), 157 on the surgery CL before clerkship (76.6%), and 129 provided information on both periods (39.8%).

Among the 157 schools that specified their surgery CL before clerkship, the curriculum organization was traditional in 81 (51.6%), problem-based learning in 11 (7.0%), modular in eight (5.1%), with mixed approaches in three (1.9%), integrated in one (.6%), and serial in one (.6%). The curriculum organization was not specified in 52 schools (33.1%). This variable was not used in subsequent analyses due to the preponderance of traditional and unspecified approaches.

The STES CL had a non-normal distribution ($p = .000$ in the Kolmogorov–Smirnov test) with a median of 90.0 hours ($P_{25-75} = 60.0-120.0$ h), a mean of 96.2 hours ($SD = 45.2$; $95\%CI = 87.2 - 105.2$), and a range between 30.0 and 300.0 hours.

Table 1 shows the number of Brazilian medical schools with data on surgery CL by geographic region, administrative affiliation, and fee status.

Table 2 shows the surgery CLs and the total curriculum CL.

Table 3 shows the percentages of surgery CLs concerning the total curriculum CL.

Table 4 shows surgery CLs at the 129 medical schools with these data available on the internet, divided by

Table 1. Distribution of Brazilian medical schools with surgery course load available on the internet by geographic region, administrative affiliation, and fee status.

Characteristics	Schools with surgery CL before clerkship n (%)	Schools with surgery CL during clerkship n (%) ^a	Schools with surgery CL in both periods n (%)
Region			
North	16 (10.2)	20 (11.4)	13 (10.1)
Northeast	28 (17.8)	42 (24.0)	22 (17.0)
Center-west	10 (6.4)	14 (8.0)	9 (7.0)
Southeast	72 (45.9)	72 (41.1)	59 (45.7)
South	31 (19.7)	27 (15.4)	26 (20.2)
Administrative Affiliation			
Federal	48 (30.6)	68 (38.9)	43 (33.3)
State	16 (10.2)	21 (12.0)	13 (10.1)
Municipal	5 (3.2)	6 (3.4)	4 (3.1)
Private	88 (56.0)	80 (45.7)	69 (53.5)
Tuition status			
Yes	64 (40.8)	89 (50.9)	56 (43.4)
No	93 (59.2)	86 (49.1)	73 (56.6)
Total	157 (100)	175 (100)	129 (100)

Abbreviations - CL: course load; n (%): number (absolute frequency) and percentage (relative frequency).

^aTotal percentage may add up to 99.9% or 100% due to one decimal rounding.

Table 2. Total curriculum and surgery course loads in Brazilian medical schools that made the data available on the internet as of September 2018.

Loads ^a	Mean hours (SD)	95%CI	Median hours (P_{25-75})	Min-Max hours
CL before clerkship (n=157)	268.7 (140.3)	246.6 – 290.8	270.0 (151.0 – 360.0)	32.0 – 780.0
CL during clerkship (n=175) ^b	582.5 (243.0)	546.2 – 618.7	540.0 (400.0 – 712.0)	170.0 – 1,410.0
Total surgery CL (n=129) ^b	855.1 (266.9)	808.6 – 901.6	815.0 (677.5 – 992.0)	340.0 – 1,665.0
Total curriculum CL of schools with any surgery course load available on the internet (n=205)	8,409.0 (937.5)	8,279.9 – 8,538.1	8,295.0 (7,675.0 – 8,897.0)	6,836.0 – 13,630.0
Total curriculum CL of schools with surgery course load before clerkship available online (n=157)	8,420.1 (946.2)	8,271.0 – 8,569.3	8,328.0 (7,727.5 – 8,904.0)	6,984.0 – 13,630.0
Total curriculum CL of schools with surgery course load during clerkship available on the internet (n=175)	8,455.9 (947.1)	8,314.6 – 8,597.2	8,375.0 (7,720.0 – 8,905.0)	6,836.0 – 13,630.0
Total curriculum CL of schools with surgery course load before and during clerkship available on the internet (n=129)	8,495.3 (954.9)	8,329.0 – 8,661.7	8,520.0 (7,807.0 – 8,912.0)	7,104.0 – 13,630.0

Abbreviations - CL: course load; SD: standard deviation; 95%CI: 95% confidence interval; P_{25-75} : 25th and 75th percentiles; Min-Max: Minimum and Maximum values.

^a Course load is equivalent to 60 minutes, and both the mean and median values are given to allow comparisons with other studies.

^b Non-normal distribution ($p < .05$ in the Kolmogorov–Smirnov test), so the median and 25th and 75th percentiles are given.

Table 3. Percentage values of partial and total surgery course loads concerning the total curriculum course load in medical schools that made this information available on the internet as of September 2018.

Percentage values	Mean hours (SD)	95%CI	Median hours (P ₂₅₋₇₅)	Min-Max hours
Surgery CL before clerkship concerning total curriculum CL in schools with surgery course load before clerkship available on the internet (n=157)	3.2 (1.7)	2.9 – 3.5	3.3 (1.8 – 4.4)	.35 – 8.7
Surgery CL during clerkship concerning total curriculum CL in schools with surgery course load during clerkship available on the internet (n=175) ^a	6.9 (2.7)	6.5 – 7.3	6.4 (5.0 – 8.2)	1.8 – 15.1
% Total surgery CL concerning total curriculum CL in schools with surgery CL before and during clerkship available on the internet (n=129) ^a	10.1 (3.0)	9.6 – 10.6	9.7 (8.3 – 11.8)	3.5 – 18.9

Abbreviations - CL: course load; SD: standard deviation; 95%CI: 95% confidence interval; P₂₅₋₇₅: 25 and 75 percentiles; Min-Max: Minimum and Maximum limits.

^a Non-normal distribution ($p < .05$ in the Kolmogorov-Smirnov test), meaning that the median and P₂₅₋₇₅ should be considered.

Table 4. Surgery course loads among the 129 medical schools included in the study with data available on the internet by geographic region and school fee status.

Characteristics	Surgery CL before clerkship Mean hours (SD)	STR Test (df); p	Surgery CL during clerkship Median hours (P ₂₅₋₇₅)	STR Test (df); p	Total surgery CL Median hours (P ₂₅₋₇₅)	STR Test (df); p
Region						
North (n=13)	275.7 (100.2)		440.0 (395.0 – 742.0)		784.0 (640.0 – 1,010.0)	
Northeast (n=22)	235.3 (107.2)		583.5 (385.0 – 714.2)		812.5 (651.2 – 945.5)	
Center-west (n=9)	270.6 (164.2)	F(4) = .4; p = .78	560.0 (492.0 – 612.5)	X ² (4) = 1.4; p = .85	799.0 (682.0 – 983.5)	X ² (4) = 1.4; p = .85
Southeast (n=59)	270.3 (153.2)		570.0 (420.0 – 768.0)		852.0 (705.0 – 1,080.0)	
South (n=26)	286.6 (131.9)		505.0 (429.5 – 664.0)		813.0 (675.0 – 1,008.7)	
Tuition-free						
Yes (n=56)	249.8 (126.2)	t(126)=-1.5; p = .14	585.0 (427.2 – 843.0)	U = 1,609.0; p = .04	865.0 (706.5 – 1,125.2)	U = 1,752.5; p = .17
No (n=73)	285.2 (140.8)		510.0 (400.0 – 647.0)		800.0 (658.0 – 915.0)	

Abbreviations - CL: course load; SD: standard deviation; statistical test results: STR; degrees of freedom: df; p: p-value; P₂₅₋₇₅: 25 and 75 percentiles; F: factor variance in ANOVA; t: Student t-test value; X²: Chi-square value in Kruskal-Wallis test; U: Mann-Whitney test value.

geographical region and fee structure. There was no statistical difference in the CL between geographic regions. There was no difference between schools with and without tuition in total or before clerkship surgery CL. The only significant difference was a higher median surgery CL during the clerkship in the tuition-free schools.

DISCUSSION

In this study, we found that the minimum and maximum values of surgery CL before and during clerkship vary across the Brazilian schools studied. However, the mean surgery CL before clerkship and the median total surgery CL were similar across geographical regions and schools' fee statuses. The only significant difference we found was the higher median surgery CL during the clerkship in tuition-free schools.

The wide range of surgery CL values between schools led us to reflect on the possibility that some schools may offer very low practical and theoretical exposure to surgery-related content, which may result in insufficient training to attain the required skills in the area. On the other hand, other schools may include excessive content that is not essential for undergraduate medical training, which may represent an additional burden for students.

It is difficult for us to find a plausible explanation for the higher median CL during clerkships in tuition-free schools since the definition of this CL may be influenced by several factors. As there was no significant difference in the median total surgery CL across schools with different fee statuses, one possible reason may be the way in which the theoretical and practical content is distributed in these schools. However, more consistent

explanations could only be given after investigating many other aspects beyond the CL. Some of them, for instance, would be the school's view on the value of surgery (which could be assessed by examining the PPP or interviewing administrators), the time at which outpatient practices and surgical procedures begin, the practical settings, and how students are allocated in them, and the number and expertise in surgery of professors/physicians who participate as preceptors in clerkships.

Regarding the CL values, we were unable to find Brazilian studies that would allow comparison with our findings. Brazilian documentation does exist on the curriculum matrix content for revalidation of diplomas obtained abroad³³, but without CL recommendations. In fact, this gap in the literature motivated us to carry out this research and establish a baseline for future comparisons, contributing to the process of developing and evaluating medical curricula.

Some comparisons, though, can be made with the international literature^{4,27-29}. In Cuba, the surgery CL before clerkship recommended by the Cuban Ministry of Education is higher than the mean and 95%CI found in our study, and the clerkship and median total surgery CLs are within the percentile ranges found in our sample²⁷. These findings make us reflect on the possibility of excessive surgery content in Brazilian medical schools since Cuban doctors are trained to perform a wider range of surgical procedures, which are only performed by surgeons in Brazil.

In the study with 16 medical schools in southeast Europe, five institutions had a mean surgery CL before clerkship lower than the 95% CI of our study, while nine were higher and two within the confidence interval: one of them in Mostar (Bosnia and Herzegovina), and the other in Pristina (Kosovo)²⁸.

In the European study with 26 schools, seven had a mean surgery CL before clerkship that was lower than the 95% CI of our study, while 13 were higher and six were within our confidence interval. The latter group was comprised of Split (Croatia), Brno (Czechia), Vienna (Austria), and Rome, Florence, and Naples (Italy)⁴.

The mean surgery CL before clerkship in a survey with 153 US medical schools was within the 95% CI of our study, while the median surgery CL during clerkship was above the P_{25-75} ranges in our study and the median total surgery CL was within the P_{25-75} ranges in our study²⁹.

Therefore, we notice that the surgery CLs also vary considerably in European countries and that the P_{25-75} ranges of Brazilian schools' total surgery CL are consistent with values found in Cuban and American schools. The mean surgery CL before clerkship and the median surgery CL during clerkship in our study are within the levels found in Cuban schools and lower than American ones.

The limitations of our study included the impossibility of finding the surgery CL in schools with integrated curricula that did not specify the surgery CL, as well as the impossibility of finding complete documentation in the CLs of all surgery disciplines. Despite the aim of achieving an integrated curriculum in several knowledge areas, the CL dedicated to specific content should ideally be specified in the interest of providing objective parameters for comparison. Another limitation of our study was that we collected data available on the internet, although these data should ideally be collected directly from the medical schools to better understand the theoretical and practical CL distribution and the content covered.

Finally, we suggest further studies to evaluate the predominant school of thought guiding the schools' curricula, the administrators and professors' perception on what elements of surgery are essential and need to be taught during undergraduate medical courses, and the pedagogical approaches in surgery, including student assessment, practical scenarios, and content.

Our study on CL of Brazilian medical schools identifies the value/weight that the schools assessed attribute to surgery in their curricula and provides medical school administrators with information on the surgery CL distribution. However, these findings should be considered as the "tip of the iceberg" and are not sufficient to analyze the quality of these medical courses and the factors that influence the decisions regarding surgery CL at each school^{34,35}.

CONCLUSIONS

Regarding the objectives of our study, although we found considerable variation in the range of surgery CL, there were no significant differences in the mean surgery CL before clerkship, nor in the median total surgery CL across schools' geographic regions or fee statuses, or the median surgery CL during clerkship across geographic regions. However, the median surgery CL was significantly higher in tuition-free schools.

Our results can help those responsible for medical education to understand the surgery CL distribution in Brazilian medical schools and help medical school administrators to assess and plan the surgery CL accordingly in their institutions.

We suggest further studies including more information, from the political-pedagogical course conception to the surgery instruction scenarios, as well as assessment methods for teaching and students, with data collection including both the schools' existing documents and interviews or focus groups with individuals involved in the teaching and learning process.

AUTHORS' CONTRIBUTION

Athos Paulo Santos Martini participated in the project

design, data collection and analysis, and drafting of the manuscript, which was the term paper that he presented as the undergraduate medical course requirement at UFSC. Sofia Romay Oliveira participated in the project design, data collection and analysis, and drafting and review of the manuscript. Suely Grosseman participated as Mr. Martini's advisor and in the project creation, data collection and analysis, drafting, and review of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

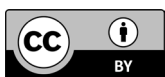
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