

PROFESSIONAL BACKGROUND AND EXPERIENCE OF PHYSICIANS PRESCRIBING ANTIRETROVIRALS IN THE STATE OF SÃO PAULO

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ABSTRACT

OBJECTIVE. To analyze the professional profile of physicians who prescribe antiretroviral drugs (ARV) to HIV infected people in the State of São Paulo, Brazil.

METHODS. Databases from a range of different sources were consulted, namely Ministry of Health, São Paulo State Regional Medical Council, National Commission on Medical Residency and the Lattes standardized CV platform. Data on socio-demographic characteristics, academic and professional background and experience for the period from October 2007 to May 2009 were analyzed.

RESULTS. Regular ARV prescriptions were issued to 74 thousand patients by 1,609 physicians whose characteristics were as follows: even gender distribution, age 30 to 49 years, living in the metropolitan area of Greater São Paulo, graduated an average of 16.1 years ago at 93 different Brazilian medical schools, holding specialty diplomas in 67.5% of cases, most in the field of Infectious Diseases (38.9%). The mean number of patients per physician was 10, although 51.6% of physicians prescribed for 20 or more patients. Of these physicians 62% reported specialist knowledge or experience with HIV care, although 2.7% of all prescriptions were issued by physicians without a specialist qualification. Regions with high AIDS incidence had smaller numbers of prescribing physicians, such as Barretos and Baixada Santista, which had the highest concentrations of physicians lacking proper credentials.

CONCLUSION. The absolute majority of HIV patients receive their prescriptions from duly trained and experienced physicians. Nevertheless, the large number of non-qualified physicians together with the reduced number of physicians in regions with elevated HIV incidence constitute a major challenge to achieving comprehensive and adequate care for HIV patients.

KEY WORDS: Infectious disease medicine. Anti-HIV agents. Acquired immunodeficiency syndrome. Prescription drugs. Professional practice.

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INTRODUCTION

Antiretroviral drugs (ARV) can inhibit viral replication, help the immune system recover and reduce the occurrence of opportunistic infections and other causes of morbidity¹ and have had an impressive impact on mortality reduction and improvement of the quality of life of people infected with HIV. However, ARV prescription merits special attention because of the complexity of administration of these drugs and the dynamic nature of knowledge about the drugs and because of the impact on patient health and concerns with compliance and health system costs.²

Physicians prescribing these drugs must therefore have

a high degree of specialist knowledge about and experience with treating people with HIV to provide them with a basis on which to make the complex decisions that are necessary. This fact has given rise to a large number of studies attempting to define the profile of the ideal physician with the best qualities to prescribe ARV and provide care to people with HIV. In synthesis, these studies have suggested that the ideal care providers, at centers of excellence, are professionals who can offer the following combination of characteristics: be fully qualified, be up-to-date on ARV treatment and have professional experience acquired providing treatment to a minimum number of patients.³⁻⁸

In Brazil, such studies are still unpublished, but there is

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extant research that shows that treatment success is related to quality of care provided by healthcare services, with particular emphasis on service location and size and the availability of healthcare team professionals. Services that are not specialized and those that treat lower numbers of patients (less than 100) are more likely to have low quality levels. When compliance with antiretroviral therapy is analyzed, smaller services also have a higher estimated risk of noncompliance than do services with more than 500 patients.^{9,10,11}

The objective of this article is to describe the profile of physicians prescribing ARV for the treatment of people with HIV in the State of São Paulo, Brazil, in terms of sociodemographic characteristics, academic and professional qualifications and professional experience.

METHODS

The study population comprised the set of physicians who provided treatment to people with HIV in the State of São Paulo and who prescribed antiretroviral drugs between October of 2007 and May of 2009. The list of physicians included in this study was provided by the Brazilian Ministry of Health and was generated by their logistical drug control system (SICLOM). Information on sociodemographic characteristics and the physicians' qualifications was provided by the Regional Medical Council for the State of São Paulo (CREMESP) and supplemented with data from the National Commission for Medical Residency (CNRM) and the National Council for Scientific and Technological Development's unified curriculum vitae database (CNPq/LATTES). Epidemiological data for 2006 on AIDS and on the populations of the towns and cities where the physicians lived were provided by the Brazilian National Health Service's IT department (DATASUS).

Physicians were excluded from the analysis, despite being part of the set of all physicians who had prescribed at least once during the study period, if they had prescribed exclusively for the purposes of prophylaxis against HIV infection. The SICLOM database tags these as "special ARV prescriptions" and they include HIV-positive expectant mothers, cases of post-exposure prophylaxis after occupational accidents, cases of sexual exposure between partners with different seropositivity status, prophylaxis secondary to sexual violence and rape, needle sharing and other situations. The decision to exclude these professionals was based on the fact that these prescriptions are emergency procedures and short-lasting exceptional cases. In many cases the patient is not even registered at the dispensing service.

The following sociodemographic variables were included in the descriptive analysis: sex, age and place of residence, which was subdivided into Greater São Paulo, other parts of São Paulo state or other states.

Analysis of the geographical distribution of the physicians in the State of São Paulo was based on the state's regional health departments (RHD) and employed three indicators: the

absolute number of physicians per household, the number of physicians per 100 cases of AIDS notified in patients aged 13 years or over and the number of physicians per 100 thousand inhabitants.

The information on medical qualifications provided three variables: (1) time since graduating from medical school, categorized into: during the previous 4 years, from 5 to 9 years, from 10 to 19 years or 20 years or more; (2) qualifications in some type of medical specialty, which was affirmative for those who had completed a medical residency and/or were certified by a medical specialty board and/or had completed a *lato sensu* specialization course, a masters or doctorate; and (3) type of specialty qualification, classified into one of three categories: qualification in Infectious Diseases, when this was referenced at any stage of education; other specialty, when there was no reference to Infectious Diseases; or no specialty.

The SICLOM data also provided details on the number of prescriptions made per physician during the period and the number of patients given prescriptions. The variable "number of patients per physician" was categorized into: just 1 patient, from 2 to 5, from 6 to 20 and more than 20 patients. It should be pointed out that a certain percentage of patients were given prescriptions by more than one physician during the period, because of changing the healthcare service or the professional providing treatment. In these cases, patients were summed successively so the number of patients given prescriptions during the period is greater than the total number of patients being treated in the State of São Paulo.

In order to make it possible to analyze the profile of the physicians with respect to characteristics that contribute to treatment success, variables on knowledge of and experience with continuous treatment of people with HIV were also analyzed broken down into three categories: professionals with specific knowledge, which included those with qualifications in Infectious Diseases; professionals with experience, with or without specific knowledge, here defined as those physicians who were treating more than 20 patients during the period; and professionals without specific knowledge or experience. The more-than-20-patients category was used as a reference to indicate professional experience since institutional documentation, consensus statements and several studies have adopted this parameter.^{12,13,14}

RESULTS

A large number (3178) of different physicians prescribed ARV in the State of São Paulo from 2007 to 2009. Eight hundred and seventeen of them (817, 25.7%) exclusively prescribed for prophylaxis against HIV infection and were excluded from the analysis.

Seven hundred and fifty-two (752, 31.9%) of the 2361 physicians who treated people with HIV had only prescribed once, probably in situations related with hospital admissions, emergency care and medical residency, and were not

continuously treating HIV patients. The remaining 1609 (68.1%) physicians were seeing HIV patients regularly.

The profiles of the professionals who only prescribed once per patient were substantially distinct, being predominantly women (56.8%), less than 30 years old (50.1%), living in Greater São Paulo (58.1%), had completed Medical School within the previous 4 years (53.1%), with no specialty (50%) and 91.4% of them prescribed ARV for a maximum of five patients during the 20-month period. This subset of physicians prescribed drugs for a total of 1823 patients during the period.

In contrast, the subset of 1609 physicians who regularly treat people with HIV were older than 30 (74.6%) and were balanced in terms of sex, with 50.1% women. We analyzed the characteristics of this group of physicians in greater detail.

The analysis of the geographical distribution of physicians' place of residence (Table 1) indicates relative equality between Greater São Paulo (52.8%) and the rest of the State, with concentrations of residences in the State capital (48.4%) and the cities of Campinas (6.6%) and Ribeirão Preto (6.3%). However, significant inequalities are observed when this distribution is analyzed in relation to the number of cases of AIDS and the population in each location. Ribeirão Preto has 7.3 times more prescribers (8.7/100 thousand inhabitants) than does Barretos (1.2/100 thousand inhabitants);

Presidente Prudente has 9.6 times more prescribers per

AIDS case (2.5 per 100 adult cases) than does Barretos (0.26 per 100 adult cases). It is notable that, for 2006, some of the highest coefficients of AIDS incidence in the State are observed in regions, such as Barretos and Baixada Santista, with relatively low numbers of prescribers, with Barretos in third place (15.89/100 thousand inhabitants) and Baixada Santista in fourth (15.78/100 thousand inhabitants).

Mean number of years since graduating from Medical School was 16.1 and the prescribers were trained at a large number of schools all over Brazil. There are a total of 178 institutions teaching medicine in Brazil that have already graduated classes and 93 of them trained the prescribers of São Paulo. Schools located within the State itself predominated (65.3%) as did public institutions (52%). The States of Rio de Janeiro and Minas Gerais made the next greatest contributions.

A little over two-thirds of the regular prescribers had some type of specialty; 51.7% had completed a medical residency program; 60.3% were board certified, 11.9% had masters degrees and 8.8% held doctorates. (Table 2). Infectious Diseases was the principal specialty (38.9%).

It is notable that a large proportion of these prescribing physicians (32.5%) had no specialist qualification and that 28.6% had some type of qualification in other specialties and fields of medicine that are not directly related to the diagnosis and treatment of infectious diseases.

Table 1 - Distribution of the physicians studied by specialty and sex, age group, number of patients treated, time since graduation and place of residence. São Paulo, Brazil, 2008

		None		Specialty Infectious Diseases		Other specialties		Total	
		N	%	N	%	N	%	n	%
Sex	Male	239	45,7	318	50,8	246	53,5	803	49,9
	Female	284	54,3	308	49,2	214	46,5	806	50,1
Age group (years)	Up to 29	268	51,2	48	7,7	92	20	408	25,4
	30 to 49	136	26	416	66,5	185	40,2	737	45,8
	50 or older	119	22,8	162	25,9	183	39,8	464	28,8
Number of Patients	Just 1	55	10,5	11	1,8	54	11,7	120	7,5
	2 to 5	149	28,5	61	9,7	97	21,1	307	19,1
	6 to 20	134	25,6	94	15	123	26,7	351	21,8
Time since graduated from medical school (years)	More than 20	185	35,4	460	73,5	186	40,4	831	51,6
	Up to 4 years	283	54,1	36	5,8	95	20,7	414	25,7
	5 to 9	46	8,8	123	19,6	39	8,5	208	12,9
	10 to 19	50	9,6	206	32,9	78	17	334	20,8
Place of residence	20 or more	144	27,5	261	41,7	248	53,9	653	40,6
	Greater SP	267	51,1	379	60,5	204	44,3	850	52,8
	Other SP	239	45,7	240	38,3	253	55	732	45,5
	Other States	17	3,3	7	1,1	3	0,7	27	1,7
Total		523	100	626	100	460	100,	1609	100

Among the factors investigated, age group and time since graduation were most closely related to professionals having a medical specialty. Therefore, 70.2% of the men, who had older mean age (44.6) and longer time since graduation (mean of 17.5 years), had a specialty, whereas this percentage was 64.8% among the women, whose mean time since graduation was 11.5 years and whose mean age was 38.6 years. There was no significant difference in proportion of physicians with a specialty when analyzed by town of residence. However, the Infectious Diseases specialists are more heavily concentrated in Greater São Paulo (60.5%).

The group of professionals analyzed here prescribed antiretrovirals for 74368 people with HIV, generating a total of 817855 dispensing records. This was a mean of 11

prescriptions per patient over the 20 months analyzed.

The mean number of patients given prescriptions per physician was 90.3 and the mode was 1, with 51.6% of the professionals prescribing drugs for 20 or more people during the period, while 26.5% treated a maximum of five patients.

There is an important relationship between professional experience and the number of patients prescribed for, with the number of patients exhibiting a tendency to increase in line with increased age, with longer time since graduation and if the professional is qualified in a specialty. Thus, those qualified in Infectious Diseases (who were responsible for prescribing to 66.9% of the patients), professionals aged 30 or older (91.9% of the patients) and those who graduated more than 20 years ago (48.2% of the patients) were treating, 3.7; 7.5 and 6.3 times more patients than professionals with

Table 2 – Percentage of physicians prescribing ARV who had completed residency, specialization, masters and/or doctorate, by sex, age group and number of patients. São Paulo, 2008

		Specialty	Residency	Residency or specialty	Masters	Doctorate	Residency, specialty, masters or doctorate
		%	%	%	%	%	%
Sex	Male	63,9	49,7	70	11,8	10,6	70,2
	Female	56,7	53,7	64,5	11,9	6,9	64,8
Age group (years)	Up to 29 years	20,3	33,3	34,1	1,7	0,5	34,3
	30 to 49	76,1	71,1	81,3	15,6	10,3	81,5
	50 or older	70,3	37,1	74,1	14,9	13,6	74,4
Number of patients	Just 1	51,7	33,3	54,2	5,8	10,8	54,2
	2 to 5	44,6	40,4	51,1	10,1	9,1	51,5
	6 to 20	53,8	45	61,5	9,7	8,3	61,8
	More than 20	70	61,4	77,5	14,3	8,5	77,7
Total		60,3	51,7	67,2	11,9	8,8	67,5

Table 3 – Percentage of physicians by expertise, time since graduation, sex and age group. São Paulo, 2008

		Specialist knowledge		Experience without specialist knowledge		Neither	
		N	%	N	%	N	%
Years since graduation	Up to 4	36	5,8	68	18,3	310	50,7
	5 to 9	123	19,6	42	11,3	43	7
	10 to 19	206	32,9	66	17,8	62	10,1
	20 or more	261	41,7	195	52,6	197	32,2
Age group (years)	Up to 29	48	7,7	65	17,5	295	48,2
	30 to 49	416	66,5	147	39,6	174	28,4
	50 or older	162	25,9	159	42,9	143	23,4
Sex	Male	318	50,8	181	48,8	304	49,7
	Female	308	49,2	190	51,2	308	50,3
Total		626	100	371	100	612	100

no specialty, than younger professionals and than those who graduated within the previous 4 years.

When we analyzed the profile of the physicians against characteristics that could influence treatment success, we observed that 38.9% had specialist

knowledge, since they had Infectious Diseases qualifications, and 51.6% had experience in treating people with HIV, defined in this study as treating 20 patients or more during the period. Prescribers who did not match either of these two conditions made up 38% of the sample of professionals. (Table 3)

Professionals who did have specialist knowledge or experience (62%) were responsible for prescribing drugs to 97.3% of the people with HIV and the majority of the Infectious Diseases specialists (73.5%) were prescribing for more than 20 patients. The regions with the lowest proportions of professionals with knowledge or experience were Registro (37.5%) and Ribeirão Preto (52.3%), while the highest proportions were observed in Marília (79.3%) and Piracicaba (69.7%).

Of those prescribers who did not meet any of the criteria analyzed, 50.7% had graduated less than 4 years previously, 48.2% were 29 years old or younger and 50.3% are women (Table 3). This subset of physicians was responsible for prescribing drugs to 2.7% of the patients in the State of São Paulo.

CONCLUSIONS

Analysis of the profile of physicians prescribing antiretroviral drugs in the State of São Paulo revealed two distinct patterns: the majority of patients were given prescriptions by professionals who, in theory, had the knowledge or experience to guarantee quality of care. This is corroborated by the fact that the ARV prescribers who had the most HIV patients were those with more specialist qualifications, those who were older and those who had been qualified for the longest time.

On the other hand, more than a third of the prescribers analyzed did not have any type of specialist qualification and had little experience continuously treating HIV patients. Almost half of them had not completed a medical residency program, which is considered the most important form of in-service specialization to supplement deficient undergraduate medical courses.¹⁵ There are two groups of ARV prescribers in the State of São Paulo: physicians with qualifications in Infectious Diseases and physicians with a range of different specialties or general practitioners with no specialist qualifications.

When interpreting the findings of this study, it should be understood that relatively inclusive parameters were adopted, defining professionals as specialists if they had a qualification in any medical specialty, accepting a range of different specialist qualifications (medical board certification, medical residency, *lato sensu* specialization, masters and doctorates). Many of the specialists who are not Infectious Diseases specialists, such as pediatricians and gynecologists, may well offer

additional attributes applicable to prescribing ARVs for specific patient populations. However, other common specialties, such as occupational health and general surgery, would appear to have less relevance to prescribing ARVs. This is one limitation of the study, since, with the exception of Infectious Diseases, it doesn't distinguish between specialties that are more or less appropriate to prescribing ARVs.

Notwithstanding, it should also be understood that the best specialist physician is not necessarily the one with the best qualifications. A physician's capacity may derive from their professional experience, which can be translated into years of practice or number of cases treated. In Brazil, in partly because of a lack of medical residency places and because of individuals' need to begin paid employment, it is still common for physicians to start their careers as general practitioners and later to specialize informally among their peers or in daily practice at health services and sometimes going on to obtain certification by passing medical board examinations.

In the case of complex antiretroviral therapy it is not only necessary to take into account the experience and specialties of the prescribers, but also the heterogeneous nature of the patients' needs and the uncertainty of clinicians who are constantly faced with changing treatment contexts and an accelerated rate of advance in medical and scientific knowledge.¹⁶

Compounding this are certain features of medical training in Brazil, where there is evidence of a deterioration in medical teaching, where the number of courses in medicine that do not have the minimum conditions necessary are multiplying, where the career of physician is characterized by multiple jobs, excessively long shifts, a low level of specialization and a low level of attendance at ongoing education programs.¹⁷

A large number of physicians who treated up to 20 patients did not have a qualification in Infectious Diseases, although they were responsible for treating a smaller number of patients. These prescribers are characterized as young, recently qualified, living in parts of the State of São Paulo other than Greater São Paulo and having a lower mean number of patients and prescriptions.

Along the same lines, it should be considered that around 2000 patients were prescribed with their antiretroviral drugs by physicians who only prescribed once for each individual. Our survey methods did not identify the situations in which these prescriptions were made, but it can be assumed that a proportion of them will have been written out in medical residencies or during admissions and at emergency services. These last two situations are critical points in AIDS treatment and demand professionals with the capacity to ensure that the health of people with HIV is not compromised.

Therefore, even though this study has confirmed the existence of an "elite" among prescribers that treats the greater part of those living with HIV and AIDS, the possible negative impacts on the health and lives of those treated by professionals without experience and/or specialist qualifications cannot

be ignored. These professionals may become potential regular prescribers further down their career paths.

To the extent that they have an impact on better or worse care, the diverse professional and academic backgrounds of these physicians can be viewed as an additional obstacle to the implementation, through public policies, of ongoing education programs and ARV clinical management refresher courses with wider coverage.

The low concentration of prescribing physicians in parts of the State that have high incidence rates of AIDS is of concern and underscores the need for actions and initiatives that will improve the geographical distribution of physicians through incentives that encourage and prioritize their placement in peripheral services.

Although it was not one of the objectives of this study to analyze the profile of qualifications of professionals who only prescribed ARVs for prophylaxis against HIV infection, it is clear that this subset merits special attention in health policy because they perform an essential activity and are significantly numerous to reduce the impact of the epidemic on the population.

It is true that there are gaps in the literature with relation to the effect of care provided by specialists (Infectious Diseases specialists or other specialists) compared with general practitioners in terms of patient outcomes. More research is needed before a definitive recommendation can be formulated.¹⁸

There is also more work to do on the subject of how much experience is enough or ideal to determine which physicians are in fact qualified to treat HIV and AIDS.^{19, 20}

This was the first study to delineate the profile of those prescribing ARV drugs in Brazil, which is an important first step, making possible studies to analyze the relationship between the physicians who are treating HIV / AIDS, the experience they gain, the care processes, the regularity of ARV availability, compliance with treatment and clinical and virological patient outcomes.

This is undoubtedly a subject of great interest to those financing and managing healthcare systems, to the government programs that promote access to ARVs, to medical professionals and to people living with HIV and AIDS.

Ethics Committee

This research was approved in advance by the Research Protocol Analysis Ethics Commission - CAPPesq/HC/FMUSP.

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