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The *Mais Médicos* (More Doctors) Program, the infrastructure of Primary Health Units and the Municipal Human Development Index

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Abstract *The main objective of this article was to examine the context in which professionals working within the* Mais Médicos *(More Doctors) Program operate. This study used the infrastructure scale of primary health units (PHUs), which was recently developed by Soares Neto and colleagues to provide more information regarding the relationship between the infrastructure of PHUs and the Municipal Human Development Index (MHDI) of municipalities that received* Mais Médicos *Program doctors. Using exploratory and inferential statistics, the article shows that 65.2% of the PHUs that received* Mais Médicos *Program doctors had medium-quality infrastructure and only 5.8% of them had low-quality infrastructure. The correlation of 0.50 between the infrastructure indicator and the MHDI points to a moderate tendency for municipalities with low MHDIs to have more precarious PHUs. Using multiple linear regression analysis it can be inferred that the main factor that contributed to the increase in the infrastructure indicator of the PHUs was the average municipal income. On the other hand, the factor that negatively affected the infrastructure of the PHUs was being located in the north or northeast regions.*

Key words Mais Médicos *Program, infrastructure, municipal human development index, primary health unit, indicators*

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Introduction

During the first decade of this century, studies have indicated a shortage of doctors in Brazil. A report published in 2010 by the Center for Studies in Public Health at the Federal University of Minas Gerais (NESCON/UFMG) found that 97.6% of municipalities had a shortage of doctors and that 400 municipalities were totally lacking in doctors. In a response to this need, the Brazilian government launched the *Mais Médicos* Program through Law No. 12,871, which was passed on 22/10/2013[1]. The implementation of the *Mais Médicos* Program resulted in intense discussions regarding the numbers of doctors in Brazil and their training.

Mais Médicos Program doctors were assigned to primary health units (PHUs), which were located in very different situations: rural, indigenous, *quilombolas*, border regions, and on the outskirts of large towns and cities, from the south to the north of Brazil. Because of this, the infrastructure of the units in which *Mais Médicos* Program doctors worked has also been the subject of much debate. For example, the following was the headline of an article published in the iG portal on 7/7/2013: "Lack of adequate infrastructure is an obstacle to the regional distribution of doctors: doctors argue that without a guarantee of good working conditions, not even foreign doctors will work in the interior or on the peripheries of large cities"[2].

Nora and Junges[3] performed a literature review and a subsequent metasynthesis, which aimed to analyze the humanization practices within the Brazilian health system. They pointed out that problems related to the context in which work was performed interfered in the work process itself, compromising the quality of services, demotivating professionals and managers, and causing discomfort to service users. The lack of adequate space in health units led to a lack of privacy in conversations between professionals and service users. In addition, these authors found that a lack of equipment and material resources in the units interfered with the continuity of care, and that it created unfavorable working conditions.

Given that the infrastructure conditions encountered by *Mais Médicos* Program professionals has had an effect on their performance, the monitoring of such conditions should be one of the central concerns of the *Mais Médicos* Program. Moreover, in order that new public policies can be planned to improve service conditions, greater knowledge is required about the specific reality of each PHU in which professionals from the *Mais Médicos* Program operate.

The monitoring and evaluation of governmental intervention programs has been considered to be an important part of the program itself. In the specific case of the *Mais Médicos* Program, part of Law No. 12.871[1] concerns the structuring of evaluative research in order to monitor the development of the program. The *Bolsa Família* (Family Allowance) Program, which is another public policy of great social impact, also incorporates an established policy of monitoring and evaluation.

In terms of the evaluation procedures and monitoring of public policies, P. M. Jannuzzi[4] writes, "Information and knowledge are key inputs for the improvement and innovation of public policies and programs. In isolation they are not enough, but they are certainly essential, given the scale, scope and complexity that characterize governmental action in the contemporary world". In the same publication, Jannuzzi[4] continues: "The monitoring of programs requires an intelligent selection of key indicators regarding resources, processes, products and, if possible, of results and potential impacts, which are organized in a way that allows for the continuous monitoring of critical activities of the program and the timely decisions that are necessary for its proper working. Completeness, redundancy and ambiguity are not good or objective attributes for a monitoring system. Regularity, timeliness and sensitivity are what are expected of the indicators of such a system".

To monitor the evolution of the material conditions of PHUs, Soares Neto et al.[5] constructed an infrastructure scale regarding PHUs in Brazil. A scale is a sophisticated way of constructing an indicator. The authors claim that "the advantages of having a scale are multiple, highlighting the fact that the level of infrastructure of a PHU can be more easily understood; for example, given the infrastructure score one knows the probability of whether that PHU has clusters of infrastructure items evaluated in the questionnaire".

The Human Development Index (HDI)[6] was developed by Amartya Sen and Mahbub ul Haq in the 1990s and it has been used since 1993 by the United Nations Development Program (UNDP) in its annual report. The HDI allows comparison between countries, taking into account their degree of human development, which can very high, high, medium or low. The HDI is based on data that is gathered at the national level regar-

ding life expectancy at birth, education, and GDP per capita. Each year, the United Nations (UN) classifies its member countries according to their HDI. Furthermore, this index can be calculated for states, cities, villages, etc.

Since 2012, the Brazilian UNDP, the IPEA and the João Pinheiro Foundation have used the global HDI methodology to obtain the municipal HDI (MHDI) of the 5,565 Brazilian municipalities. The calculations are based on the data of three censuses that were performed by the Brazilian Institute of Geography and Statistics (IBGE) - 1991, 2000 and 2010 - and according to the municipal grid that existed in 2010.

According to the Atlas of Human Development[6], "the Brazilian MHDI considers the same three factors as the global HDI, i.e. longevity, education and income but it goes further and fits the global methodology to the Brazilian context and the availability of Brazilian indicators. Although it measures the same phenomena, the indicators taken into account in the MHDI are better suited to evaluate the development of Brazilian cities and metropolitan regions".

This article is based on the aforementioned infrastructure of scale and the MHDI. The analysis is provided in order to provide greater knowledge about the conditions of the infrastructure in Brazilian PHUs and their relationship to the MHDI.

Results are also presented regarding the municipalities, in which comparisons will be made of the infrastructure conditions of the PHUs taking into account the size of the municipality. For the analysis of the information, descriptive and inferential statistical analysis of the level of infrastructure of PHUs is used.

The relevance of the study of the relationship between the infrastructure of Brazilian PHUs and the MHDI is underpinned by the expectation of a strong relationship between these two variables, which would show that there is a tendency that municipalities with a low MHDI would also have PHUs with low infrastructure scores; and on the other hand, municipalities which had a high MHDI would also have high infrastructure scores.

Infrastructure of low complexity and with insufficient material resources compromises the development and quality of primary care actions that are currently being developed by municipalities and these factors also limit the potential to expand actions from the perspective of reorganizing health care models and practices.

The infrastructure scale and the *Mais Médicos* Program

The article by Soares Neto et al.[5] describes in detail the methodology used to obtain the infrastructure scale of Brazilian PHUs. That scale will be used in the current article to provide further information about the context in which doctors from the *Mais Médicos* Program operate.

An important feature of any scale is its ability to create different levels of complexity. In the specific case of infrastructure, six levels of complexity were created. Level 1 refers to PHUs with quite a basic infrastructure, while Level 6 refers to PHUs with more sophisticated equipment and structures.

Because other data collection has already been carried out, or even by using the data from the National Health Establishments Census (CNES), it is possible to compare the temporal series and to check the progress of the infrastructure of each individual PHU. It is also possible to check PHUs in individual cities, states or even the country as a whole. In addition, if information regarding other infrastructure items were to be obtained in future data collections, they could be simply included on the scale.

Recognizing the importance of having structural features and equipment that make it possible to meet primary care health needs, the Brazilian Ministry of Health launched "The Physical Structure of Primary Health Units Manual: family health"[7], which proposed that the physical structure of PHUs acts as facilitator of changes in health practices, thereby favoring changes in the Brazilian health care model. This manual[7] follows the principles of Resolution of the Collegiate Directorate (RDC No. 50/ANVISA/February/2002[8]), which deals with technical regulations for the planning, programming and evaluation of physical projects of healthcare establishments (EAS).

The aforementioned manual[7] states that the minimum physical structure (for a family health team) should consist of the following: a reception/records room; a waiting room; an administration/management/ACS room; a meeting and health education room; a storeroom; a consultation room with a toilet; a consultation room; a vaccine room; a dressing/procedure room; a nebulization room; a pharmacy (drug storage room); dental equipment; a compressor area; a bathroom for service users; a bathroom for the disabled; a bathroom for employees; a kitchen; a storage area for cleaning materials; a reception room for cle-

aning and decontamination; a sterilization room; an area for solid waste; and a trash storage area.

The present study used data from the PMAQ census data of 2012 (6th June version). This database provides information from 38,308 PHUs. However, it was observed that out of this total, 3,449 health units did not complete the questionnaire required by the 2012 PMAQ census and therefore they could not be included in the analysis.

The Register of Doctors dated September 2014, which was available from the Open University of the National Health Service (UNASUS) was used to provide information about the numbers of doctors in units who were working within the *Mais Médicos* Program. Data were used from doctors allocated to PHUs until the fifth cycle. Out of a total of 14,702 practicing physicians there was information regarding the figures for PHUs without repetition for 11,136 doctors. Subsequently, 2,671 more doctors registered in PHUs were added from CNES data (August 2014), making a total of 13,351 doctors working within the *Mais Médicos* Program who were allocated to known PHUs. Data relating to the infrastructure level were found for 9,902 PHUs with *Mais Médicos* Program doctors. From this analysis, it was found that 2,115 Brazilian municipalities did not have doctors working within the *Mais Médicos* Program allocated until September 2014. Of the 3,198 municipalities with *Mais Médicos* Program doctors, about 50% received the service of only one such doctor and 19% received the service of two such doctors. It is necessary to investigate the location and trajectory of these doctors using more recent data, given that the *Mais Médicos* Program continued to grow after 2014.

Table 1 shows the percentage of PHUs in relation to levels of infrastructure and the allocation of at least one *Mais Médicos* Program doctor.

Table 1 provides an important contribution to public policy. It shows the conditions of the PHUs in Brazil within the five geographical regions in summary form, and more specifically, those units which contained *Mais Médicos* Program doctors.

It was observed that in Brazil most PHUs that were allocated *Mais Médicos* Program doctors had infrastructure Levels of 3 and 4 (65.2%). The lowest percentage of PHUs was found for Level 1 (only 1.1%). About 64% of PHUs were classified within three main infrastructure levels, i.e. Levels 4, 5 and 6. Few PHUs were at the extremes of the scale; 4.6% at Level 1 (indicating the lowest infrastructure level) and 7 9% at Level 6 (the highest infrastructure level).

Regarding the degrees of complexity of the PHUs found in this study, generally there were higher percentages in the lower range levels (Levels

Table 1. Level of infrastructure of primary health units assessed by the PMAQ Census (2012) and allocation of doctors working within the *Mais Médicos* Program (MMP) by geographical region, Brazil 2014.

		Infrastructure						
Region	**MMP**	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Total**
North	No	19.3	21.2	27.4	23.0	7.9	1.1	100.0
	Yes	1.9	11.1	30.4	44.1	10.2	2.3	100.0
	Total	13.0	17.5	28.5	30.7	8.7	1.6	100.0
Northeast	No	8.2	13.4	28.5	42.0	6.6	1.4	100.0
	Yes	1.8	6.3	31.0	48.7	9.6	2.6	100.0
	Total	6.5	11.5	29.1	43.8	7.4	1.7	100.0
Southeast	No	1.7	5.1	19.0	39.3	22.1	12.7	100.0
	Yes	0.5	2.0	11.7	35.5	25.9	24.5	100.0
	Total	1.5	4.4	17.4	38.4	22.9	15.3	100.0
South	No	4.1	9.7	19.5	32.1	23.3	11.3	100.0
	Yes	0.4	2.2	12.0	40.1	30.8	14.4	100.0
	Total	3.1	7.6	17.4	34.4	25.4	12.2	100.0
Midwest	No	3.2	7.3	17.4	48.3	18.5	5.4	100.0
	Yes	0.3	1.7	17.7	55.2	18.0	7.0	100.0
	Total	2.5	5.9	17.5	50.0	18.4	5.8	100.0
Brazil	No	5.9	10.2	23.1	38.7	15.2	6.9	100.0
	Yes	1.1	4.7	21.6	43.6	18.3	10.7	100.0
	Total	4.6	8.8	22.7	39.9	16.0	7.9	100.0

Source: prepared from PMAQ data, 2012.

1, 2 and 3) in the north and northeast regions and higher percentages were found in the upper levels (Levels 4, 5 and 6) in the southeast, south and midwest. It was found that most of the units in the north (59.0%) and almost half of the units in the northeast (47.1%) were located in the lower levels of the scale (Levels 1, 2 and 3), unlike the southeast, south and midwest, in which most units were at higher levels (Levels 4, 5 and 6). It is noteworthy that even in the north, which contained about 30% of PHUs with Level 1 and 2 infrastructure, only 13% of PHUs that had allocated *Mais Médicos* Program doctors had such a low levels. In the north, 13.0% of PHUs had Level 1 type infrastructure. It is noteworthy that this percentage was much lower in the southeast (1.5%), midwest (2.5%) and the south (3.1%).

The *Mais Médicos* Program, the Municipal Human Development Index (MHDI) and the infrastructure of Primary Health Units

This section provides a detailed study of how the Municipal Human Development Index is related to the infrastructure of the PHUs basic health units. It is vital to check this relationship because, as there is a significant relationship between the MHDI and the infrastructure of PHUs, there is a need to prioritize the development of public policies aimed at improving the material conditions of PHUs located in municipalities with a lower MHDI.

The boxplot that follows presents the MHDI according to the level of infrastructure of the PHU.

The MHDI is a composite measure of indicators regarding three factors related to human development: longevity, education and income. The index ranges from 0 to 1, and the closer to 1 the higher the level of human development in a municipality.

In Figure 1, the gray box is separated by the median into two quartiles, the upper and lower (25th and 75th percentiles) quartiles. The median is the score that divides the population into two; half above and half below. The height of the boxes represents the interquartile range and estimates the variability of the data. Figure 1 shows that there was a pattern of better infrastructure for PHUs in municipalities with a higher MHDI, mainly at Levels 4 and 5. The value of the median in the municipalities with PHUs at Level 1 and 2 was about 0.62, indicating that 50% of the PHUs at the two lowest levels of infrastructure had an HDI less than or equal to 0.62. However, a much higher value was found when observing the median of PHUs with Level 6 of infrastructure ($MHDI_{median} = 0.78$). The vertical lines that leave the box are known as cat's whiskers and they represent the 25% lowest and 25% highest scores (which are not outliers). The small circles represent values that were moderately distant from the interquartiles, and the values that were substantially distant are marked with an asterisk. Figure 1 also shows that there were PHUs at Level 5 and 6 in municipalities with a low MHDI, however, these PHUs were considered to be outliers.

Figure 2 below, shows the average values for each of the three types of MHDI that were available, namely: MHDI_Longevity, MHDI_Education and MHDI_Income, according to the level of infrastructure of the PHUs.

Figure 2 shows that the three factors involved in the calculation of the MHDI behaved quite differently when they were analyzed from the perspective of the level of infrastructure of the PHUs. The education factor (MHDI_Education) has the lowest average values for all the levels of infrastructure. The longevity factor (MHDI_Longevity) had the highest average values. In addition, there was a growing pattern between the level of infrastructure of the PHUs and the MHDI, in particular in relation to the education and income factors.

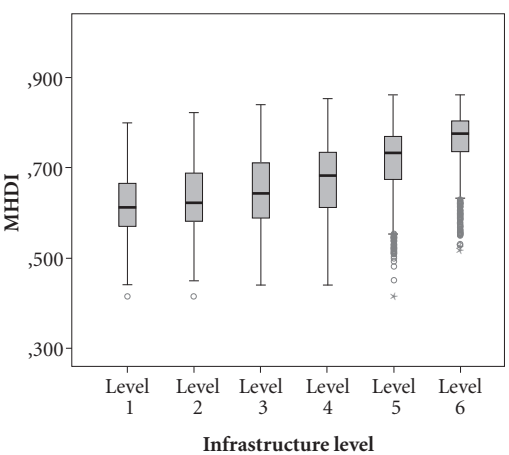
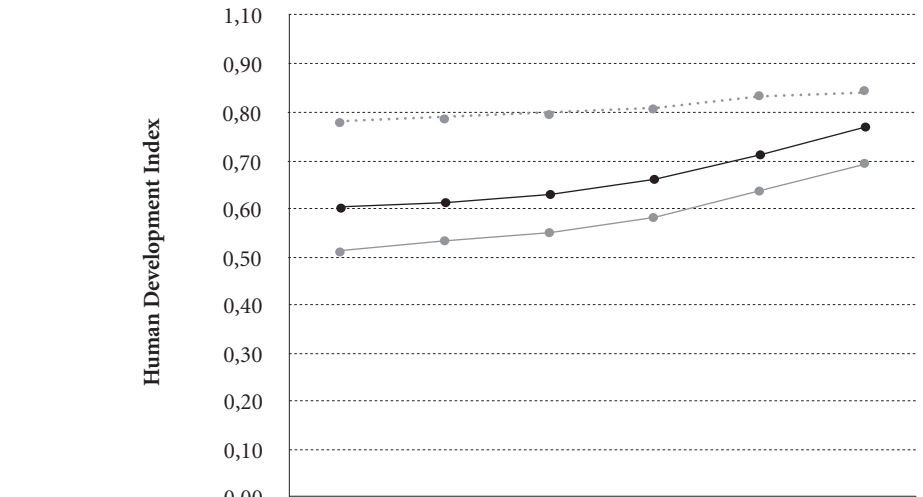


Figure 1. Boxplot of the Municipal Human Development Index for the level of infrastructure of PHUs.

Source: prepared from PMAQ data (2012) and Brazilian Human Development Atlas.



	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
MHDI_Education	0,51	0,53	0,55	0,58	0,64	0,69
MHDI _Longevity	0,78	0,79	0,79	0,81	0,83	0,84
MHDI _Income	0,60	0,61	0,63	0,66	0,71	0,77

Figure 2. Average Municipal Human Development Index level of infrastructure of PHUs.

Source: prepared from PMAQ data (2012) and Brazilian Human Development Atlas.

In an analysis of the Pearson Correlation between the MHDI and the average infrastructure score for municipality, there was a moderately high correlation ($r=0.50$, $p<0.01$, $N=5.542$), indicating that the higher the development within a municipality the better the infrastructure of the PHUs.

In order to investigate the size of the effects of variables such as MHDI, size of the municipality, and the geographical region of the PHU, multiple linear regression analysis was performed. The regression coefficient indicates how much the probability of an event increases with the increase of a unit in the independent variable, when all the other variables remain constant. The higher the value of the coefficient (Beta), the greater the predictive power of the explanatory variable regarding the infrastructure scores. In contrast, negative values are associated with a decrease in the infrastructure score. It should be noted that in this analysis the categorized variable was not used in the six infrastructure levels, but its continued value, on a scale from 0 to 100.

The coefficients in Table 2 show that MHDI_ Income was the factor that contributed most to the increase in the infrastructure score for PHUs ($\beta = 0.206$, $p < 0.05$), followed by MHDI_Education and the number of inhabitants in the municipality (both: $\beta = 0.177$, $p < 0.05$). The positive sign of the coefficient indicated that the greater the (a) income of the municipality, (b) educational level and (c) number of inhabitants of the municipality, the higher the infrastructure score for PHUs.

Furthermore, living in the north or northeast negatively and significantly affected the infrastructure score ($\beta = -0.115$, $p < 0.05$). The negative sign of the coefficient indicated that the PHUs located in the north and northeast were associated with a decrease in the infrastructure score.

Regarding the number of inhabitants of the municipality, from the data that was analyzed, about 58% of PHUs with Level 1 and Level 2 infrastructure were located in municipalities with 10,000-50,000 inhabitants. PHUs with Level 6 infrastructure were mainly found in large municipalities: about 66% of such PHUs were in municipalities with more than 100,000 inhabitants.

The following table shows the average infrastructure score and also the average score for the three types of MHDI, according to whether or not there were *Mais Médicos* Program doctors in the PHUs.

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Table 3 shows that the infrastructure score was slightly higher in PHUs that had health units that had *Mais Médicos* Program doctors. The average values for MHDI were very similar and the largest difference was found for MHDI_Education and MHDI _Income.

When these average scores were analyzed only considering two areas - (1) north and northeast and (2) southeast, south and midwest the biggest difference in HDI scores was in terms of location, and not the allocation of *Mais Médicos* Program doctors. In general, PHUs that were allocated *Mais Médicos* Program doctors had slightly higher infrastructure scores, regardless of their location.

Conclusion

Many studies have provided in-depth knowledge about social inequality in Brazil. In recent decades, with the possibility of collecting more and more accurate data due to technological advances, it has become possible to construct good social indicators, which in turn has made it possible to expand the level of analysis that can be performed and therefore provide greater understanding about the issue being studied.

This study used a scale of infrastructure of primary health units (PHUs) that was recently developed by Soares Neto et al.[5] for the study of the relationship between the infrastructure of PHUs and their location in Brazil. That particular study examined the relationship between the infrastructure of PHUs and the Municipal Human Development Index (MHDI). The aforementioned study found that "most health units in the north of Brazil (59.5%) and almost half in the northeast (47.2%) were in the lower range (Levels 1, 2 and 3), unlike those in the southeast, south and midwest in which the majority were located in the upper levels (Levels 4, 5 and 6)". The present study found that a large majority of PHUs (75.8%) with the lowest scores for infrastructure (i.e. Level 1) were located in the north and northeast of Brazil. A similar situation was found for Levels 2 and 3. On the other hand, it

Table 2. Estimates of multiple linear regression between the infrastructure score for PHUs and contextual variables.

	Non-standardized coefficients		Standardized coefficients		
Model	β	Standard error	β	t	Sig.
1 (Constant)	30.932	1.372		22.552	.000
MHDI_Education	17.512	.900	.177	19.456	.000
MHDI _Longevity	-6.891	2.074	-.031	-3.323	.001
MHDI _Income	22.606	1.273	.206	17.752	.000
No. of inhabitants of city	1.365E-6	.000	.177	36.522	.000
North and northeast	-2.311	.136	-.115	-16.945	.000

Source: prepared from PMAQ data (2012) and Brazilian Human Development Atlas.

Table 3. Average infrastructure and score and MHDI score depending on whether or not there were *Mais Médicos* Program doctors (MMPD) in the PHUs.

	PHUs without MMPD			PHUs with MMPD		
	Brazil	NO/NE	SE/SU/CO	Brazil	NO/NE	SE/SU/CO
Infrastructure score	52.4	45.24	52.31	49.17	48.39	56.22
MHDI_Education	0.58	0.52	0.64	0.59	0.52	0.64
MHDI _Longevity	0.81	0.77	0.84	0.81	0.77	0.84
MHDI _Income	0.66	0.6	0.72	0.67	0.59	0.73

Source: prepared from PMAQ data (2012) and Brazilian Human Development Atlas.

was noted that most of the PHUs with a high level of infrastructure (Levels 5 and 6) were located in the southeast (44.5% and 60.9%, respectively). This data reflects the well-known inequality that exists between regions of Brazil, where, in general, the north and northeast are more deprived than other regions.

A study by Santos et al.[9] found that the *Mais Médicos* Program was effective in reducing health inequities and that the program has been important in highlighting the importance of the right to health and the mandatory nature of municipal adherence to the refurbishment of PHUs, which involves investing in the (re)construction of PHUs. The aforementioned authors also found that in Brazil in 2015 there were 23,050 PHUs scheduled to be refurbished of in the process of being refurbished and that for the period 2013-2014 the estimated total value of works was R$ 3.3 billion for 4,811 municipalities.

Regarding the MHDI, in the present study there was a moderate relationship between MHDI and the infrastructure levels of PHUs. Thus, in general, there was a rising pattern in which the growth in the value of the Human Development Index was related to growth in the infrastructure level of PHUs, especially in terms of education and income.

Among the PHUs assessed at Level 1, 23% were in the north and 52.8% were in the northeast. On the other hand, of the total PHUs assessed at Level 6, 60.9% were in the southeast and 25.2% were in the south. This data is very strong evidence of well-established regional inequality in Brazil. A very similar picture, with regard to the educational situation in Brazil, was found in a study of the infrastructure conditions in Brazilian schools[5]. This evidence that Brazilian social reality has led to an undesirable association between these two variables (region of Brazil and level of infrastructure) points to the need for further studies to study public policies in order to provide better structures for PHUs for municipalities with low MHDI, mainly in the north and northeast of Brazil.

The present study also indicates other important aspects to be observed such as the relationship between the levels of infrastructure and indices of MHDI (Education), MHDI (Longevity), MHDI (Income), and Brazilian municipalities. While the average for MHDI (Longevity) was basically the same for all the levels of infrastructure, a clear positive trend was noted between the relationship between MHDI (Education) and MHDI (Income) with the levels of infrastructure.

With regard to possible differences between the HDI of municipalities that received *Mais Médicos* Program doctors and those that did not, it was noted that there was no substantive difference between the average MHDI of municipalities that received *Mais Médicos* Program doctors and those that did not, when the region to which the PHU belonged was controlled. However, in relation to the infrastructure score, both in the north/northeast and also the southeast/south/Midwest regions, the average infrastructure score for PHUs with *Mais Médicos* Program doctors was higher than that of PHUs without such doctors. This shows an effort to provide minimum (or more appropriate) conditions in relation to the work of the *Mais Médicos* Program doctors, even though the *Mais Médicos* Program envisaged that such doctors would be allocated as a priority to municipalities that generally had greater needs and a higher proportion of vulnerable clients.

When analyzing the study variables as a whole, namely, the three types of MHDI, the size of the municipality and the location in the north/northeast, regression analysis was used to investigate which of these variables most explained the infrastructure of PHUs. It was found that MHDI (Income) was the factor that most contributed to an increase in the infrastructure score of PHUs. The second ranked factor was MHDI (Education) and the number of inhabitants in a municipality. These results indicated that the higher the (1) income of a municipality, (2) educational level of its inhabitants and (3) size of the municipality, the higher its score in relation to the level of infrastructure of PHUs. On the other hand, being located in the north or northeast decreased the score in relation to the level of infrastructure of PHUs. These results were in line with research conducted by Campos et al.[10], in which the authors highlighted the difficulties in employing health professionals in deprived regions. Similarly, Tomasi et al.[11] also found striking inequalities among the inhabitants of different regions in Brazil with regard to access to health care and health care itself.

It is important to highlight the fact that growth in income and educational indicators is related to growth in the indicator of infrastructure in PHUs. This study was unable to establish any causal relationship between the variables. Further studies should be conducted in order to verify the need for integrated educational and health policies.

Collaborations

JJ Soares Neto, MH Machado and CB Alves participated actively in all stages of preparation of the article.

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