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Original Articles

Evaluation of the Brazilian Health Research System: some characteristics of the researchers and the scientific production[1]

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Abstract

The article describes some characteristics of researchers and scientific production in the health field. The data was obtained through a survey carried out with a sample of 180 researchers selected at random from among the leaders of research groups registered in the Brazilian National Council for Scientific and Technological Development (CNPq)'s research directory. Compared to the total of researchers in the CNPq research directories, the interviewees had a higher median age, a similar distribution by sex and a similar academic background. No differences in salary were noted according to the area of activity. Scientific production is usually limited to academic environments and shows accentuated growth. Academic training and qualification is taking place in the country, and is a key factor in the growth and enhancement of health research.

Keywords

Scientific policy, researcher profile, scientific production, health research system, researcher income

Introduction

A series of documents prepared by international cooperation agencies has highlighted the importance of the system of science and technology in health for achieving the objectives of national health systems. According to the dominant perspective, scientific and technological knowledge should be seen as an input for the actions of the national health policy (GLOBAL FORUM FOR HEALTH RESEARCH, 2004; PANG et al., 2004). In addition, it is necessary to consider the impact that the outcomes of research and technological development may have on healthcare policies. Health research can have a direct impact on costs, whether through the introduction of new prevention methods which reduce the number of people affected, or through an increase in the unit cost of treatment due to the incorporation of new technologies (BUXTON et al., 2004).

According to Guimarães, a survey carried out by the Global Forum on Health Research showed that almost 106 million dollars were spent on health research and development worldwide in 2001. In Brazil, health research activities represented a third of all research activity in the country in 2004, without taking into consideration the development work carried out by the private sector (GUIMARÃES, 2006).

Among its strategies for strengthening the health research capacity in member countries, the World Health Organization (WHO) proposed the use of Health Research Systems Analysis (HRSA) as an instrument for generating information and evaluating the status of health research in countries.

The HRSA initiative comprises two main activities: research projects focusing on current issues and country studies. This study fits into the latter category.

The countries which participated in the pilot phase were: Tanzania, Senegal, Pakistan, Iran, Kazakhstan, Brazil, Costa Rica, Indonesia, Thailand, Malaysia, Laos, Chile, Cameroon, Tunisia, the Russian Federation, France and Australia.

The main goal of the pilot study was to test a set of instruments for the diagnosis and monitoring of countries' health research systems. The WHO's key arguments for adopting the survey as a privileged source of information were: the need to discover the perspectives of the various actors – science policymakers, researchers and health research users – and to focus on all research with application in the health sector, not just biomedical research as is traditionally the case in scientometric evaluations. This article presents some of the information obtained in the survey, which was carried out with a sample of researchers, science policymakers and research users. The survey covered four topics: characteristics of the interviewees, evaluation of the research environment in the country, evaluation of the health research system and production and use of research.

This article will present the results in relation to some of the characteristics of the researchers who were interviewed and the production of research, since the large amount of information available means it is impossible to present all of the points of the evaluation in one article.

Methodology

The research was carried out through a survey using a probabilistic sample of researchers and an intentional sample of science policymakers and users of scientific knowledge. The data was obtained through interviews with the individuals and the analysis is exploratory, of the descriptive type. The data in this article refers only to the probabilistic sample of researchers.

Sample

Given the time and financial limitations, the team opted to concentrate the interviews in the six states where most of Brazil's health research activity takes place: Rio de Janeiro, São Paulo, Minas Gerais, Rio Grande do Sul, Brasília and Bahia (GUIMARÃES, 2006; CNPQ, 2003). As well as the state capitals, the cities of Campinas, Ribeirão Preto, Niterói and Pelotas were also included as they are home to important university campuses.

The WHO proposed that interviews be carried out with 200 researchers, 50 science policymakers and 50 users of scientific knowledge. These numbers were arbitrary for the pilot phase stage. At this first moment there was not a concern with using large enough samples to ensure the power of the test, since the purpose was only to describe the situation in each country from the perspective of the various actors in the health research system.

The selection of the researcher sample was based on the identification in the Brazilian National Council for Scientific and Technological Development (CNPq)'s Directory of Research Groups of the leaders of groups active in the health and biological sciences as well as other areas, as long as the knowledge generated had application in the health sector. 180 leaders were selected, corresponding to around 2% of the total of health research group leaders and 5% of group leaders in the states selected for the research.

Of the 180 researchers selected only 145 were effectively included in the survey, and of these, 128 completed all of the questionnaires. The losses were due to the excessive duration of the research, which led several interviewees to request that it be interrupted and the fact that the questionnaire was considered "boring" and repetitive by the majority of interviewees. The refusals to schedule the interview (19%) were justified due to not having time to receive the interviewers, given that the estimated average duration of the interview was 1 hour and 50 minutes.

Instrument

The questionnaire was developed by the WHO team and translated into Portuguese. The Project Coordinators then held various meetings with consultants who were contracted to analyze the questions in order to homogenize concepts and categories. It was made up of five modules, with the first one relating to the social and demographic characteristics of interviewees, the second focusing on the evaluation of the research environment, the third on the evaluation of the health research system, the fourth on defining the production and use of scientific knowledge and the fifth one relating to the evaluation of the instruments used in the interview. The WHO team was in charge of carrying out validity and reliability analyses (53 questionnaires were reapplied by the coordinators) and the final design of the instruments, incorporating in part the suggestions from the countries.

In global research coordinated by the WHO, the adjustment of the instruments to the reality of each country is always problematic. The WHO coordinators are often not aware of the existing capacities in member countries and their starting point is that they do not exist. As a result, the design of the research and the instruments ends up being inadequate for the majority of situations. Given the concern with guaranteeing comparability and, in particular, applicability even in countries with few resources, there is practically no flexibility to make adjustments.

Despite these difficulties the national team believed that the results of the pilot study should be disseminated, since they contain some information which is not currently available about the health research system in the country. For this article the data from modules 1, 4 and 5 was used.

Data processing

The data were double entered in a database built in the Epi-Info application to make it possible to check the entries electronically. As well as the automatic procedure for checking the entries, a consistency analysis was also carried out for each of the questions included in the five questionnaires applied to each interviewee.

The processing was carried out in the SPSS application, consisting mainly of description procedures, given that the size of the sample was not sufficient to carry out consistent internal comparisons, and that it was intentionally directed only at research group leaders in the regions of the country with the most scientific production. The results therefore reflect the characteristics of these leaders, and cannot be generalized for the universe of Brazilian researchers.

Results

The interviewees were predominantly male, corresponding to 60.7% ($IC_{95\%}$:54.0-67.1) of the sample and the median age was 50 to 59 years. The average monthly income varied from R$ 1,880.00 (US$ 644.00) to R$ 50,000.00 (US$ 17,123.00) with an average of R$ 7,872.02 (US$ 2,696.00) and a median of R$ 5,500.00 (US$ 1,884.00) with 25% of interviewees reporting monthly income below R$ 4,800.00 (US$ 1,644.00) and 25% with a monthly income over R$ 8,000.00 (US$ 2,740.00)

The sample of researchers showed different characteristics from the whole. Amongst researchers the distribution by sex was balanced, with 52.4% (IC:44.0-60.8) being women and 47.6% men (IC:39.2-56.0). The distribution is similar to that observed for the leaders of research groups in the health sciences in the states selected and for the country as a whole, according to data from the CNPq Directory of Research Groups (non-significant differences).

The women were on average younger than the men, with an average age of 47.9 and 50.6 years respectively. Chart 1 shows the age distribution for men and women. The lower average age of women can be attributed to a generation cohort effect, in accordance with the increase in levels of education amongst women observed over the past 25 years.

The average income of the researchers was R$ 7,872.00 (US$ 2,696.00) with a median of R$ 5,500.00 (US$ 1,884.00). The average monthly income ranged from R$ 1,880.00 (US$ 644.00) to R$ 50,000.00 (US$

Chart 1 - Distribution of researchers by age and sex, Brazil, 2003

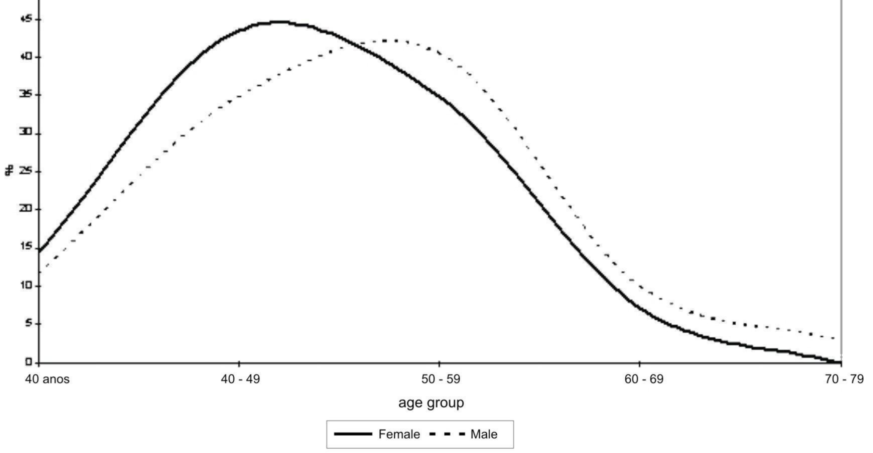

Table 1 - Percentiles of researchers' average monthly income, Brazil, 2003

Percentile	Average monthly income	
	R$	US$
0	1880,00	644.00
10	4000,00	1370.00
20	4500,00	1541.00
30	5000,00	1712.00
40	5000,00	1712.00
50	5500,00	1884.00
60	6300,00	2158.00
70	7500,00	2568.00
80	10000,00	3425.00
90	13000,00	4452.00
100	50000,00	17123.00

17,123.00). Table 1 shows the percentiles of the income distribution of the researchers.

No significant differences were observed between the average income of men and women, between researchers from the public, private or philanthropic sectors, or between researchers from different age groups. The average monthly income was higher for researchers from the basic, clinical or public health areas compared to the average monthly income for researchers working with technological development.

The number of dependents per researcher varied from 0 to 15. The average was equal to 2.64. The median number of dependents was 2.0, with 25% of interviewees having less than 2 dependents and 25% having more than 3.0.

As for the sector in which researchers are active, 85.5% of researchers work in the state public sector and 11.7% in the non-profit-making private sector. Only one researcher works in the profit-making private sector. Of the researchers interviewed, 94% are university lecturers. The rest work as researchers in research institutions.

Of the interviewees, 99.5% ($IC_{95\%}$:96.4-99.9) were carrying out paid work and 86.8% were working full-time. Of the others, 10.7% were being paid for more than 50% of their time and 2.0% for less than 50% of their time.

The years of professional experience varied from less than a year to more than 50. The average time of professional experience was 24.8 years with a median of 24 years.

Around 5% of researchers are active in the area of science policymaking, communication, information and publishing. Of the rest, 42% are active in basic research, 20% in clinical research, 9.3% in public health and 5% in research and development.

Only 1.4% of interviewees (IC95%:0.2-4.9) are educated up to university level only, without postgraduate courses. Around 6% (IC95%:2.9-11.5) have a master's degree and the remaining 92.6% (IC95%:88.3-96.9) have a PhD. This data is also similar to the distribution observed for health research group leaders in the states selected and in the country as a whole, according to data from the CNPq Directory of Research Groups (non-significant differences).

The areas of concentration in master's and PhDs were mainly health sciences (32.7%), biological sciences (20.9%) and human and social sciences (17.2%). Around 35% of interviewees also have a post-doctorate.

Still in relation to education, around one third of interviewees report having undertaken specialization or training courses related to their research activity or health policymaking activities.

The interviewees' command of English for reading, writing and speaking was investigated. Only 2% of interviewees reported little or no ability to read in English. The proportion of those who reported little command of the written or spoken language was 12% and 16% respectively.

Of the researchers interviewed, 12 reported having changed their citizenship. Of these, six acquired Brazilian citizenship, three acquired Portuguese citizenship, two acquired Italian citizenship and one acquired Spanish citizenship.

Among the foreign researchers who came to Brazil, only 28% cited professional motivations for the migration.

Table 2 shows the activities carried out by the researchers over the past 12 months. More than 75% of the interviewees carried out activities directly related to the production and dissemination of research results as well as the training of new researchers. Between 50% and 75% of researchers carried out activities related to the selection of priorities, evaluation of projects, synthesis of research results and their dissemination to laypeople. Between 25% and 50% of researchers mentioned activities related more to science policy, such as monitoring production indicators, evaluation of the research structure and reviewing ethical aspects of projects. Less than 25% of researchers were involved in activities more directly related to health policy.

Table 2 - Activities carried out in the last 12 months by researchers, Brazil, 2003

Activity	%
Preparation and submission of articles	96.2
Teaching and training of new researchers	93.2
Leadership of projects	90.2
Submission of research proposals	86.5
Administration of projects	85.0
Evaluation or review of research results	78.9
Teaching and training in the use of research results	74.2
Project review	66.9
Synthesis of research results	63.9
Preparation of reports for the press	56.8
Discussion, selection of priorities for health research	55.6
"Advocacy" of research activities	47.4
Discussion, selection of research priorities in another area	44.4
Development of new interventions	42.4
Allocation of funding for research	39.8
Review of ethical aspects	39.4
Updating of interventions	37.1
Monitoring or evaluation of the physical and human infrastructure for research	32.6
Monitoring of indicators of research production	30.3
Identification of priorities for health policies	25.8
Monitoring or evaluation of adherence to research priorities	25.8
Review of existing policies	23.5
Acquisition of patents	22.7
Monitoring of financial flows for research	22.0
Formulation of health policies	18.2
Implementatation of policies	17.4
Evaluation of the implementation of policies	17.4
Elaboration of calls for research proposals	13.5

Table 3 - Scientific and intellectual production in the last five years, Brazil, 1998-2002

Products	Production in the period	Average production per researcher*	Average production per productive researcher*
Articles published in international periodicals	415	2.86	9.88
Articles published in peer-reviewed national periodicals	696	4.80	13.13
Presentations at international congresses	1,352	9.32	18.03
Presentations at national congresses	2,801	19.31	28.29
Books or book chapters	619	4.27	12.89
Research reports	209	1.44	12.29
Reports for the media	451	3.11	6.53
Technical documents	106	0.73	17.66
Articles in newspapers or magazines distributed to laypeople	158	1.09	10.00
Participation in radio or TV programs	567	3.91	9.45
National patents	2	0.01	1.00

* excluding researchers who did not produce during the period

Table 4 - Proportion of non-productive researchers in relation to each product analyzed, Brazil, 1998-2002

Products	Average proportion in the period
Articles published in international periodicals	71.0
Articles published in peer-reviewed national periodicals	63.4
Presentations at international congresses	48.6
Presentations at national congresses	31.6
Books or book chapters	67.0
Research reports	88.0
Reports for the press	52.6
Technical documents	95.6
Articles in newspapers or magazines distributed to laypeople	89.1
Participation in radio or TV programs	65.4
National patents	99.7

Scientific and intellectual production over the past five years was evaluated through the number of internationally indexed articles, peer-reviewed national articles, presentations at national and international congresses, books and book chapters, research reports, technical documents, reports for the media, newspaper articles, participation in radio or television programs and the number of national patents acquired (Table 3).

The difference in the average production by researcher and by productive researcher gives an idea of the proportion of productive researchers in the sample. Each year, a considerable portion of researchers do not produce material for each of the products under consideration (Table 4). For all of the products considered, a trend of increasing production over the past five years was observed.

The annual average of articles produced over the past five years was 0.57 for those published in journals with international indexing and 0.96 for those published in peer-reviewed national periodicals. The average number of presentations at congresses was 1.86 for international congresses and 3.86 for national congresses. The number of books or book chapters published was 0.85. The number of products developed with a national patent was 0.002. If only the productive researchers are taken into account, these numbers are more expressive: 1.98 international articles; 2.63 national articles; 2.56 books or book chapters; 3.61 presentations at international congresses; 5.66 presentations at national congresses and 0.20 national patents per researcher per year.

The production of researchers of the overall area of health sciences in the states under consideration is quite similar in relation to the articles published in periodicals. In 2004, 4.5 national and international articles were recorded. The production of books or book chapters and presentations at congresses, as well as other products, was lower in the overall group of researchers. For group leaders in the country as a whole, the intellectual production is slightly less than that found in the sample.

As well as the information above, the access of interviewees to national and international scientific periodicals and the internet and their ability to download research at least once a month were also investigated. Almost 100% of interviewees reported having access to at least five international periodicals (94.9%) and five national periodicals (93.9%), a computer connected to the internet (94.4%) and the ability to download (96%).

Interviewees were also asked about the minimum percentage of their time which should be dedicated to research activities (the ideal time) and the actual time spent on health research. For the two distributions the average and median were around 50% of the researchers' time. For 23% of interviewees, the time cited as ideal coincides with the time actually spent on research. Around 40% of researchers spend more time on research than they consider ideal, whilst 34% spend less time than they think is ideal.

Discussion

The characteristics of the interviewees fundamentally reflect the biases stemming from the process of selecting the sample. The intentional selection of leaders from the scientific and health fields, giving the aims of the survey, ended up generating a sample with quite particular characteristics. The comparison with the data available in the CNPq Directory of Research Groups leads to the conclusion that the sample studied may be considered representative of the leaders of research groups in the selected states and in the country as a whole.

Sociodemographic characteristics

The distribution by sex of the interviewees reflects the fact that male researchers dominate in positions of leadership, whether in the sample of policymakers or in the sample of users and researchers. The total of researchers registered in the CNPq's research group directory showed this distribution of two men for every woman in 1995. In the last census carried out in 2004, the distribution was found to be 53% male to 47% female (CNPq, 2004). However, in the overall health sciences area, 49.1% of researchers are male and 50.6% are female (CNPq, 2004).

A study carried out among full and associate professors at Swiss medical schools showed higher concentrations of men, corresponding to 93.1% of the positions (BUDDEBERG-FISHER, et al., 2003:319). For the Johns Hopkins medical school, the proportion of men varied from 71%, in the faculty as a whole, to 82% among clinical researchers (THOMAS, et al., 2004). While the data is not comparable, since in the overall health area there is a higher concentration of women in areas other than medicine, the data suggests a greater concentration of men in positions of leadership or at the top of the academic profession than that which is seen in Brazil.

For the Collective Health area, for example, CNPq data for the research directories in 2002 showed that 41% of PhDs were male and 59% were female. The same proportion was observed among the holders of productivity grants, suggesting the lack of gender discrimination in the allocation of grants; however, when the classification of the grant holders was considered the distribution was inverted, with a marked predominance of women in the initial classes (2B and 2C) and men at the top of the distribution (1A and 1B) (BARATA et al., 2003).

The distribution by age of the interviewees is also different from the distribution observed both for researchers in general and for the leaders of research groups. The group interviewed for this survey is on average ten years older than the reference population. The median age was similar to that observed among full and associate professors at Swiss medical schools and higher than that observed among the researchers and teaching staff at the faculty of medicine of Johns Hopkins University (BUDDEBERG-FISHER et al., 2003; THOMAS et al., 2004).

In relation to the average income there is no information available which would allow a comparison with researchers as a whole. The values observed are compatible with the salaries paid to university-educated professionals with postgraduate qualifications in Brazil.

The absence of differences in income in relation to the areas of activity may be due both to the lack of differentiated salary conditions for health researchers, whatever their area of activity, and to the insufficient size of the samples. Researchers from the basic area made up 40% of the sample, meaning that the estimates for this group were more precise. If the sample had included a similar number of individuals from each of the groups, perhaps the differences in income would be significant.

The fact that the majority of interviewees carry out teaching functions or are involved in directing academic institutions stems from the fact that Brazilian science is predominantly academic with low levels of insertion in spaces outside of universities or research institutions. The concentration of activities in public institutions is also marked on the national scientific landscape, concentrating almost all of the national research capacity in the state and federal universities and in the research institutions of the federal government and some state governments (LANDI, 2005; LETA et al., 2006). The predominance of research in state universities corresponds to the so-called Western profile which can also be observed in Belgium, Finland, Ireland and Portugal (LETA et al., 2006).

This concentration of research activities in public and university institutions is the result of a relatively complex set of social processes related to the model of higher education present in the country; the low levels of investment by companies from the productive sector in technological development, given that the national industrialization process took place fundamentally through import substitution without significant investment in innovation; the precariousness of private higher education institutions; and the relative scarcity of research institutions linked directly to government agencies, as is the case in other countries.

The average time of professional experience, around 24 years, suggests that the individuals selected for the sample have knowledge of the different aspects of scientific activity, and are therefore capable of participating in the evaluation proposed in a conscious way.

The qualifications held by the interviewees were also different from the overall group of researchers according to data from the 2004 census. Of researchers as a whole, 65% hold a PhD, compared to 88.3% among leaders as a whole, and 93% in our sample, once again reflecting the criteria used to select interviewees (CNPq, 2004).

Individuals in the sample obtained their qualifications, predominantly, in health sciences, biological sciences or human sciences (71.4%).

The expressive attendance of courses on topics specifically related to scientific activity reported by interviewees suggests, on the one hand, a preoccupation with capacity-building in order to be able to carry out the different functions and on the other, the wide choice of training and education for research which exist in the country.

The use of foreign languages in professional activities is coherent with the influences present in the Brazilian academic environment. The dominance of English as the "language of science" in the health sciences field reflects the universal hegemonic tendency of North American science in all areas of knowledge. The smaller, but significant, proportion of the use of Spanish may be a reflection of Brazil's Mercosur commitments and the increased relationships with other countries on the continent and the Iberian peninsula. Finally, the use of French reflects the influence of French science, mainly in the field of human sciences, which played a role in the founding of Brazilian universities and still exerts a great deal of influence in this field.

The command of the written English language is one of the important determinants of the growth in the number of publications indexed in international databases. (MAN, et al., 2004).showed the strong correlation between grades achieved in the English proficiency exam (TOEFL) and the number of articles published in the five main scientific periodicals from the medical area: *The New England Journal of Medicine, JAMA, The Annals of Internal Medicine, BMJ* and *The Lancet* (MAN, et al., 2004).

Scientific production

The high number of interviewees who stated that they did not generate a regular flow of scientific production in the period under analysis is partly due to the selection process itself, which gave priority to individuals in leadership positions and directors of institutions, in other words those with less time for producing research.

The exclusion of these individuals with no production in the period from the calculation of the average rate of production reveals a group which is quite productive, corresponding to the selection criteria of researchers who lead research groups. The comparison of these values with those obtained in the census of research groups is frankly favorable for the sample studied here, even though the criteria adopted for the classification of products are not the same. In the directory the classification of articles in national and international periodicals is based on the language used, whereas this research used the periodical classification criteria adopted by CAPES (the Brazilian Ministry of Education's agency for the development of higher education staff and evaluation of postgraduate programs), considering as international those periodicals which are indexed in databases such as the ISI or Medline.

The results of this study, which found higher levels of productivity among the researchers included in the sample compared to the totality of researchers in the selected states and the country as a whole, are coherent with the fact that the sample includes only the leaders of research groups. The data for scientific production which is available in the census of research groups does not allow the production of the leaders to be considered separately. Accordingly, the leaders demonstrated higher rates of production, followed by that of the researchers from the selected states and those in the country as a whole.

The scientific production of Brazilian articles shows expressive growth over the last decade, placing the country among the 20 countries with the largest number of articles indexed in the Thomson Scientific databases (ISI) in 2002. Although 72% of the articles in this database originate in the seven countries of the G7, Brazil appears in 19th position with 0.73% of the production (PARAJE et al., 2005).

In 2004, Brazilian production became responsible for 1.7% of the global production, and the country moved into 17th position (FAPESP, 2005). During the 1990s, Brazilian production rose around 8% or 9% each year, increasing its participation in global production by 150% (GLÄNZEL et al., 2006). It is important to emphasize that these evaluations capture only part of the national production, given that few Brazilian journals are indexed in this database. Meneguini et al. (MENEGUINI et al., 2006) show that of the 144 journals indexed in the SciELO Brasil collection in 2006, only 19 were indexed by the ISI/ JCR. Among the most popular periodicals for publication among Brazilian scientists in 2003, the majority were national or Latin American periodicals, with publications in English or Portuguese. This strategic publication can mainly be observed in the life sciences (GLÄNZEL et al., 2006).

The impact of Brazilian science measured by the relative ratio of citations, a comparison between the citations received by the article and the citations expected based on the average rate of citations of the periodicals in which the articles were published, is greater in the areas of physics, agricultural sciences and biology (indexes over 1.5) and smaller in the medical sciences (indexes under 1.0). Still in the area of health sciences, biomedical research achieves an index of 1.0, which is within what would be expected (GLÄNZEL et al., 2006). It is not possible to establish the impact of the collective health area, since the classifications adopted in European research do not allow this field to be separated out. When the index is calculated without self-citations, all the areas give results below 1.0, with the smallest change taking place in the medical sciences, showing that the use of self-citation is relatively rare in this area (GLÄNZEL et al., 2006).

All the product modalities analyzed show expressive and growing production between 1998 and 2002. The big exception is the number of patents obtained, which reflects the incipient state of research and development in the country. The stagnation of economic growth in the period between 2000 and 2003 meant that there was little progress in technological innovation in the country. On the other hand, the Industrial Survey of Technological Innovation, or Pintec (PINTEC 2003), carried out by the Brazilian Institute of Geography and Statistics (IBGE), showed a growth of 30% in the number of industries which invested in the development of new products and processes. Only 2.3% of industrial turnover was spent on innovation. Around 19% of industries received financial support from the government for innovation programs, through credit lines from the BNDES (National Bank for Economic and Social Development), the *Banco do Brasil* (Bank of Brazil) and the *Caixa Econômica Federal* (Federal Savings Bank). As well as these credit lines there are programs run by the FAPESP (Research Support Foundation of the State of São Paulo), CNPq and FINEP (the Brazilian innovation agency) for industrial innovation and for projects developed by partnerships between companies and universities with resources from the sectoral funds (FAPESP, 2005).

Access to scientific information is also high in the different modalities investigated, confirming several of the affirmations made by interviewees in the evaluation of this component of the system. Ospina et al. studied the access of Latin American researchers (excluding Brazilians) from the biomedical areas to bibliographical databases, and found similar levels of use. Unlike Brazil, where the CAPES portal provides a significant proportion of researchers with access to a wide range of periodicals, one of the most significant problems encountered by researchers in other Latin American countries is the difficulty in accessing the complete texts of publications. In the investigation carried out by Ospina et al., only 1.2% reported having access to texts online (OSPINA et al., 2005).

Finally, although the same average and median were shown for the minimum time considered necessary for the development of research activities and the actual time dedicated to these activities, there were some discrepancies. There was only a match between the ideal and the actual time spent on research for 23% of researchers. Around one third considered that their dedication is less than the ideal, suggesting that teaching and administrative activities take up part of the time which could be dedicated to research. However, 40% of researchers consider that they spend more time on research than ideal, suggesting that perhaps these researchers would like to diversify their activities.

Conclusions

The social and demographic make-up of the interviewees differed from that of the total group of researchers currently active in the country due to the sampling procedures used and cannot be considered representative of the universe. However, since the main objective of the study was to evaluate the health research system in the country, it was considered legitimate to give priority to individuals in positions of leadership. The comparison of the data from the sample with data from the overall group of leaders shows that the sample is representative of this segment.

The main findings point to characteristics which can be considered natural, such as the higher median age in this group. Another well-known aspect of the research system as a whole in Brazil is also reproduced in the field of the health sciences and research with application in health in general: the fact that scientific production is almost exclusively concentrated in academic environments.

The scientific production is generally satisfactory and has been increasing, and there are innumerous opportunities to participate in national and international scientific events, to gain access to scientific information and to publish work.

The academic training and qualification of a growing number of researchers has been taking place in a generalized way in the country – it is not just restricted to the leaders analyzed here – and is a key factor in the growth and enhancement of health research.

Free access to scientific information, whether through initiatives such as SciELO, which provide free access to full texts throughout the country, or government initiatives, like the CAPES portal, which fund access by researchers from public universities to periodicals published by commercial publishers, is certainly an important differential in the production conditions enjoyed by Brazilian science when compared to other countries on the continent.

Note

1. This article presents partial results from the Health Research System Analysis initiative coordinated by the WHO in 12 countries between 2002 and 2006. In Brazil, the pilot project was coordinated by the Brazilian Association of Postgraduate Study in Collective Health (Abrasco) and the Ministry of Health's Department of Science and Technology (DECIT).

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