RESEARCH

A Quantitative Analysis of the Quality of Pharmacy Education in Brazil

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Objective. To compare the quality indicators of public and private pharmacy schools in Brazil.

Method. Descriptive data regarding undergraduate pharmacy schools recorded as of April 2016 was obtained from the website of Brazil's Ministry of Education. The quality indicators analyzed included scores on the National Student Performance Examination, preliminary classification of the school, and final classification of the school. The schools were graded on a scale of 1 to 5, with 5 being excellent.

Results. Four hundred sixty-seven Brazilian pharmacy schools were analyzed. The number of schools and class sizes has been increasing since 1832. The number of private pharmacy schools has increased since 1996, with the majority located in non-capital cities. The results showed an isomorphic characteristic of the quality indicators and a central tendency of the scores (score of 3), which are indicators of satisfactory quality. Most public institutions received a score of excellent.

Conclusion. The analysis found an increase in the number of pharmacy schools in the private sector in Brazil and that the quality of public institutions was better than that of private institutions. Qualitative research should be carried out to complement the quantitative findings reported here.

Keywords: education, quality, pharmacy

INTRODUCTION

The concept of quality in higher education is complex. Several aspects must be considered when evaluating higher education, such as employability of graduates and respect for diversity and equity.¹ Van Vught and Westerbeijfen relate the concept of quality to the evaluation process by combining intrinsic dimensions (the ideals of truth and knowledge seeking) and extrinsic dimensions (the services that educational institutions provide to society).² For an adequate evaluation, they consider five elements: an autonomous evaluation system, promotion of self-evaluation, review by external experts and peer review with onsite visits, reporting of results and experience gained, and identification of the possible relationships of these results with governmental decisions.² Morosini divides the concept of quality into isomorphic quality, quality of specificity, and quality of equity.³ Isomorphic quality is assessed in four stages (planning, action, evaluation, and promotion), with the evaluation process

standing out as an end rather than a means to achieve quality. The accreditation of higher education institutions is based on this type of quality. Quality of specificity is identified by the presence of standardized indicators in parallel with the preservation of local specificities. Standardized indicators are not imposed as the only standards; they strengthen the existing integration between countries through their differences rather than similarities. Quality of equity takes into consideration that this construct is more than the simple standardization of indicators; it presupposes personal and social circumstances (eg, gender and economic status) and ensures a minimum standard of education for all. In addition, it involves qualitative and quantitative studies capable of reflecting its complexity.³

In the European Union, because of integration between countries and respect for each other's differences, when the quality of pharmacy schools is assessed, the concept of quality of specificity is most often adopted. The quality of specificity reflects the principle that there is no single measure of the quality of higher education, but rather the measure of quality that is best suited to each country should be used.³ The United States and Canada have implemented self-evaluation (accreditation) criteria and onsite visits by external evaluators, which are

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characteristics of isomorphic measures of quality. In Latin America and Brazil there are fewer differences between isomorphic quality and quality of equity; however, measures of isomorphic quality are more prevalent.³⁻⁵

The International Pharmaceutical Federation (FIP), the World Health Organization (WHO), and the United Nations Organization for Education, Science and Culture (UNESCO) recognize the need for equitable quality in pharmacy education. These institutions state that pharmacy education should be socially accountable, globally connected, and quality assured in order to meet the needs of communities.^{4,5} To guarantee quality, pharmacy schools must adopt evaluation strategies that use indicators and results that are measured periodically.^{6,7} Countries such as the United States, France, Canada, Australia, and the United Kingdom have well-established quality assurance systems that include internal, self-assessment processes within higher education institutions under government supervision.^{4,8-11}

In Brazil, the evaluation process of all undergraduate schools is under the responsibility of the Ministry of Education and is carried out by the Anísio Teixeira National Institute for Educational Research and Study (INEP). It is a triennial process, the results of which are published on official websites and serve as a basis for the authorization, recognition, and renewal of recognition of higher education schools. The process ensures that pharmacy schools meet a minimum standard of quality. The INEP in Brazil develops complementary instruments and indicators that evaluate teaching, research, extension programs, student performance, and management of the institution, faculty, and infrastructure.¹²

There has been an accelerated expansion of undergraduate schools in Brazil, particularly in private institutions.¹³ In Brazil, there are 45,037 undergraduate schools distributed among 2,864 higher education institutions, 2,533 of which are private and 331 of which are public.¹⁴ The pharmacy schools in Brazil offer a bachelor's degree program that provides students with the skills to perform academic or professional activities in the pharmacy field. Pharmacy schools in Brazil have been evaluated systematically since 1995.¹⁵ This study analyzed the quality indicators of pharmacy schools in Brazil, comparing public and private institutions.

METHODS

This was a descriptive study of data gathered on the Bachelor of Science degree in pharmacy schools through April 2016 by the Ministry of Education (MEC) in Brazil. The study included pharmacy schools that were operating at the time of data collection. The data used were publicly available on the MEC website. Greater reliability of the data

was ensured by excluding schools for which no information was available, duplicates, and distance-learning programs.

The data collection process lasted two months. The advanced search tool on the website allowed researchers to refine their results and obtain information separated by state. The variables analyzed were: the number of places (ie, maximum enrollment capacity) in each operating school authorized by the MEC; municipality where the school was located (capital or non-capital city); year in which the school began to operate; administrative category (private or public institutions); regional location (North, Northeast, Midwest, Southeast, and South); and quality indicators. Quality indicators included average student scores on the National Student Performance Examination (ENADE); Preliminary Classification of the School (CPC), and Final Classification of the School (CC).

The ENADE scores students' knowledge regarding the content of the national curricula of universities from zero to five.¹⁶ The CPC was determined based on three criteria: student performance (ENADE score), faculty (degree and type of employment contract), and conditions offered for the development of the learning process (didactic and pedagogical organization, infrastructure, and physical facilities). Student scores ranged from one to five. The CC was determined based on an onsite evaluation of the school to confirm or modify the CP) score the school had been given.

In the present study, the CPC was chosen as the main indicator of quality.¹⁷ Schools with CPC scores of 1 or 2 were automatically included in the onsite evaluation schedule, while schools with scores equal to or greater than 3 could choose for the evaluators to not visit and thus transform the CPC into CC.¹⁸ For analytical purposes, the indicators ENADE, CC, and CPC were interpreted based on the MEC's quality classification system for undergraduate schools, where, score 1=nonexistent school, score 2=insufficient, score 3=sufficient, score 4=very good, score 5=excellent, and no score (NS)=schools with fewer than two participants.¹⁹

The data were compiled in an Excel spreadsheet and analyzed using Stata 11 (Statacorp, College Station, TX). Measures included: absolute and relative frequencies of the variables and mean, standard deviation, and minimum and maximum values for the continuous variable "number of authorized places." Bivariate analysis of the quality indicators was performed using the Fisher exact test and the chi-square test to determine the differences between public and private institutions. Significance level was set at $p \leq .05$.

RESULTS

According to the MEC website at the time of the study (April 2016), there were 501 pharmacy schools in

Brazil. After applying the exclusion criteria, 6.8% (n=34) of the schools were excluded from the study and 467 were included in the analysis.

The increase in the number of pharmacy schools in Brazil since 1832 is shown in Figure 1. Until 1974, only 26 public pharmacy schools had been created. Between 1975 and 1995, three more public pharmacy schools and 26 private pharmacy schools were created. Since 1996, there had been an increase of 79.6% (n=372) in the number of private pharmacy schools and of 8.6% (n=40) in the number of public pharmacy schools.

Table 1 shows the distribution of undergraduate pharmacy schools by number and location. In all, 85.2% (n=398) of the pharmacy schools were private and 14.8% (n=69) were public. The Southeastern region of Brazil had the highest percentage of schools (44.5%). Additionally, this region was home to 45.2% (n=180) of the private pharmacy schools in the country. The Northern region of the country had 7.1% (n=33) of the total number of pharmacy schools and 10.1% (n=7) of the public pharmacy schools. The percentage of pharmacy schools located in the countryside was 67.0% (n=313). While the majority of private pharmacy schools were in non-capital cities (68.3%, n=272), the majority of public pharmacy schools were located in capital cities (40.6%).

The maximum enrollment capacity in undergraduate schools by region is shown in Table 2. Most (60,611 [90.6%]) of the places were in private pharmacy schools. This number was almost 10 times greater than the number of places in public pharmacy schools (6,285 [9.4%]). In all, 51.8% of the 66,896 places were offered in the Southeastern region. Proportionally, the Southeastern region (54.4%), the Southern region (13.4%), and the Northern region (6.6%) held higher percentages of places in public pharmacy schools than did private institutions. In the Midwest region, the places in private institutions outnumbered those offered in public institutions (12.4%).

The bivariate analysis of the quality indicators, which included the National Student Performance Examination

(ENADE) scores and the preliminary and final ratings of public and private institutions, are presented in Table 3. Of the 467 institutions analyzed, 107 had unsatisfactory ENADE scores (score of 1 or 2). Of these institutions, 101 (94.4%) were private institutions. Of the 105 (22.5%) institutions that achieved a score of 3, 93.3% (n=98) were private. Most of the pharmacy schools that achieved a score of 5 (78.6%) were public. Information on nearly 20% of the pharmacy schools analyzed (the majority of which were private schools) was missing from the MEC's database. For the indicator "no score," approximately 17% of all pharmacy schools did not provide information. Of these, 91.1% were private institutions.

Regarding the CPC, 6.4% (n=30) of all pharmacy schools received an unsatisfactory score (a score of 1 or 2). The majority of these (86.6%, n=26) were private institutions. Furthermore, the only pharmacy school that achieved a score of 1 was a private school. The majority (60.0%) of the pharmacy schools that achieved a score of 5 (n=5) were public.

Regarding CC score (included schools that were required or elected to undergo a final inspection), 0.9% (n=4) received unsatisfactory scores (score of 2). In comparison, 69.4% (n=324) of the pharmacy schools received satisfactory scores (scores of 3, 4 and 5). There was no information on CC scores for 23.1% (n=108) of the institutions.

DISCUSSION

The present study analyzed the quality indicators of pharmacy schools in Brazil and compared those for public and private institutions. To do so, the indicators recommended by Brazil's Ministry of Education (ie, ENADE, CPC, and CC scores) were used. According to the Ministry of Education, the CC indicator is a definitive classification; however, the CPC score is more important to measure the quality of undergraduate schools in Brazil.¹⁷ The CPC is composed of three dimensions and respective

Figure 1. Expansion of Pharmacy Schools in Brazil, 1832-2016

Table 1. Distribution of Pharmacy Undergraduate Schools in Brazil by Region and Location

Pharmacy Schools	Private (n=398)	Public (n=69)
	N (%)	N (%)
Region		
Southeast	180 (45.2)	28 (40.6)
Northeast	77 (19.3)	16 (23.2)
South	62 (15.6)	12 (17.4)
Midwest	53 (13.3)	6 (8.7)
North	26 (6.6)	7 (10.1)
Location		
Countryside	272 (68.3)	41 (59.4)
Capital	126 (31.7)	28 (40.6)

Source: MEC, April 2016

weights: student's performance, 55% (student's score on the ENADE and the CPC score reflect the difference between observed and expected performances); faculty, 30% (the number of MSc and PhD professors and type of employment contract) and the students' perception of the conditions of the training process, 15%.^{16,18,19} As the ENADE and CPC indicators are composed of dimensions and weights, the fact that the researchers only had access to indices with the final scores and not to the criteria used to compose them is important to remember. These indicators are interconnected in an articulated system, with the CPC indicator representing the official quality outcome of the schools.¹⁷

The CPC may have been influenced by the hiring of PhD professors, an increasingly less common procedure in the private sector, as reported by Bittencourt in a study of the impact of the CPC in public and private institutions.¹⁷ Private schools have a great advantage over public institutions when it comes to facilities, infrastructure, and teaching resources, which may explain the CPC scores of 4.

The indicators contribute to the classification of schools and the evaluation of faculty and students. Most

public and private pharmacy schools presented score 3 for ENADE and CPC indicators, which corresponds to a satisfactory quality. However, excellent CPC scores were characteristic of public pharmacy schools. Studies carried out in Brazil show that public institutions present higher ENADE scores.¹⁷

Measuring the quality of a higher education institution means checking for minimum requirements such as knowledge production, technological innovations, partnerships between universities, research institutes and the productive sector, research on relevant social issues, and development of social technologies.²⁰ The demand for this quality is regulated by the establishment of performance indicators and associated national standards with a view to improving the quality of education.²¹

The idea of quality should not be based on technical assumptions and cannot be dissociated from the commitment to society.²¹ This is because institutions may feel comfortable after they have achieved at least the minimum score for quality. Secondly, there is concern with the certification process rather than a focus on qualified training of new professionals, particularly in private institutions. Finally, there is an emphasis on teaching to the test, which encourages students to learn through traditional content-oriented teaching methods that do not foster the development of reflection and decision-making skills.

Content-oriented teaching influences the position of each school in a ranking, which is used for marketing purposes. The commercialization of education sometimes inhibits critical education and focus on market-oriented mechanisms within the dehumanizing logic of capital, which has its foundations in individualism and profit.²²

The number of pharmacy schools in Brazil has been on the rise since 1832. From 1996 forward, the number of private institutions has increased steadily, particularly

Table 2. Maximum Enrollment Capacity in Undergraduate Pharmacy Schools in Brazil

	Private (n=60,611)		Minimum	Maximum	Public (n=6,285)		Minimum	Maximum
	N (%)	M (SD)			N (%)	M (SD)		
Maximum enrollment capacity by region		152.3 (110.9)	25	1,275		91.1 (71.2)	30	480
Southeast	31,202 (51.5)	173.3 (132.5)	40	1,275	3,421 (54.4)	122.2 (97.5)	30	480
Northeast	12,581 (20.8)	163.4 (73.3)	40	440	1,202 (19.1)	75.1 (35.3)	30	185
South	5,765 (9.5)	92.9 (49.8)	25	240	840 (13.4)	70 (34.9)	30	130
Midwest	7,523 (12.4)	141.9 (93.8)	40	460	405 (6.5)	67.5 (25.6)	40	100
North	3,540 (5.8)	136.1 (127.3)	40	720	417 (6.6)	59.6 (30.4)	35	120

Source: MEC, April 2016

Table 3. Quality Indicators of Undergraduate Pharmacy Schools in Brazil

Indicators	Private (n=398)	Public (n=69)	Total (n=467)	p value ^a
ENADE ^b				.000
-	85 (93.4)	6 (6.6)	91 (100.0)	
1 (nonexistent school)	15 (88.2)	2 (11.8)	17 (100.0)	
2 (insufficient)	86 (95.6)	4 (4.4)	90 (100.0)	
3 (sufficient)	98 (93.3)	7 (6.7)	105 (100.0)	
4 (very good)	39 (54.9)	32 (45.1)	71 (100.0)	
5 (excellent)	3 (21.4)	11 (78.6)	14 (100.0)	
No score	72 (91.1)	7 (8.9)	79 (100.0)	
CC ^c				.003
-	108 (77.7)	31 (22.3)	139 (100.0)	
1 (nonexistent school)	-	-	0 (-)	
2 (insufficient)	4 (100.0)	-	4 (100.0)	
3 (sufficient)	166 (92.2)	14 (7.8)	180 (100.0)	
4 (very good)	109 (84.5)	20 (15.5)	129 (100.0)	
5 (excellent)	11 (73.3)	4 (26.7)	15 (100.0)	
No score	-	-	0 (-)	
CPC ^d				.000
-	121 (93.1)	9 (6.9)	130 (100.0)	
1 (nonexistent school)	1 (100.0)	-	1 (100.0)	
2 (insufficient)	25 (86.2)	4 (13.8)	29 (100.0)	
3 (sufficient)	130 (91.6)	12 (8.4)	142 (100.0)	
4 (very good)	68 (68.0)	32 (32.0)	100 (100.0)	
5 (excellent)	2 (40.0)	3 (60.0)	5 (100.0)	
No score	51 (85.0)	9 (15.0)	60 (100.0)	

Source: MEC, April 2016

^a Chi-square test and Fisher exact test

^b ENADE: 91 schools did not provide information on these data: 21.3% of private schools and 8.7% of public schools

^c CC: 139 schools did not provide information on these data: 27.1% of private schools and 44.9% of public schools

^d CPC: 130 schools did not provide information on these data: 30.4% of private schools and 13% of public schools

outside of capital cities. Toward the end of the 20th century, Latin American governments, just like the United States and England, promoted strategies to overcome economic, political, and social problems through the application of neoliberal policies. To achieve a quality education in that context, it was necessary to meet the political demands to reproduce and improve a model of capitalist development and to foster openness to the privatization of education. Since then, most educational systems in Brazil fit into two institutional domains: a public and state-run educational system and a private educational system. However, free education is a constitutional right in Brazil and it is the government's responsibility to meet the educational needs of the population.²³ Given the existence of these two systems, the present study analyzed the quality indicators of pharmacy schools in Brazil, comparing public and private institutions.

We sought to better understand the expansion of pharmacy schools in Brazil. There has been a large privatization of pharmacy education since the 1990s, whereas the expansion of public pharmacy schools has stagnated.

During that period, the country underwent a redefinition of the public and private sectors, which directly affected higher education because of the commercialization of education. Brazilian governments have reformed higher education through a variety of normative instruments, such as the organic law on education and the National Education Guidelines and Framework Law, which focus on education budget limits.^{24,25} A similar situation has occurred in India, where until the mid-1980s, higher education was funded by the public sector and there were only 37 pharmacy schools. With the rapid industrialization of the pharmaceutical sector and the privatization and economic growth throughout the country, the number of pharmacy schools increased to 854, with 91% of them in the private sector.²⁶

More recently, the privatization policy adopted by the Brazilian government has been put into effect through a series of measures, such as fee waivers and scholarships for low-income students awarded through the Student Loan Fund and the University for All Program. These measures have stimulated the creation of schools and places in

private institutions and their expansion throughout the countryside.²⁵ The Southeastern region possesses the largest number of pharmacy schools because its population has a higher purchasing power and a higher per capita income, while the Northern region has lower incomes.²⁷ However, studies should be undertaken to determine whether these increases were associated with an increase in the satisfactory quality of pharmacy education.

One limitation of the present study was that information on the quality indicators of many schools was missing and some schools had not been given scores. The institution responsible for disclosing the data was contacted to determine why information was missing from the database. The institution reported that higher education institutions are free to decide whether they want to report information to the Ministry of Health database (e-MEC) and that institutions have sole responsibility for reporting the information. The present research is not an in-depth analysis of the realities of each institution considering its subjectivities and processes; rather, it was conducted based exclusively on quantitative information. Further studies should carry out a qualitative analysis, taking into consideration subjective aspects so as to contribute to the planning of public policies or even to decision-making.

CONCLUSION

Our study found that an expansion of Brazilian pharmacy schools has occurred in the private sector, mainly since the 1990s. In general, the pharmacy schools were of satisfactory quality (score of 3); however, public institutions were of higher quality. These schools were opened predominantly in non-capital cities. In view of the aspects addressed in this study, new investigations should be carried out to deepen the knowledge about the subjective dimensions of the evaluation of the quality of pharmacy schools in Brazil. This study was not intended to take over the role of the country's evaluation agencies; rather, it sought to draw the scientific community's attention to the importance of reflecting on the growth of pharmacy schools and to present the quality indicators developed in the evaluations of higher education in Brazil as tools that can be applied to other pharmacy schools in other countries with similar characteristics given the lack of specific criteria for pharmacy training.

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