Community Health course load before clerkship in Brazilian medical schools

Carga horária de saúde coletiva antes do internato em escolas médicas brasileiras

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ABSTRACT

Introduction: The limits of the Community Health (CH) course load (CL) before medical clerkship (MC) in undergraduate medical courses are not defined neither in the National Curriculum Guidelines nor in other documents, and have not been investigated in a comprehensive way in national studies.

Objective: To analyze the community health course load before clerkship in Brazilian medical schools.

Method: Cross-sectional study of schools acknowledged by the Ministry of Education, which started activities until December 31, 2017. The sites of the 323 existing schools were accessed and the schools that had their curricula available in the internet with details of the CH CL before MC were included. The variables were school geographic region and administration type, medical course CL and CH CL before MC, also including epidemiology, biostatistics and occupational health course loads. Data were analyzed using descriptive statistics, Pearson chi-square (X^2) for categorical variables and Mann-Whitney-U (U) and Kruskal Wallis X^2 tests for continuous variables.

Results: Out of 323 existing medical schools, 222 were included (68.7%). Among the included schools, 83 were tuition-free (37.4%) and 139 were not (62.6%). The median of the CH CL before MC was 440.0 hours (P_{25-75} = 300.0 - 640.0), equivalent to 5.4% (P_{25-75} = 3.5 - 7.8) of the medical course CL. The median of the CH CL before MC in hours in private and municipal schools was, respectively, 480.0 (P_{25-75} = 330.7 - 679.2) and 576.0 (P_{25-75} = 360.0 – 766.0), and of state and federal schools, respectively, 337.0 (P_{25-75} = 281.2 - 524.2) and 370.0 (P_{25-75} = 300.0 - 480.0), $X2(3)$ = 11.48, p = .009. The median of the total CH CL in non-tuition-free schools was 500.0 hours (P_{25-75} = 336.0 - 690.0) and in the tuition-free schools, it was 364.0 hours (P_{25-75} = 285.0 – 504.0), U = 4.259.0, z = -3.26, p = .001. The median of epidemiology and biostatistics CL in hours before MC in the 124 schools was 88.0 (P_{25-75} = 60.0 - 120.0), whereas the occupational health CL in 63 schools was 40.0 (P_{25-75} = 33.0 - 60.0).

Conclusions: The CH CL before clerkship varies widely, being higher in non-tuition-free medical schools.

Keywords: Medical Education; Curriculum; Public Health; Course Load; Community Health.

RESUMO

Introdução: *Os limites da carga horária (CH) de saúde coletiva (SC) antes do internato (AI) não estão definidos nas Diretrizes Curriculares Nacionais, nem em outros documentos, e não foram investigados de forma abrangente em estudos nacionais.*

Objetivo: *Analisar a CH de SC AI em escolas médicas (EM) brasileiras.*

Método: *Estudo transversal, com escolas reconhecidas pelo Ministério da Educação que iniciaram as atividades até 31 de dezembro de 2017. Os sites das 323 escolas existentes foram consultados, e foram incluídas aquelas que disponibilizavam seus currículos na internet com detalhamento de CH de SC AI. As variáveis foram região geográfica e administração da escola, CH do curso de medicina e CH de SC AI, incluindo também as CH de epidemiologia, bioestatística e saúde do trabalhador. Os dados foram analisados usando-se estatística descritiva, teste de qui-quadrado (X^2) de Pearson para variáveis categóricas e testes Mann-Whitney-U (U) e X^2 de Kruskal-Wallis para variáveis contínuas.*

Resultados: *Foram incluídas 222 das 323 EM existentes (68,7%), sendo 83 gratuitas (37,4%) e 139 não gratuitas (62,6%). A mediana da CH total de SC AI foi de 440,0 horas (P_{25-75} = 300,0 - 640,0), equivalente a 5,4% (P_{25-75} = 3,5 - 7,8) da CH total do curso. A mediana da CH de SC AI em horas das escolas privadas e municipais foi de, respectivamente, 480,0 (P_{25-75} = 330,7 - 679,2) e 576,0 (P_{25-75} = 360,0 - 766,0); no caso das estaduais e federais, a mediana foi de, respectivamente, 337,0 (P_{25-75} = 281,2 - 524,2) e 370,0 (P_{25-75} = 300,0 - 480,0), $X^2(3)$ = 11,48, p = 0,009. As escolas não gratuitas tiveram mediana de CH total de SC de 500,0 horas (P_{25-75} = 336,0 - 690,0) e as gratuitas de 364,0 horas (P_{25-75} = 285,0 - 504,0), U = 4.259,0, z = - 3,26, p = 0,001. A mediana da CH, em horas, de epidemiologia e bioestatística AI entre 124 escolas foi de 88,0 (P_{25-75} = 60,0 - 120,0) e de saúde do trabalhador entre 63 foi de 40,0 (P_{25-75} = 33,0-60,0).*

Conclusões: *A CH de SC AI apresenta grande variação, sendo maior em escolas não gratuitas.*

Palavras-chave: *Educação Médica; Currículo; Saúde Pública; Carga Horária; Saúde Coletiva.*

INTRODUCTION

Universities influence and are influenced by the communities in which they operate. The trained professionals are agents who share the knowledge generated in higher education with the population who receive their care[1].

The relationship between medical education and the current health system is not different. The relevance of social determinants in the health-disease process has gained strength throughout the 20th century, guiding the study of Social Sciences in the Public Health area [2]. The Health Reform movement started in Brazil in the beginning of the 1970s, aiming at a health policy that considered the community and its context. This movement culminated in the political, governmental and private groups agreement for the establishment of a Unified Health System (SUS, *Sistema Único de Saúde*), with universal, equal and free access to health, valuing collective care as an inseparable aspect of individual health, made official in the Federal Constitution of 1988 and in subsequent regulations needed for its implementation.[3]

Concomitantly, since the 1950s, there have been initial discussions regarding the medical curriculum and the teaching process[4], which were intensified since the 1980s. It became clear that more professionals were required to competently work with the new health system being structured in its different levels of care. The transformation in the training offered by medical schools (MS) was considered as one of the most effective means to initiate changes regarding the future doctors and, therefore, in the way they worked in the health system[5].

The transformation of the view on public health and of its representation in undergraduate medical curriculum also occurred in all continents where public health education was covered during medical school. Countries such as Canada[6,7], China[8], Spain[9], Australia[10], United Kingdom[11,12] and Ghana[13] are some examples.

In Brazil, in 2001, the National Curriculum Guidelines (DCN, *Diretrizes Curriculares Nacionais*) for undergraduate medical courses were developed, so that medical education was aligned with the SUS and the population needs and provided the training of doctors who were competent "to work (...) in the health-disease process" in all levels of care[14]. These DCN were developed based on a comprehensive MS assessment and further educators, health professionals and government discussions for shared decision-making[14]. The encouragement towards a general practitioner training, with practices including primary care settings and the development competencies related to public health stood out as a differential in relation to the existing curricula until then, which were predominantly aimed at medical specialties and with practices in hospitals. After 13 years, the DCN were restructured so that medical education would respond "to the new challenges of contemporary societies" adequately encompassing primary health care and valuing the training aligned with the SUS". In this new version, what was already covered in the previous DCN was reinforced and medical training was approached in three axes: health care, health management and health education[15].

The DCN also establish a minimum course load (CH) of 7,200 hours for medical courses[15] and clerkship percentages in relation to the course load and areas of knowledge considered essential. However, and even to provide greater flexibility to schools regarding curricular planning, they do not suggest course loads limits for contents before clerkship. If, on the one hand, not having the limits for the areas of knowledge and contents before clerkship represents a possibility of a greater freedom to the curriculum planning in each school, on the other hand, this may result in a great variation in the CL of each area, depending on the choices of managers and teachers. In this scenario, as stated by Lima-Gonçalves, despite the fundamental importance of the course load in the curricular structure, the decision of the CL to be reserved for each discipline has often been carried out as a "bargaining chip" in the creation of curricula and can result in insufficient or excessive CL in certain areas[16].

Regarding the teaching of Community Health (CH), although both DCN[14,15] versions recognize the importance of learning it in primary care practice settings, not all MS have been able to carry it out comprehensively. Also, as each MS can consider the theoretical and practical CL to be assigned to CH in its curriculum in different manners, the current CH CL limits in medical curricula need to be known.

The medical course at the Federal University of Santa Catarina (UFSC) changed its curriculum in 2003 to meet the recommendations of the DCN. In 2018, its curriculum contained a total CL of 7,670.0 hours, with a module called "Health and Society" aimed at CH, taught from the first to the eighth semester of the course (before clerkship). The total module CL comprised 480.0 hours (6.2% of the total curriculum CL), with a total theoretical CL CH of 240.0 hours, which included 90.0 hours of epidemiology and biostatistics (EB) and 30.0 hours of occupational health (OH), and with a total practice CL of 240.0 hours, carried out in primary health care settings, called community interaction. During the clerkship, the CH CL was of 736.0 hours. Therefore, the total CH CL at this university was of 1,094.0 hours, corresponding to 14.3% of the total curriculum CL. Aiming to assess the adequacy of this CL, we searched for articles on the limits of CH CL before clerkship in Brazilian MS, which provided comparisons with national limits. However, we did not find comprehensive national studies. Therefore, the research question emerged:

- What are the limits of CH CL before-clerkship in Brazilian medical schools?

To answer this question, **the objective of this study** was to analyze the CH CL before clerkship in Brazilian medical schools.

METHOD
Design and ethical principles
This study was cross-sectional and descriptive. The research project was not submitted to the Research Ethics Committee because the data are secondary and of public domain, available on the internet.

Study universe and sample
The universe comprised all current 323 Brazilian MS until September 2018, acknowledged by the Ministry of Education (MEC) and listed on the e-MEC page at http://emec.mec.gov.br[17]. The websites of all existing schools were accessed and the criteria for their inclusion were: having started academic activities registered with e-MEC before December 31, 2017, having a curricular matrix or political-pedagogical project (PPP), also called Course Policy Project, available on the internet and containing information about the CH CL in the course.

Data collection
The data were collected between March and September 2018.

After consulting the e-MEC page on the website http://emec.mec.gov.br[17], the official website of each institution was accessed from this website, searching for the curriculum matrix and/or the PPP. When these documents were not available, a search for the university's website was carried out in the Internet, through Google®, using the search key: ("university name") AND ("medicine") AND ("curricular matrix" OR "Political-Pedagogical Project" OR "Course Policy Project"). When available, the learning programs/teaching plans, their key-points, content and CL were analyzed, to confirm that the entire CL was aimed at CH and to differentiate the theoretical from the practical load.

To define modules and disciplines to be included as CH, the UFSC's CH curriculum was used as basis: Health Education, Epidemiology and Biostatistics, Public Health Policies, Family and Community Medicine, Service Planning, Management and Evaluation, Occupational Health and Health Programs. Modules, disciplines and contents related to CH with names different from the previous ones were also included when they addressed SUS principles and operation, primary care attributes in health, public management, health information systems, biostatistics, health planning and occupational health.

This set integrates more contents than those included by some authors. Oliveira et al.[18], for instance, do not include Statistics and Occupational Health, despite the importance of statistical analysis in population studies related to CH and the relevance of occupational health in the context of communityic health, which was confirmed by Resolution 1,488/98 of the Brazilian Federal Council of Medicine (CFM, *Conselho Federal de Medicina*)[19], which provides specific standards for all doctors who provide care to the worker.

Although the Social and Human Sciences were considered relevant and essential for CH, their contents were not included and accounted for in this study, because they are more often taught separately from public/community health and taught by departments in other areas of knowledge, such as Anthropology and Sociology.

The variables included were: geographic region and school administration, total medical course CL, total compulsory CH CL before clerkship, with its theoretical and practical CL (including activities carried out in the community, such as teaching-service interaction), EB CL and OH CL.

Despite being included in the total content of CH, the EB and OH CLs were individualized, for better understanding of their limits.

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 1 hour / class corresponding to 60, 50 or 45 actual minutes.

Data analysis
The data were entered into a 2013 Microsoft Excel® software database.

The analysis was performed using descriptive statistics, with absolute and relative frequency for categorical variables and measures of central tendency for continuous variables. The normality of continuous variables distribution was assessed using the Kolmogorov-Smirnov test, with the distribution being considered normal when $p \geq .05$. The central tendency measures for variables with normal distribution comprised the mean and standard deviation, and the measures for variables with non-normal distribution comprised the median and the 25th and 75th percentiles (P_{25-75}). In order to provide comparisons with other studies, in the case of non-normal distribution, the mean and standard-deviation (SD) were also be provided.

Pearson's Chi-square test (X^2) for categorical variables and Mann-Whitney-U test (U) and Kruskal Wallis X^2 for continuous variables were used to analyze differences between groups.

In addition to the individualized analysis of the school

administration type, this category was grouped in tuition status, with tuition-free schools including federal and state schools and non-tuition-free schools including private and municipal schools.

The significance level was set at p < .05.

RESULTS

Table 1 shows the distribution of schools included and not included, by geographic region, administration type and tuition status. It can be observed that 222 of the 323 existing MS (68.7%) were included. There was no difference between included and not included schools by administration type and tuition status inside each region. Also, the number of private and non-tuition-free schools in Brazil is greater than that of tuition-free schools (63.5%). The Southeast and South regions have the highest proportion of private and non-tuition-free schools in relation to the total number of schools in each of these regions (64.2% and 77.8%, respectively). The other regions have a more balanced proportion between tuition-free and non-tuition-free schools.

Table 2 shows the total course CL, the CH CL before clerkship, as well as the percentage of the latter in relation to the CL of the course by geographic region, administration type and tuition status. As it can be observed, there was no difference in the CH CL before clerkship and its percentage in relation to the CL of the course by geographic region, but both were higher in non-tuition-free schools. The CH CL mean before clerkship was 487.0 (SD = 249.3) and its percentage in relation to the CL of the course was 5.9% (SD = 3.0).

Table 3 shows the theoretical and practical CH CLs before clerkship among schools that provided these data and the total CH CL of schools which only provided the CH CL without discriminating the theoretical and practical CL, by geographic region, administration type and tuition status. As it can be observed, in the North region, the theoretical CH CL before clerkship was higher among 9 of the 20 schools that provided this data. Among the 124 schools that did not discriminate whether the CH CL before clerkship was theoretical and/or practical, the CH was higher in those that were non-tuition-free.

Table 1. Distribution of all medical schools acknowledged by MEC and active until December 31, 2017, by inclusion in the study, geographic region, administration type and tuition status.

Geographic region	inclusion (I)	School characteristics	Private	State	Municipal	Federal	Yes	No	Total
			Administration (A)				**Tuition-free (TF)**		
North[a, b]	Yes	n	8	4	1	7	11	9	20
		(% I)	(40.0)	(20.0)	(5.0)	(35.0)	(55.0)	(45.0)	(100.0)
		(% A and TF)	(66.7)	(100.0)	(100.0)	(77.8)	(84.6)	(69.2)	(76.9)
		(%Total)	(30.8)	(15.4)	(3.8)	(26.9)	(42.3)	(34.6)	(76.9)
	No	n	4	-	-	2	2	4	6
		(% I)	(66.7)	-	-	(33.3)	(33.3)	(66.7)	(100.0)
		(% A and TF)	(33.3)	-	-	(22.2)	(15.4)	(30.8)	(23.1)
		(%Total)	(15.4)	-	-	(7.7)	(7.7)	(15.4)	(23.1)
	Total	n	12	4	1	9	13	13	26
		(% I)	(46.2)	(15.4)	(3.8)	(34.6)	(50.0)	(50.0)	(100.0)
		(% A and TF)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
		(% Total)	(46.2)	(15.4)	(3.8)	(34.6)	(50.0)	(50.0)	(100.0)
Northeast[c, d]	Yes	n	24	6	-	16	22	24	46
		(% I)	(52.2)	(13.0)	-	(34.8)	(47.8)	(52.2)	(100.0)
		(% A and TF)	(66.7)	(46.2)	-	(57.1)	(53.7)	(66.7)	(59.7)
		(%Total)	(31.2)	(7.8)	-	(20.8)	(28.6)	(31.2)	(59.7)
	No	n	12	7	-	12	19	12	31
		(% I)	(38.7)	(22.6)	-	(38.7)	(61.3)	(38.7)	(100.0)
		(% A and TF)	(33.3)	(53.8)	-	(42.9)	(46.3)	(33.3)	(40.3)
		(%Total)	(15.6)	(9.1)	-	(15.6)	(24.7)	(15.6)	(40.3)
	Total	n	36	13	-	28	41	36	77
		(% I)	(46.8)	(16.9)	-	(36.4)	(53.2)	(46.8)	(100.0)
		(% A and TF)	(100.0)	(100.0)	-	(100.0)	(100.0)	(100.0)	(100.0)
		(% Total)	(46.8)	(16.9)	-	(36.4)	(53.2)	(46.8)	(100.0)

Table 1. (Continuation) Distribution of all medical schools acknowledged by MEC and active until December 31, 2017, by inclusion in the study, geographic region, administration type and tuition status.

School characteristics			Administration (A)				Tuition-free (TF)		
Geographic region	inclusion (I)		Private	State	Municipal	Federal	Yes	No	Total
Midwest[e, f]	Yes	n	6	1	4	9	10	10	20
		(% I)	(30.0)	(5.0)	(20.0)	(45.0)	(50.0)	(50.0)	(100,0)
		(% A and TF)	(50.0)	(33.3)	(80.0)	(75.0)	(66.7)	(58.8)	(62,5)
		(%Total)	(18.8)	(3.1)	(12.5)	(28.1)	(31.3)	(31.3)	(62,5)
	No	n	6	2	1	3	5	7	12
		(% I)	(50.0)	(16.7)	(8.3)	(25.0)	(41.7)	(58.3)	(100,0)
		(% A and TF)	(50.0)	(66.7)	(20.0)	(25.0)	(33.3)	(41.2)	(37,5)
		(%Total)	(18.8)	(6.3)	(3.1)	(9.4)	(15.6)	(21.9)	(37,5)
	Total	n	12	3	5	12	15	17	32
		(% I)	(37.5)	(9.4)	(15.6)	(37.5)	(46.9)	(53.1)	(100.0)
		(% A and TF)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
		(% Total)	(37.5)	(9.4)	(15.6)	(37.5)	(46.9)	(53.1)	(100.0)
Southeast[g, h]	Yes	n	63	8	6	16	24	69	93
		(% I)	(67.7)	(8.6)	(6.5)	(17.2)	(25.8)	(74.2)	(100.0)
		(% A and TF)	(64.3)	(80.0)	(85.7)	(80.0)	(80.0)	(65.7)	(68.9)
		(%Total)	(46.7)	(5.9)	(4.4)	(11.9)	(17.8)	(51.1)	(68.9)
	No	n	35	2	1	4	6	36	42
		(% I)	(83.3)	(4.8)	(2.4)	(9.5)	(14.3)	(85.7)	(100.0)
		(% A and TF)	(35.7)	(20.0)	(14.3)	(20.0)	(20.0)	(34.3)	(31.1)
		(%Total)	(25.9)	(1.5)	(.7)	(3.0)	(4.4)	(26.7)	(31.1)
	Total	n	98	10	7	20	30	105	135
		(% I)	(72.6)	(7.4)	(5.2)	(14.8)	(22.2)	(77.8)	(100.0)
		(% A and TF)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
		(% Total)	(72.6)	(7.4)	(5.2)	(14.8)	(22.2)	(77.8)	(100.0)
South[i, j]	Yes	n	27	5	-	11	16	27	43
		(% I)	(62.8)	(11.6)	-	(25.6)	(37.2)	(62.8)	(100.0)
		(% A and TF)	(81.8)	(83.3)	-	(84.6)	(84.2)	(79.4)	(81.1)
		(%Total)	(50.9)	(9.4)	-	(20.8)	(30.2)	(50.9)	(81.1)
	No	n	6	1	1	2	3	7	10
		(% I)	(60.0)	(10.0)	(10.0)	(20.0)	(30.0)	(70.0)	(100.0)
		(% A and TF)	(18.2)	(16.7)	(100.0)	(15.4)	(15.8)	(20.6)	(18.9)
		(%Total)	(11.3)	(1.9)	(1.9)	(3.8)	(5.7)	(13.2)	(18.9)
	Total	n	33	6	1	13	19	34	53
		(% I)	(62.3)	(11.3)	(1.9)	(24.5)	(35.8)	(64.2)	(100.0)
		(% A and TF)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
		(%Total)	(62.3)	(11.3)	(1.9)	(24.5)	(35.8)	(64.2)	(100.0)

Table 1. (Continuation) Distribution of all medical schools acknowledged by MEC and active until December 31, 2017, by inclusion in the study, geographic region, administration type and tuition status.

School characteristics			Administration (A)				Tuition-free (TF)		
Geographic region	inclusion (I)		Private	State	Municipal	Federal	Yes	No	Total
Total[k,l,m, n, o, p, q, r]	I — Yes	n	n	128	24	11	59	83	139
		(% I)	(57.7)	(10.8)	(5.0)	(26.6)	(37.4)	(62.6)	(100.0)
		(% A and TF)	(67.0)	(66.7)	(78.6)	(72.0)	(70.3)	(67.8)	(68.7)
		(%Total)	(39.6)	(7.4)	(3.4)	(18.3)	(25.7)	(43.0)	(68.7)
	No	n	n	63	12	3	23	35	66
		(% I)	(62.4)	(11.9)	(3.0)	(22.8)	(34.7)	(65.3)	(100.0)
		(% A and TF)	(33.0)	(33.3)	(21.4)	(28.0)	(29.7)	(32.2)	(31.3)
		(%Total)	(19.5)	(3.7)	(.9)	(7.1)	(10.8)	(20.4)	(31.3)
	Total	n	n	191	36	14	82	118	205
		(% I)	(59.1)	(11.1)	(4.3)	(25.4)	(36.5)	(63.5)	(100.0)
		(% A and TF)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
		(% Total)	(59.1)	(11.1)	(4.3)	(25.4)	(36.5)	(63.5)	(100.0)

Abbreviations – MEC: Ministry of Education; I: inclusion; A: type of administration; TF: tuition-free.

Observation: Analyses performed with Pearson's X^2.

[a] North Region by inclusion and administration: $X^2(3) = 2.2$, p = .53 (6 cells with count < 5).

[b] North Region by inclusion and tuition status: $X^2(1) = .87$, p = .352 (2 cells with count < 5).

[c] Northeast Region by inclusion and administration: $X^2(2) = 1.79$, p = .41.

[d] Northeast region by inclusion and tuition status: $X^2(1) = 1.35$, p = .246.

[e] Midwest region by inclusion and administration: $X^2(3) = 3.34$, p = .34 (6 cells with count < 5).

[f] Midwest region by inclusion and tuition status: $X^2(1) = .21$, p = -.647.

[g] Southeast region by inclusion and administration: $X^2(3) = 3.62$, p = .305 (6 cells with count < 5).

[h] Southeast region by inclusion and tuition status: $X^2(1) = 2.22$, p = .136.

[i] South region by inclusion and administration: $X^2(3) = 4.43$, p = .218 (6 cells with count < 5).

[j] South region for inclusion and tuition status: $X^2(1) = .18$, p = .699.

[k] Inclusion by region: $X^2(4) = 8.08$, p = .89.

[l] Inclusion by administration: $X^2(3) = 1.36$, p = .715.

[m] Inclusion by tuition status: $X^2(1) = .224$, p = .636.

[n] Number of schools included and not included: $X^2(1) = 45,328$, p = .000.

[o] Administration by region in all schools: $X^2(12) = 40.03$, p = .000.

[p] Tuition status by region in all schools: $X^2(4) = 24.72$, p = .000.

[q] Administration by region in the included schools: $X^2(12) = 29.97$, p = .03; and in those not included: $X^2(12) = 22.84$, p = .029.

[r] Tuition status by region in those included: $X^2(4) = 11.48$, p = .022; and those not included: $X^2(4) = 17.77$, p = .001.

Table 2. Total course load and Community Health course load before clerkship and percentage of this load in relation to the total course load of the included medical schools, acknowledged by MEC and active until December 31, 2017, by geographic region, administration type and tuition status.

School characteristics	Course load		
	Course Median (P_{25-75})	CH before clerkship Median (P_{25-75})	% CH before clerkship/course Median (P_{25-75})
Region[a, b, c]			
North (n=20)	8,535.0 (7,815.0 – 8,802.5)	505.0 (375.0 - 720.0)	6.0 (4.4 – 8.6)
Northeast (n=46)	7,980.0 (7,564.5 – 8,721.5)	420.0 (276.7- 657.00)	4.9 (3.3 - 8.6)
Midwest (n=20)	7,940.0 (7,381.5 – 8,912.0)	393.0(337.5 - 628.0)	5.1 (3.8 – 8.2)
Southeast (n = 93)	8,375.0 (7,673.5 – 8,910.0)	450.0 (294.5 - 674.0)	5.4 (3.3 - 8.1)
South(n = 43)	8,205.0 (7,673.0 – 8,704.0)	420.0 (300.0 - 576.0)	5.3 (3.5 - 7.5)
Administration[d, e, f]			
Private (n=128)	8,276.0 (7,631.0 – 8,880.7)	480.0 (330.7- 679.2)	6.0 (3.9 - 8.3)
Municipal (n=11)	8,500.0 (7,607.0 – 8,963.0)	576.0 (360.0 - 766.0)	6.8 (3.7 - 10.0)
State (n=24)	8,527.5 (7,857.0 – 9,669.2)	337.0 (281.2 - 524.2)	4.0 (2.6 - 6.3)
Federal (n=59)	8,130.0 (7,560.0 – 8,765.0)	370.0 (300.0 - 480.0)	4.6 (3.4 - 5.9)
Tuition-free[g, h, i]			
Yes (n=83)	8,205.0 (7,660.0 – 8,785.0)	364.0 (285.0 - 504.0)	4.5 (3.4 - 6.2)
No (n=139)	8,280.0 (7,607.0 – 8,903.0)	500.0 (336.0 - 690.0)	6.1 (3.9 - 8.5)
Total (n=222)	8,262.5 (7,641.7 – 8,848.5)	440.0 (300.0 - 640.0)	5.4 (3.5 – 7.8)

Abbreviation - MEC: Ministry of Education; CH: Community Health; P_{25-75}: 25th and 75th percentiles.

[a] Course load per region: $X^2(4) = 3.50$, p = .48 (Kruskal-Wallis).

[b] Community Health course load before clerkship by region: $X^2(4) = 2.95$, p = .56 (Kruskal-Wallis).

[c] Percentage of Community Health load before clerkship in relation to the course load by region: $X^2(4) = 2.06$, p = .72 (Kruskal-Wallis).

[d] Course load by administration: $X^2(3) = 4.34$, p = .23 (Kruskal-Wallis)

[e] Community health course load before clerkship by administration: $X^2(3) = 11.48$, p = .009 (Kruskal-Wallis).

[f] Percentage of Community Health course load before clerkship in relation to the course load by administration: $X^2(3) = 11.52$, p = .009 (Kruskal-Wallis).

[g] Course load by tuition-free status: Mann-Whitney U (U) = 5,600.0.z = -.364, p = .716.

[h] Community health workload before clerkship by tuition-free status: U = 4,259.0, z = -3.26, p = .001.

[i] Percentage of Community Health load before clerkship in relation to the course load by tuition-free status: U = 4,283.5, z = --3,21, p = .001.

Table 3. Theorethical and practical Community Health course loads before clerkship of the included medical schools, acknowledged by MEC and active until December 31, 2017 by region, type of administration and tuition status.

School characteristics	Theoretical[a, b, c]		Practical[d, e, f]		Not categorized[g, h, i]	
	n	Median (P$_{25-75}$)	n	Median (P$_{25-75}$)	n	Median (P$_{25-75}$)
Region						
North	9	320.0 (257.50 - 440.0)	9	280.0 (105.0 - 470.0)	11	440.0 (300.0 - 760.0)
Northeast	16	202.5 (170.2 - 307.5)	16	194.5 (118.7 - 316.0	30	420.0 (247.5 - 657.0)
Midwest	6	190.0 (123.5 - 243.0)	6	331.0 (130.5 - 635.0)	14	384.0 (311.5 - 592.0)
Southeast	49	220.0 (171.0 - 280.0)	48	153.5 (60.0 - 330.7)	44	470.0 (334.5 - 747.0)
South	18	165.0 (119.0 - 259.5)	18	191.0 (90.0 - 327.0)	25	420.0 (294.0 - 652.0)
Administration						
Private	49	220.0 (168.5 - 330.0)	48	237.0 (85.5 - 430.5)	79	480.0 (340.0 - 690.0)
State	10	197.5 (143.7 - 300.0)	10	148.5 (80.7 - 283.2)	14	300.0 (277.5 - 670.0)
Municipal	4	98.0 (80.7 - 317.0)	4	392.5 (52.5 - 667.2)	7	576.0 (360.0 - 766.0)
Federal	35	225.0 (160.0 - 270.0)	35	165.0 (90.0 - 270.0)	24	354.0 (255.0 - 565.5)
Tuition-free						
Yes	45	220.0 (153.5 - 270.0)	45	160.0 (96.0 - 267.5)	38	337.5 (270.0 - 595.5)
No	53	217.0 (162.5 -330.0)	53	237.0 (85.5 - 446.5)	86	480.0 (360.0 - 690.0)
Total	98	218.5 (159.0 – 278.0)	98	180.0 (90.0 - 346.5)	124	436.5 (300.0 - 663.7)

Abbreviation - MEC: Ministry of Education; n: number of schools in absolute frequency; P$_{25-75}$: 25th and 75th percentiles.

[a] By region: $X^2 (4) = 10.22$, $p = .037$ (Kruskal-Wallis).

[b] By administration: $X^2 (3) = 3.82$, $p = .28$ (Kruskal-Wallis).

[c] By tuition-free status: Mann-Whitney U (U) = 1,97.0, z = - .68, p = .496.

[d] By region: $X^2 (4) = 2.73$, $p = .604$ (Kruskal-Wallis)

[e] By administration: $X^2 (3) = 1.71$, $p = .635$ (Kruskal-Wallis).

[f] By tuition-free status: U = 1,005.0, z = - 1.194, p = .233.

[g] By region: $X^2 (4) = 2.74$, $p = .603$ (Kruskal-Wallis).

[h] By administration:$X^2 (3) = 8.12$, $p = .044$ (Kruskal-Wallis).

[i] By tuition status: U = 1,129.0, z = - 2.738, p = .006.

Table 4. Course load of epidemiology and statistics and occupational health before clerkship (included in the calculation of the total community health course load) by geographic region, administration type and tuition status in the included medical schools acknowledged by MEC and active until December 31, 2017.

| | Course load of | | | |
| | Epidemiology and statistics [a, b, c] | | Occupational health [d, e, f] | |
School characteristics	n	Median (P$_{25-75}$)	n	Median (P$_{25-75}$)
Region				
North	13	105.0 (70.0 - 162.5)	5	60.0 (35.0 - 70.0
Northeast	28	90.0 (60.0 - 120.0)	14	45.0 (38.5 - 60.0)
Midwest	10	76.0 (69.0 - 93.7)	2	67.5 (60.0 - 75.0)
Southeast	65	80.0 (60.0 - 120.0)	30	40.0 (32.2 - 72.0)
South	26	102.5 (68.0 - 120.0)	12	34.5 (30.0 - 58.5)
Administration				
Private	77	80.0 (60.0 - 120.0)	37	40.0 (34.5 - 66.0)
State	17	90.0 (71.5 - 143.0)	2	45.0 (30.0 - 60.0)
Municipal	5	67.0 (55.0 - 72.0)	2	31.5 (30.0 - 33.0)
Federal	43	90.0 (72.0 - 120.0)	22	47.5 (33.0 - 60.0)
Tuition-free				
Yes	60	90.0 (72.0 - 120.0)	24	47.5 (31.0 - 60.0)
No	82	80.0 (60.0 - 120.0)	39	40.0 (33.0 - 60.0)
Total	124	88.0 (60.0 - 120.0)	63	40.0 (33.0 - 60.0)

Abbreviations: n: number of schools in absolute frequency; P$_{25-75}$ - 25th and 75th percentiles

[a] By region: X^2 (4) = 6.63, p = 0.157 (Kruskal-Wallis).

[b] By administration: X^2 (3) = 5.05, p = 0.168 (Kruskal-Wallis).

[c] By tuition-free status: Mann-Whitney-U (U) = 2,060.0, z = -1.657, p = 0.098.

[d] By region: X^2 (4) = 5.25, p = 0.263 (Kruskal-Wallis).

[e] By type of administration: X^2 (3) = 2.58, p = 0.46 (Kruskal-Wallis).

[f] By tuition-free status: U = 448.0, z = - 0.286, p = 0.775.

Table 4 shows the EB and OH CLs by geographic region, administration type and tuition status. There was no difference in any of the studied variables.

DISCUSSION

Our study included 68.7% of MS acknowledged by MEC and active until December 31, 2017. We found a higher number of private and non-tuition-free schools in Brazil, which was especially higher in the southeast region. We also found that there is a higher proportion of private and non-tuition-free schools in the South and Southeast regions and a more balanced proportion between tuition-free and non-tuition-free schools in the other regions. This greater balance, perhaps, could partly be justified by the federal MS expansion from 2013 to 2015, resulting from the *Mais Médicos* (More Doctors) Program, implemented in 2013[20]. During this period, 30 schools were created: 13 in the Northeast, 3 in the North, 4 in the Midwest, 5 in the Southeast and 5 in the South region[20].

Another finding was a higher CH CL before clerkship in non-tuition-free schools, however, we could not raise a plausible hypothesis for this finding.

Also, the theoretical CH CL before clerkship was higher in the Northern region. Nevertheless, it is noteworthy that only nine schools located in that region made their CL available in a discriminatory manner, which may have led to a bias in this analysis, since, when considering the total CH CL, there was no difference between the regions.

In the literature, we identified national cases as case studies or reports, among them, one carried out in three universities in the state of Paraná[21], one about the *Universidade Estadual de Londrina* (UEL)[22] and its curriculum transformation process and one about the *Faculdade de Medicina de Marília*[23] curriculum. There are also studies about the *Universidade Estadual do Ceará*[18,24] curriculum. However, due to the lack of recommendations for the CH CL limits before clerkship in the DCN and of comprehensive national studies covering most Brazilian schools, it was not possible to compare our findings with national data. This gap was the main motivation for carrying out our study.

We found international recommendations and studies that allowed comparisons.

The Cuban Ministry of Education establishes that the medical course curriculum must include a CL of 1,242.0 hours before clerkship aimed at the subjects analyzed in our study[25, 26]. This value is more than twice the 75th percentile (P_{75}) obtained in our study.

In the University of Toronto medical course, in Canada, the period before clerkship lasts two years [27], in which the CH CL is 328.0 hours[28]. This value is close to the 25th percentile (P_{25}) in our study. Reviewing the curriculum progress throughout 10 years before clership, it was verified that the CH CL redistribution over the two years, without altering the total CL, resulted in better academic outcomes[28].

Some other international studies mention the CL, but, they do not specify whether it is the total course load or the CL before clerkship. A Catalan study[29], which included four MS, found a variation between 1.5 and 12 credits in the CLs. In the European Credit Transfer and Accumulation System, each credit is equivalent to 25 to 30 hours[30]. Thus, the CH CL in the Catalan study ranged from 37.5 to 360.0 hours[29], a value below the P_{25} found in our study.

A study with 16 MS from six Eastern European countries found a variation from 235.0 to 615.0 hours in the CH CLs[31]. Another study with 32 MS from 18 countries in Europe found a variation from 18.5 to 500.0 hours in the CLs[32]. Although it was not possible to know whether the CLs included the clerkship, of the 16 MS in the Eastern European study[31], 13 had a CH CL that ranged between the P_{25-75} in our study and two had a CL below the P_{25} in our study. As for the study with 32 European schools[32], in 10, the CH CL was between the P_{25-75} in our study and, in 22, it was below the P_{25}.

In Great Britain, in 2008, among 29 of 31 British schools, the mean percentage of CH training in relation to the total CL was 13.0%, ranging from 3.4 to 20.0%. The authors did not specify whether it was before clerkship or throughout the course[33]. This average is well above the the median found in our study; however, we emphasize that it can represent the CH CL of the entire course, including clerkship.

As for the OH CL, in a study in UK[34], the content ranged from zero to more than 6 hours a week, while in other in Mexico[35] with 35 MS, the OH discipline lasted one semester and the CL varied from 1 to 8 hours/week. In the study with 16 Eastern European schools[31], the CL of OH varied from 30.0 to 165.0 hours; comparing the CL of these schools in relation to the CL found in our study, it was below the P_{25} in one school, above the P_{75} in ten schools and between the P_{25-75} in four schools. In the study with 32 European schools[32], the CL ranged from zero to 105.0 hours, five of which were below the P_{25} of our study, four above the P_{75} and three between the P_{25-75}.

Regarding the EB CL, it was 120.0 hours in Cuba[26], which is equivalent to the P_{75} in our study. In Eastern European[31], this CL ranged from 75 to 180, with the CL of four MS above the P_{75} in our study and the remaining 11 between the P_{25-75}. In the study with 32 European schools[32], the CL ranged from 7.0 to 225.0 hours, with the CL of 11 schools below the P_{25} of our study, five above the P_{75} and seven between the P_{25-75}.

The limitations of our study include the impossibility to differentiate the theoretical and practical CL in almost half of the included schools, as well as the impossibility of including schools that did not clarify the CL intended for CH in their integrated modules. Although the curricular integration is recommended, ideally, the CL intended for each area should be specified, aiming to provide objective parameters of comparison. Another limitation was the analysis of data only available in the internet.

In order to have a better understanding of CH teaching, we suggest further studies that analyze the schools' political-pedagogical concept and current of thought that support the CH teaching, the distribution of CH throughout the course, its contents and the teaching- learning strategies and settings, including students' assessment. For reaching this purpose, it would be necessary a detailed analysis of the schools' political-pedagogical projects and teaching-learning plans, associated with interviews with managers, teachers and students.

CONCLUSIONS

The schools included in the study were representative in terms of type of administration and tuition status in each geographic region.

There was great variability regarding the CH CL median before clerkship, as well as its percentage in relation to the CL of the total course, which were higher in non-tuition-free schools, which are in higher proportion in the Southeast and South regions.

The EB and OH contents are similar by region, type of administration and tuition status.

AUTHORS' CONTRIBUTION

Sofia Romay Oliveira participated in the project design, data collection and analysis and drafting of the manuscript, which was the term paper that she presented as the undergraduate medical course requirement at UFSC. Athos Paulo Santos Martini participated in the project design, data collection and analysis and drafting and review of the manuscript. Suely Grosseman participated as Ms. Oliveira's advisor and in the project creation, data collection and analysis and drafting and review of the manuscript.
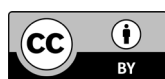
CONFLICTS OF INTEREST

SOURCES OF FUNDING

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