Research

DIFFERENTIALS IN EARNINGS FROM WORK AMONG HEALTH PROFESSIONALS IN BRAZIL – 2010/2017

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Article received on September 26, 2022. Accepted corrected version on November 28, 2022.

ABSTRACT
INTRODUCTION: Income disparities among professionals employed in the health job market are discrepant in Brazil, even when comparing professionals with the same socioeconomic and demographic characteristics, but with complete higher education in different areas of the health sector. OBJECTIVE: The objective of this article is to analyze the differentials in earnings from work for those allocated in the health sector as a function of having completed higher education in different undergraduate courses in the health area. MATERIALS AND METHODS: Data from the Annual Social Information Report - RAIS of the Social Security and Employment Secretariat of the Ministry of Economy of Brazil - MEB for the years 2010 and 2017 are used. In addition, quantile regressions are used to

measure income differentials in the quantiles of the conditional distribution of wages. RESULTS: The results show that physicians' earnings are much higher than that of other health professionals in all quantiles of earnings, with the wage/hour worked by these professionals far exceeding 100%, as disparities still rise in the upper tail of labor income. In addition, attributes such as experience and age had positive effects on income. CONCLUSIONS: This article highlights the existence of great income inequality among workers in the same area and with a similar level of education. That said, it is necessary to strengthen the other areas of health, through the representation of class councils and the establishment of fair wage floors, in order to improve the income of all employed people, reducing existing inequalities in the sector.

Keywords: Health Personnel, Labor market, Income.

http://dx.doi.org/10.7764/Horiz_Enferm.33.3.266-286

INTRODUCTION

The main approach to earnings differentials in the Brazilian labor market has, in the structural aspects of the labor market and in the socioeconomic and demographic characteristics of the workforce, the main sources of support for its hypotheses[1,2].

In Brazil, educational institutions grant the diploma as a document that is equivalent to the declaration that the bearer has the qualifications and has fulfilled the necessary requirements to obtain a degree or professional title. The diploma effect is defined as the phenomenon that implies a non-linear and discontinuous relationship between education (in this case, having completed higher education in different courses in the health area) and the logarithm of earnings (income from formal work)[3].

Thus, the occupation sector can be a determinant of the wage returns of the employed, with the diploma effect being an important determinant of labor income in sectors essential to the production and/or provision of national services, such as the health sector[4]. In this sense, studying wage differentials in health occupations, in addition to analyzing the diploma effect, analyzes this effect related to the area within the health sector and provides opportunities to observe income discrepancies in this sector of notable essentiality to the population.

It should be noted that this study was motivated by the pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (Sars-CoV-2) virus and the disease it causes, Covid-19. This context highlighted the importance of all members of the multidisciplinary health teams who stood out in their work on the front lines of combating Covid-19. In this way, investigating the wage returns of the employed workforce and trying to understand the differences in remuneration between health professionals becomes

important for the discussion about professional valuation, the organization and structuring of class councils in search of better and more homogeneous conditions of work.

The present study does not intend to make value judgments about the essentiality of each health professional based on salary return. What we intend to do, in fact, is to observe the high-income disparities in wages/hours of work and provide support for discussions about what distances the remuneration between these professionals, since each one has important attributions within the health team.

In this sense, this article studies the diploma effect, in addition to the classic socioeconomic and demographic characteristics of professionals working in the health areas on the differentials of earnings from work along the conditional distribution of wages/hour of work.

Although they are scarce, the analyzes that touch the wage issue considering the health sector are present in the national literature. Among them, Girardi and Carvalho[5], using RAIS data for the period 1995-2000, analyze the changes that occurred in the health labor market, emphasizing its salaried segment. The results found by the authors show that, over the years, wage growth for those employed in health has been more expressive than that observed for other workers in the economy. However, not analyzing the conditions of wage differentials.

Specific works in health address issues related to the labor market in their respective areas, giving a macrostructural approach[4], and/or discursive about the market and working conditions in the health sector, as well as issues related to the regulation of professions and workload. work, such as: the approach given about work and mental health[6]; labor market and professional training in dentistry, listing the challenges of the profession[7]; characterization and profile of the workforce in primary care[8]; workforce performance and challenges in training human resources in the area of mental health, in the context of psychological reform[9]; reconfigurations and actions of health work in MERCOSUR countries, regularization of professional practice[10]; appreciation and professional recognition of Peruvian nursing[11]; importance of the nursing professional for the Brazilian health system[12], multi-employment and the precariousness of nursing work in Brazil [13] without, however, comparing the levels of income inequalities among those employed in the most diverse areas of health.

Differently from the cited studies, this one analyzes the conditioning factors of earnings for those allocated in the health sector, using the estimation method by quantile regressions, to assess the effect of the control variables at different points of the conditional distribution of earnings. In addition, the lack of articles that make such an approach in the Brazilian literature is highlighted, and the comparisons made here are mainly related to studies that deal with the labor market in its most comprehensive form. Serving the present study as support for future analyses.

Nevertheless, here are original contributions to the understanding of

income inequalities among health professionals, making it possible to offer discussions that provide subsidies, along with other evidence, to determine the minimum wage for each of the categories and that can serve as an argument for the wage bargaining by class councils.

In this sense, the objective of this study is to analyze the differentials in earnings from work for those allocated in the health sector as a function of having completed higher education in the different undergraduate courses in the health area.

METHOD

Study design

This is an analytical quantitative study, using secondary data registered at the Social Security and Employment Secretariat, derived from the Annual Social Information Report – RAIS[14,15].

The **population** are health professionals with higher education in Brazil. To compose the sample, health professionals formally employed in Brazil were included. Formal professionals are considered to be all those who have entered the labor market with registration in Organs employing bodies. Self-employed health professionals are not included, nor those who carry out their activities informally (without professional ties).

In addition, in cases where professionals perform their activities formally and have, in addition to formal work, autonomous activities or without an employment relationship, it was not possible to include extra income in addition to formal work in the analysis of this study. With this, all professionals who work in the public and private sector with an employment relationship are included in this database and are classified in Annex 1, according to the occupation code of the Brazilian Classification of Occupation – CBO[16] and the specialty of professional performance.

Individuals who presented any incomplete information or those in which the employing bodies did not make available all the variables contained in this investigation, were removed from the sample, thus excluding the *Missing Values*. Therefore, the sample consisted of 308,206 professionals, in 2010, from a universe of 773,042; and, 179,447, in the year 2017, out of a population of 960,781.

The data **sample** used in this article is substantially greater than that required for 99% confidence, with a 1% margin of error. Furthermore, of the entire population, a random sample of 39.9% was used in 2010; and 18.7% in 2017. Thus, the exclusion of *Missings Values* does not compromise the estimates used here, since the sample is much larger than necessary for a study of this nature, as described in Table 01 (attachment). However, a smaller sample was not chosen, and the largest possible sample was used, with the aim of having in the sample all health professionals who had their complete declarations to the RAIS-MEB[14, 15].

From the data, professional categories were grouped, and they are classified into groups, namely: doctors, dentists, nurses, pharmacists, nutritionists, speech therapists, physiotherapists,

psychologists, occupational therapists, biomedical professionals and social workers. All of these professionals work through the need for higher education in their respective areas, which may, therefore, be a matter of the degree/area effect on the disparities in income from work among the health professionals studied here.

The **variables** (**dependent and independent**) are composed of the logarithm of a doctor's income/hours of work, representing the dependent variable of the present study (reference category), while the independent variables are the following: logarithm of the income of nurses, dentists, pharmacists, physiotherapists, speech therapists, nutritionists, psychologists, social workers, occupational therapists and biomedical doctors as the respective occupations of workers; commuting migrant, for individuals who traveled from one city to another to carry out their work activities in health; age; race/color: black, white, yellow and brown; person with a disability, for workers who had a disability; micro establishment, small establishment, medium establishment and large establishment for the size of the establishment in which the workers were inserted; up to 1 year, more than 1 to 2 years, more than 2 to 3 years, more than 3 to 5 years, more than 5 to 10 years and more than 10 years for the time workers were on the job; complete higher education, master's and doctorate for the education of these workers and Northeast, North, Southeast, South and Midwest for the region in which these workers were inserted.

It is worth noting that the variables that are the reference category[1] in each comparison are: income of a physician; a white male, non-commuting migrant, non-disabled, micro establishment, period of up to one-year, complete higher education; and Northeast region.

Empirical model

Quantile regressions are widely used in the literature and aim to analyze how the quantiles of a dependent variable change with variations in the independent variables. In this study, the income from formal work of the employed is analyzed. Thus, the aim is to explain the impacts of the explanatory variables on the different points of the conditional distribution of health professionals' salaries, using the natural logarithm of a doctor's salary/hour as a regression. This technique is used in situations in which the average behavior of the variable (estimations by Ordinary Least Squares – OLS, for example) does not faithfully reflect the existing disparities in some points of the distribution of these professionals' work income.

Due to the fact that the quantile regressions are more robust, given the high salary disparities between the professionals in this sample, that is, the presence of *Outliers*, in the dependent

[1]The reference category means the one in which the other categories in your area are compared: example: the reference category for the income variable is that of a doctor, with the others being compared to it; the race/color reference category is a white man working in the health area, in relation to other individuals in their respective races/color.

variable (natural logarithm of wages/hour), the important use of this data processing technique, widely disseminated throughout the world, mentored by Koenker and Basset Jr[17].

Furthermore, according to Buchinsky[18], quantile regression is relevant in studies in which the regressing variable may present *Outliers*, given its exceptionality in treating them. Therefore, quantile regression models can be estimated to characterize the entire conditional distribution of a regressing variable, given the existence of a series of regressing variables.

The objective function of the quantile regression presents a weighted sum of absolute deviations, this time, it returns a robust location measure, in such a way that the vector of estimated coefficients is not sensitive to extreme observations in the regressing variable. Furthermore, if the errors do not present a normal distribution throughout the sample observations, the estimators by quantile regressions are more efficient than those estimated by OLS. Furthermore, different solutions for each of the quantiles of the conditional distribution of the dependent variable can be understood as differences in the response of the variable regressing to changes in the covariates at various points in the conditional distribution of wages.

Therefore, considering that $(x_i y_i), i = 1, \dots, n$, being a sample of any population, so that x_i assumes the function of a vector of $(Kx1)$ regressing variables and y_i is a regressing variable, the $\theta -$ $ésimo$quantile of the dependent variable is y_i defined as:

$$F^{-1} = \inf\{y: F(y) \geq 0\} \qquad (1)$$

Where $F$is defined as an unconditioned distribution function of y. In situations where there is a linear relationship between the regressing variable $y$and its regressing variables x, define the equation, namely:

$$y_i = x_i'\beta + \mu_i \qquad (2)$$

In equation (2), βit assumes the function of a vector of estimated parameters, and, therefore, the $y_i(10, 25, 50, 75, 90)$ conditional percentiles of its distribution are defined from the quantiles of the conditional distribution of errors, as follows:

$$\Pr\left(y_i \leq \frac{y}{x_i}\right) = F_{\mu\theta}\left(y - \frac{x'\beta_\theta}{x_i}\right), 1 = 1, \dots, n \qquad (3)$$

Given the mathematical representation expressed in 3, quantile regression is defined as assuming the following equation:

$$Q_\theta\left(\frac{y_i}{x_i}\right) = x_i'\beta_\theta + F_{\mu}^{-1}(\theta) \qquad (4)$$

In the quantile regression presented here, the quantiles $y_i(10, 25, 50, 75, 90)$ must be analyzed as unconditional, being the solution of a maximization problem. Therefore, the

estimator of the quantile regression in its quantiles, that is, the estimator of β_θ in the equation 4 must be defined from the objective function, namely:

$$min\frac{1}{n}\sum_{i:y_i\geq x_i\beta}\theta|y_i-x_i|\beta+\sum_{i:y_i\geq x_i\beta}1-\theta|y_i-x_i|\beta=min\frac{1}{\beta}\sum_{i=1}^{n}\rho_\theta(y_i-x_i\beta) \quad (5)$$

In quantile regression, absolute values are minimized, which is different from what occurs in OLS. Furthermore, the model presented below specifies the conditional function of the quantile of the regressing variable y, in front of a matrix x of regressors, presented as follows:

$$Q_{yi}\left(\frac{\theta}{x}\right)=X\beta(\theta), onde\ \theta=[0,1] \quad (6)$$

Thus, in each of the percentiles of $y_i(10, 25, 50, 75, 90)$, there will be an impact of the area of health training and of the socioeconomic and demographic characteristics contained in x(regressors) on y(returnees), at each point of the conditional distribution.

RESULTS

Descriptive statistics of health professionals formally employed in the Brazilian labor market – 2010/2017

The distribution of those employed in health services in Brazil is presented in Table 1. The sample data show that substantial parts of the workforce employed in this sector are commuting migrants, that is, they live in different municipalities from those where they work. In the first year, approximately 37% of the women and 40% of the men who worked in the health area lived in municipalities other than those where they worked; and in the last year, the percentage is 36.76% and 36.46%, respectively.

In nursing, nutrition and social work, female professionals stand out, while most pharmacists and physiotherapists are male in both years.

It is noteworthy that most health professionals are white, with these percentages being approximately 75% of women and 71% of men, in 2010, reducing, relatively, to approximately 65% of them and 60 % declared white in 2017. The participation of black and yellow workers is the lowest, being approximately 2% for blacks in the first and 3% in the second year, while yellows made up less than 1% in both years. Dingy occupy an intermediate position with approximately 21% of women and 24% of men occupied in 2010, rising to approximately 30% of women and 34% of men in 2017.

Table 1. *Statistics of the sample of socioeconomic and demographic characteristics of health professionals in Brazil - 2010/2017.*

Variables	2010		2017	
	female	male	female	male
Commuting migrant	37.0	40.0	36.76	36.46
Age	33.26	33.32	35.17	35.61
Doctors	0.10	0.43	0.08	0.24
Nurses	38.20	29.19	41.91	33.74
Dentists	0.13	0.27	0.17	0.29
Pharmacists	24.87	50.15	25.21	45.58
Physical therapists	8.01	10.54	8.29	10.50
Speech therapists	3.14	0.75	2.58	0.69
Nutritionists	10.35	2.75	8.82	2.03
Psychologists	2.12	0.98	1.40	0.80
Social workers	11.30	3.60	8.02	2.45
Occupational therapists	1.25	0.50	1.26	0.45
Biomedical	0.53	0.85	2.26	3.22
White	75.04	71.93	65.07	60.62
Black	2.10	2.33	3.35	3.92
Yellow	1.05	0.95	0.91	0.78
Brown	21.82	24.80	30.67	34.68
Disabled	0.30	0.20	0.45	0.50
Micro establishment	27.85	43.46	27.34	39.26
Small establishment	18.03	16.30	16.58	15.77
Medium establishment	20.69	16.05	18.95	16.13
Great establishment	33.43	24.19	37.13	28.84
Up to 1 year	39.93	44.45	33.78	07.37
More than 1 to 2 years	19.40	19.76	02.16	16.64
More than 2 to 3 years	10.93	10.79	11.71	11.50
More than 2 to 3 years	11.01	10.46	15.78	14.87
More than 5 to 10 years	11.29	9.60	14.32	13.58
More than 3 to 5 years	7.42	4.93	8.40	6.33
Graduated	99.20	99.27	98.58	98.82
Master's degree	0.55	0.47	1.18	0.96
Doctorate degree	0.16	0.16	0.24	0.22
income from work	3,288.12	3,210.90	4,131.51	4,213.19

Source: Authors ' elaboration based on RAIS-MEB microdata [13.14]

Note: labor income is deflated by the National consumer Price Index – INPC, from the Brazilian Institute of Geography and Statistics – IBGE, in 2019 Reais.

Furthermore, with regard to the length of stay in the job, approximately 40% of the women and 44% of the men were in their jobs for less than a year, in 2010. For the year 2017. It is possible to observe a reduction in turnover, although it is recorded that approximately 33% of women and 37% of men had been in their jobs for less than a year.

Also observed that workers allocated in the health sector enter the labor market shortly after graduation, with the vast majority (more than 99% and 98% of women and men in 2010 and 2017, respectively) had education up to the undergraduate level. The participation of master's and Doctors is substantially small in relative terms. Women with a master's degree reached 1.18% in 2017, but men with a master's or doctorate or women with a doctorate did not even reach half a percent in any of the years on the screen.

With regard to average income from work, it appears that, on average, women received R$ 3,288.12; while men received R$ 3,210.90 in the same year. In 2017, the average income of men was higher, at R$ 4,213.19, while that of women was R$ 4,131.51. It is worth highlighting the increase in average income from 2010 to 2017 for both men and women. Women recorded a 26% growth in labor income compared to the first year, while men recorded a 31% growth in labor income over the same period.

Effect of degree/area and socioeconomic and demographic characteristics on job earnings differentials among health professionals – 2010/2017

Table 2 shows the results referring to the estimates of the quantile regressions for the year 2010. Considering the income differentials by occupation, the negative exponents presented by the variables show that, compared to a doctor, allocated in other occupations earned lower income from work. The lowest coefficient in the first decile was recorded for a dentist (-37%) and the highest were recorded for a physiotherapist (-106%), a nutritionist (-106%) and a psychologist (-105%), relatively equal percentages of inequalities between the three categories.

At the 9th percentile of the distribution, wage/hours disparities became higher between a physician and other professionals. At this point in the distribution, a doctor's hourly earnings are more than 100% higher for all categories, with the exception of a dentist (-65%). In relation to that of a nurse (-107%), a pharmacist (-118%), nutritionist (-134%), speech therapist (-112%), physiotherapist (-115%), psychologist (-112%) and occupational therapist (-113%).

With regard to race/color, it appears that black individuals (in the first decile, 1st quartile and median) and yellow (in all distribution points) earned less than banks. As for those who declared themselves mixed race, the coefficients showed positive signs, indicating higher incomes in their favors at all points of the conditional wage distribution. However, the coefficients were markedly low, considering that, in the median, compared to whites, blacks received 1% less, yellows received 2.3% less and browns received 8.9% more.

Table 2. *Effect of diploma/ area and of socioeconomic and demographic characteristics on the differentials of earnings from work among health professionals in Brazil – 2010.*

Variables	Dependent Variable = logarithm of labor income									
	(1st Decile)	Standard Error	(1st Quartile)	Standard Error	(average)	Standard Error	(3rd Quartile)	Standard Error	(9th percentile)	Standard Error
Dentist	-0.373***	(0.057)	-0.492***	(0.019)	-0.579***	(0.060)	-0.587***	(0.043)	-0.653***	(0.046)
Nurse	-0.724***	(0.056)	-0.883***	(0.016)	-0.905***	(0.050)	-1.035***	(0.038)	-1,065***	(0.038)
Pharmaceutical	-0.593***	(0.056)	-0.839***	(0.016)	-0.949***	(0.050)	-1,112***	(0.038)	-1,178***	(0.038)
Nutritionist	-1,058***	(0.056)	-1,204***	(0.017)	-1,233***	(0.050)	-1,359***	(0.039)	-1,348***	(0.038)
Speech therapist	-0.968***	(0.057)	-1,056***	(0.018)	-1.025***	(0.050)	-1,109***	(0.039)	-1,122***	(0.039)
Physiotherapist	-1.057***	(0.056)	-1.102***	(0.017)	-1,032***	(0.050)	-1,138***	(0.039)	-1,153***	(0.038)
Psychologist	-1,053***	(0.058)	- 1.133***	(0.019)	-1,078***	(0.051)	-1,133***	(0.039)	-1,123***	(0.040)
Occupational therapist	-0.903***	(0.058)	-0.963***	(0.019)	-0.987***	(0.050)	-1,113***	(0.040)	-1,131***	(0.040)
Biomedic	-0.715***	(0.060)	-0.970***	(0.018)	-1,063***	(0.051)	-1,219***	(0.041)	-1,202***	(0.042)
Social worker	-0.972***	(0.056)	-1,088***	(0.017)	-1,070***	(0.050)	-1,164***	(0.039)	-1,147***	(0.038)
Black	-0.043***	(0.003)	-0.030***	(0.002)	-0.010***	(0.002)	0.017***	(0.002)	0.030***	(0.003)
Yellow	-0.048***	(0.013)	-0.030***	(0.006)	-0.023***	(0.006)	-0.023***	(0.006)	-0.018**	(0.009)
Brown	0.088***	(0.013)	0.065***	(0.009)	0.089***	(0.011)	0.073***	(0.007)	0.085***	(0.018)
Commuting migrant	0.014***	(0.004)	0.011***	(0.002)	0.009***	(0.002)	-0.003	(0.003)	-0.027***	(0.004)
Age	0.024***	(0.001)	0.022***	(0.001)	0.022***	(0.001)	0.028***	(0.001)	0.032***	(0.001)
Age²	-0.003***	(0.000)	-0.003***	(0.000)	-0.003***	(0.000)	-0.003***	(0.000)	-0.003***	(0.000)
Port of Disability	0.001	(0.036)	0.024**	(0.011)	0.043**	(0.017)	0.050***	(0.019)	0.076*	(0.039)
Small	0.142***	(0.005)	0.144***	(0.003)	0.173***	(0.003)	0.131***	(0.003)	0.131***	(0.005)
Medium	0.396***	(0.005)	0.321***	(0.003)	0.279***	(0.003)	0.224***	(0.003)	0.236***	(0.005)
Great	0.614***	(0.005)	0.541***	(0.003)	0.526***	(0.003)	0.454***	(0.003)	0.455***	(0.004)
More than 1 to 2 years	0.049***	(0.004)	0.052***	(0.002)	0.045***	(0.002)	0.056***	(0.003)	0.058***	(0.004)
More than 2 to 3 years	0.098***	(0.005)	0.092***	(0.003)	0.089***	(0.003)	0.090***	(0.003)	0.094***	(0.004)

More than 3 to 5 years	0.098 ***	(0.005)	0.099 ***	(0.003)	0.108 ***	(0.003)	0.118 ***	(0.003)	0.134 ***	(0.005)
More than 5 to 10 years	0.152 ***	(0.005)	0.140 ***	(0.003)	0.166 ***	(0.003)	0.178 ***	(0.004)	0.187 ***	(0.006)
More than 10 years	0.241 ***	(0.008)	0.269 ***	(0.006)	0.322 ***	(0.004)	0.375 ***	(0.006)	0.462 ***	(0.009)
Master's degree	0.063 ***	(0.023)	0.082 ***	(0.012)	0.095 ***	(0.010)	0.137 ***	(0.019)	0.198 ***	(0.050)
Doctorate degree	0.108 ***	(0.033)	0.082 ***	(0.008)	0.148 ***	(0.057)	0.260 ***	(0.042)	0.441 ***	(0.072)
North	0.163 ***	(0.009)	0.105 ***	(0.006)	0.093 ***	(0.006)	0.118 ***	(0.007)	0.156 ***	(0.008)
Southeast	0.293 ***	(0.005)	0.209 ***	(0.003)	0.159 ***	(0.003)	0.142 ***	(0.003)	0.128 ***	(0.004)
South	0.297 ***	(0.005)	0.172 ***	(0.003)	0.102 ***	(0.003)	0.033 ***	(0.004)	0.030 ***	(0.005)
Midwest	0.149 ***	(0.010)	0.154 ***	(0.005)	0.185 ***	(0.005)	0.224 ***	(0.005)	0.244 ***	(0.007)
Constant	3,557 ***	(0.060)	4.131 ***	(0.022)	4,434 ***	(0.052)	4,747 ***	(0.042)	4,899 ***	(0.042)
Comments					308,206					

Source: elaboration of the authors based on the results of the estimates.

Note: *** p<0.001; ** p<0.01; * p<0.05 – standard error in parentheses.

As for the condition of commuting, it is observed that commuters earned higher income from work than non-commuters in the 1st decile, 1st quartile, median and 3rd quartile), with income lower only in the 9th percentile. In addition, earnings from work increase with the length of time they are employed, taking as a reference those who had been there for less than a year. These results are found in all categories and at all points in the distribution. Thus, an employed person who has been at their job for more than 10 years, in the 1st decile of the distribution, earned 24% more income than those who had been working less than a year. At the 9th percentile, the difference increased to 46% in favor of those who stayed longer in their jobs, reflecting a trend already observed in the job market[19, 20].

With regard to education, masters and doctors earned higher earnings from work than an employed person who declared having only a degree, in all points of the conditional distribution of income, with the diploma effect being relevant to wage returns in Brazil, converging with other studies[21]. Thus, in the 1st decile of the distribution of income from work among the employed, a health professional with a doctorate earned 11% more income than a professional who only had a degree. At the 9th percentile, this difference was 44%. At the same points, a master earned 6% and 20% more, respectively.

The regional component, however, shows that at all points in the distribution of labor income and in all other regions, a health professional from any region of the country earns more from work than a health professional employed

in the Northeast region, similar to what was observed for all sectors of economic activity in the country[22]. In the 1st decile, the greatest disparities occurred between a health professional employed in the South (30%) and Southeast (29%) in relation to one employed in the Northeast, in favor of the former, and to the detriment of the latter. At the top of the income distribution (9th percentile), the greatest disparity was registered between a professional employed in the Northeast compared to one employed in the Midwest. These earned income 24% higher than that earned by those.

For the year 2017, Table 3, using the same variables as for the year 2010 (Table 2), with regard to occupations, the estimated coefficients show that, in addition to the income disparity remaining, it increases among all health professionals and a doctor. In 2017, for all points of the conditional distribution of income, a doctor earned more per hour than any other health professional. In the first decile of the distribution, the smallest income disparities were registered between the income of a doctor (reference category) and a dentist (61%), a doctor and a pharmacist (76%), a doctor and a nurse (95 %) one physician and one biomedical (101%). The biggest ones were observed between a doctor and a psychologist (-116%), a doctor and a social worker (-113%), a doctor and a speech therapist (-106%), the most in favor of doctors.

At the 9th percentile, hourly earnings disparities widen in favor of physicians compared to all other health professionals. Based on the coefficients, it is possible to state that at this point in the conditional distribution of labor income, a physician earned income greater than 100% in relation to all other professionals, with the smallest disparities being registered between a physician and a dentist (-115%).

With regard to the other control variables, a black professional earns slightly less than a white professional (reference category) in almost all points of the conditional distribution of labor income. Yellows and browns, in all points of the conditional distribution of labor income, presented positive coefficients, indicating that there is a higher income in their favors, to the detriment of a white person. Furthermore, income increases with age at any point in the distribution, in a decreasing way, according to the sign of the experience proxy (age).

In addition, for those who remain in their jobs for more than 10 years, the income disparity, in addition to being the highest, increases along the conditional wage distribution. In other words, an employed person with more than 10 years, in the 1st decile, earned 27% more income than an employed person who has been in their jobs for less than a year. At the 9th percentile the disparity rises to 43%.

Masters and doctors earn higher incomes from work than those employed with only an undergraduate course in all points of the conditional distribution of income from work. In the first decile, masters earned 18% and doctors earned 22% more, compared to a person with only a degree. In the 9th percentile, the disparity rises to 26% and 64% for masters and doctors, respectively, compared to an

employee with only an undergraduate degree.

Table 3. *Effect of diploma/ area and of socioeconomic and demographic characteristics on the differentials in earnings from work among health professionals in Brazil - 2017.*

Variables	*Dependent Variable = logarithm of income per hour of work*									
	1st Decile	Standard Error	1st Quartile	Standard Error	median	Standard Error	3rd Quartile	Standard Error	9th percentile	Standard Error
Dentist	-0.610 ***	(0.137)	-0.716 ***	(0.022)	-0.918 ***	(0.038)	-0.943 ***	(0.091)	-1,145 ***	(0.039)
Nurse	-0.952 ***	(0.134)	-1,087 ***	(0.020)	-1,185 ***	(0.035)	-1,182 ***	(0.084)	-1,394 ***	(0.035)
Pharmaceutical	-0.764 ***	(0.134)	-0.968 ***	(0.021)	-1,117 ***	(0.035)	-1,168 ***	(0.084)	-1,390 ***	(0.035)
Nutritionist	-1,164 ***	(0.134)	-1,308 ***	(0.0 21)	-1,426 ***	(0.035)	-1,448 ***	(0.084)	-1,620 ***	(0.036)
Speech therapist	-1,061 ***	(0.135)	-1,160 ***	(0.023)	-1,236 ***	(0.036)	-1,241 ***	(0.085)	-1,445 ***	(0.036)
Physiotherapist	-1,036 ***	(0.134)	-1,108 ***	(0.021)	-1,210 ***	(0.035)	-1,240 ***	(0.084)	-1,455 ***	(0.035)
Psychologist	-1,202 ***	(0.137)	-1,247 ***	(0.025)	-1,285 ***	(0.036)	-1,242 ***	(0.085)	-1,390 ***	(0.038)
Occupational therapist	-1.022 ***	(0.138)	-1,084 ***	(0.025)	-1,153 ***	(0.037)	-1,194 ***	(0.085)	-1,405 ***	(0.039)
Biomedic	-1.013 ***	(0.135)	-1,172 ***	(0.022)	-1,294 ***	(0.036)	-1,291 ***	(0.085)	-1,478 ***	(0.036)
Social worker	-1,132 ***	(0.134)	-1,218 ***	(0.021)	-1,269 ***	(0.035)	-1,264 ***	(0.084)	-1,456 ***	(0.036)
Black	-0.074 ***	(0.004)	-0.037 ***	(0.002)	-0.029 ***	(0.002)	-0.016 ***	(0.003)	0.003	(0.004)
Yellow	0.048 ***	(0.009)	0.037 ***	(0.006)	0.042 ***	(0.006)	0.028 ***	(0.006)	0.007	(0.007)
Brown	0.035 **	(0.015)	0.023 **	(0.011)	0.033 **	(0.014)	0.052 ***	(0.012)	0.070 ***	(0.018)
Commuting migrant	0.022 ***	(0.004)	0.010 ***	(0.003)	0.003	(0.003)	-0.007 ***	(0.003)	-0.030 ***	(0.004)
Age	0.030 ***	(0.002)	0.022 ***	(0.001)	0.022 ***	(0.001)	0.019 ***	(0.001)	0.016 ***	(0.002)
Age²	-0.004 ***	(0.000)	-0.002 ***	(0.000)	-0.002 ***	(0.000)	-0.002 ***	(0.000)	-0.001 ***	(0.000)
Port of Disability	0.035	(0.027)	0.069 ***	(0.017)	0.047 ***	(0.015)	0.028	(0.018)	0.017	(0.033)
Small	0.154 ***	(0.006)	0.138 ***	(0.004)	0.131 ***	(0.003)	0.104 ***	(0.004)	0.113 ***	(0.005)
Medium	0.311 ***	(0.006)	0.241 ***	(0.003)	0.204 ***	(0.003)	0.166 ***	(0.004)	0.199 ***	(0.006)
Great	0.486 ***	(0.006)	0.418 ***	(0.003)	0.411 ***	(0.003)	0.395 ***	(0.003)	0.395 ***	(0.005)
More than 1 to 2 years	0.044 ***	(0.006)	0.045 ***	(0.003)	0.052 ***	(0.003)	0.043 ***	(0.003)	0.029 ***	(0.005)
More than 2 to 3 years	0.109 ***	(0.006)	0.087 ***	(0.003)	0.104 ***	(0.004)	0.093 ***	(0.003)	0.080 ***	(0.005)

More than 3 to 5 years	0.134 ***	(0.006)	0.108 ***	(0.003)	0.129 ***	(0.003)	0.110 ***	(0.003)	0.101 ***	(0.005)
More than 5 to 10 years	0.166 ***	(0.006)	0.144 ***	(0.004)	0.174 ***	(0.004)	0.173 ***	(0.004)	0.191 ***	(0.005)
More than 10 years	0.267 ***	(0.006)	0.257 ***	(0.005)	0.302 ***	(0.005)	0.368 ***	(0.007)	0.432 ***	(0.010)
Master's degree	0.178 ***	(0.009)	0.157 ***	(0.012)	0.187 ***	(0.011)	0.194 ***	(0.011)	0.262 ***	(0.030)
Doctorate degree	0.218 ***	(0.022)	0.209 ***	(0.018)	0.221 ***	(0.033)	0.432 ***	(0.052)	0.641 ***	(0.037)
North	-0.020	(0.014)	0.048 ***	(0.008)	0.069 ***	(0.007)	0.072 ***	(0.008)	0.132 ***	(0.014)
Southeast	0.239 ***	(0.005)	0.222 ***	(0.004)	0.153 ***	(0.003)	0.097 ***	(0.004)	0.076 ***	(0.005)
South	0.263 ***	(0.006)	0.217 ***	(0.004)	0.127 ***	(0.004)	0.063 ***	(0.004)	0.048 ***	(0.006)
Midwest	0.274 ***	(0.007)	0.272 ***	(0.006)	0.299 ***	(0.006)	0.306 ***	(0.005)	0.266 ***	(0.006)
Constant	3,954 ***	(0.138)	4,546 ***	(0.028)	4,917 ***	(0.039)	5,285 ***	(0.087)	5,717 ***	(0.048)
Comments	179,447									

Source: elaboration of the authors based on the results of the estimates.

Note: *** p<0.001; ** p<0.01; * p<0.05 – standard error in parentheses.

With regard to the region of occupation, all those employed in any of the major Brazilian macro-regions, with the exception of the North in the first decile, earn higher earnings from work than an employed person in the Northeast at all points of the distribution of labor income. The lowest income disparity was registered between an employed person in the North and an employed person in the Northeast, confirming a lower income in favor of the employed in that region in the 1st decile. The greatest disparity occurred between a health professional employed in the Midwest (27%) and in the South (26%) and one employed in the Northeast. At the 9th percentile, the disparities between an employed person in the South (5%) and Southeast (8%) and an employed person in the Northeast are reduced. In this same point of distribution, income inequality increases between an employed person in the North (13%) and an employed person in the Northeast, and the salary differences between an employed person in this and the Center-West region remain unchanged (27%).

DISCUSSION

One of the inferences that can be made from the information found concerns the significant number of health professionals who carry out commuting. This may be due to the fact that these professionals reside in municipalities with better infrastructure and work in municipalities that offer less infrastructure. These municipalities often demand these professionals from outside, offering better wages. In addition, the analysis of income differentials shows that the attraction of professionals working in municipalities other than those in which they reside can be due to better

remuneration, compared to those who work in the municipality of residence, corroborating with results found in other studies about the labor market job[23,24,25].

However, it became evident that both in 2010 and in 2017 health professionals are, in several areas, mostly female, converging with the results of past studies on the feminization of training and the health workforce in Brazil, one of the sectors in which women are relatively better paid[4,26,27]. With regard to income from work, it appears that, on average, unlike what was observed by Soares and Oliveira[4], women had higher incomes than men in 2010. There was an increase in the average income of both women and men. Of men and, in 2017, this growth being more expressive for men. However, this difference showed very close income values, not configuring wage inequality.

From the data, it is possible to state that in the health area, the vast majority of those employed are white, and that, despite the reduction, it is still predominant in the last year of the analysis. Additionally, the low coefficients for income differentials related to race/color indicate that disparities in relation to race/color are practically non-existent among health professionals, and these professionals, with higher education, are not discriminated against by race/color in the labor market, unlike other studies carried out in other areas and Brazilian states [28,29,30,31].

As for the size of the establishments in which the workers were inserted, it is observed that the extremes (small size and large sport) are those that most employ health professionals in the country, both in 2010 and in 2017. This result may be associated with the growth in job offers by municipalities, many of which in quantitative terms (micro and large-scale hiring, in some cases), but with a hiring capacity limited to a minimum amount to maintain health care programs, as well as by the national private sector, which was already growing since the early years of the 21st century[32].

In terms of the high turnover of people employed in jobs, this phenomenon may result, among others, from the high job opportunity in the sector, and the growing supply of jobs with a better structure, given the great relevance and demand of the sector by employers. Furthermore, the distance from the place of residence, the best wages and the offer of better working conditions are important determinants of the choice and permanence in the job, by these professionals.

The results for professional qualification show that health professionals inserted in the labor market in Brazil, in the field of care, only have a degree (higher education) and, probably, lato sensu specialization or professional residency (events not captured by the RAIS-MEB[14.15]). Professionals with master's and doctoral qualifications appear as a minority in this study, possibly because they are mostly inserted in academia.

In terms of the degree-effect on health professionals' income differentials, the coefficients recorded by the variables show that wage/hour disparities increase along the distribution of wages between a doctor and other professionals. That is, in

the two years under review, all health professionals earned less than a doctor's earnings at any point in the distribution. In the upper tail of the distribution, the wage/hour appropriated by a physician was higher than that of all other professionals, and greater than that appropriated in the lower tail. That is, in addition to the already high salary/hours disparities of a doctor's work, compared to other professionals, it is increasing along the distribution.

According to the presented coefficients, disparities increase at the top of the income distribution in favor of physicians to the detriment of other professional categories. This is not about arguing that physicians' income is high, what is actually intended is to discuss the distance between the remuneration per hour of work of these professional and other professionals in the health area. What seems to happen is the professional undervaluation of the other categories, even in the face of the essentiality of each of the professions to basic care and to all Brazilian health.

Girardi and Carvalho[5] corroborate this research by observing in their study the existence of higher remuneration for physicians and dentists under analysis for the health sector. It is opportune to emphasize the importance of class councils in facing issues related to professional valuation and income inequalities among health professionals, given the essentiality of all professional categories to health in Brazil.

Returns to postgraduate studies increase along the conditional distribution of income for employed health professionals in Brazil. Therefore, continuity in professional training, in addition to resulting in improved professional performance in the performance of their functions, also directly impacts on remuneration via salary/hour of work, with this result being convergent to other studies carried out in Brazil[32,33].

CONCLUSIONS

This study aimed to analyze the differentials in earnings from work for those allocated in the health sector as a result of having completed higher education in different undergraduate courses in the health area. In this regard, both in the first and in the last year under analysis, the coefficients of the estimates by quantile regressions showed that a doctor earns more per hour than any other health professional, both in the first and in the last year, being extremely high inequality, since, in most points of the income distribution, the superiority of working hours exceeded 100% in relation to all professional categories. It should be noted, as appropriate, that the disparity in income between a doctor and the other professionals grows in the upper tail of the distribution, showing that in addition to increasing the disparities, they are increasing both in the points of income distribution and in time, since in 2017 inequality rose compared to 2010.

Given the above, it is worth noting that this study is relevant, since, in the context of a pandemic, all health professionals are equally relevant to face the challenges of the profession. In times of crisis, it is worth emphasizing the

important role of health professionals in the labor market and reflecting on better salary conditions and lower inequalities in labor income between them, seen in any dimension of analysis – be it socioeconomic, demographic, structural – to be developed. Professional devaluation has as one of its assumptions the offer of a high workload with low remuneration, as well as the inequality of income from work among professionals in the same area and with the requirement of a similar level of education. Thus, this article exposes one of the most perverse faces of the diploma effect in health areas, where most of the income from work is appropriated by one category, to the detriment of the others.

Thus, this article draws attention to a relevant problem in the labor market of health professionals by showing the high inequality of labor income in the sector, and all professionals are potential holders of collaborative capacity to face the problems of Brazilian public health. In addition, it is noteworthy that the disparities in income from work per degree increase when observing the first and last year. Therefore, the need to strengthen the other areas of health is highlighted, through the representation of class councils and the establishment of fair wage floors, so that it can improve the income of all those employed and thereby reduce the existing inequalities in the sector.

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Annex 1. *Classification of employed health professionals according to the Brazilian Classification of Occupations - CBO – 2002 (six-digit code and specialty).*

Dentistry:	223204: Dental Surgeon – Auditor; 223208: Dental Surgeon - General Practice; 223212: Dental Surgeon - Endodontist; 223216: Dental Surgeon - Epidemiologist; 223220: Dental Surgeon - Stomatologist ; 223224: Dental Surgeon - Implantologist ; 223228: Dental Surgeon - Geriatric Dentist ; 223232: Dental Surgeon - Forensic Dentist; 223236: Dental Surgeon - Pediatric Dentist ; 223240: Dental Surgeon - Orthopedist and Orthodontist; 223244: Dental Surgeon - Oral Pathologist; 223260: Dental Surgeon - Radiologist; 223248: Dental Surgeon - Periodontist ; 223252: Dental Surgeon - Protesiologist Oral and maxillofacial ; 223256: Dental Surgeon - Prosthodontist ; 223260: Dental Surgeon - Radiologist; 223264: Dental Surgeon - Oral Rehabilitator; 223268: Dental Surgeon - Oral and Maxillofacial Traumatologist ; 223272: Public Health Dental Surgeon; 223276: Dental Surgeon - Occupational Dentistry; 223280: Dental Surgeon - Dentistry ; 223284: Dental Surgeon - Temporomandibular Disorders and Orofacial Pain; 223288: Dental Surgeon - Dentistry for Patients with Special Needs; 223293: Dental Surgeon of the Family Health Strategy.
Physiotherapy:	223605: General Physical Therapist; 223625: Respiratory Physiotherapist; 223630: Neurofunctional Physiotherapist ; 223635: Physiotherapist Trauma -Functional Orthopedic; 223640: Osteopathic Physical Therapist; 223645: Physiotherapist Chiropractor ; 223650: Physical Therapist Acupuncturist ; 223655: Sports Physiotherapist; 223660: Occupational Physiotherapist.
Psychology:	251505: Educational Psychologist ; 251510: Clinical Psychologist ; 251515: Sports Psychologist ; 251520: Hospital Psychologist ; 251525: Legal Psychologist ; 251530: Social Psychologist ; 251535: Traffic Psychologist ; 251540: Occupational Psychologist ; 251545: Neuropsychologist .
Pharmacy:	223405: Pharmaceutical ; 223410: Biochemical Pharmacist ; 223420: Food Pharmacist .
Nursing:	223505: Nurse; 223510: Nurse Auditor; 223515: Flight Nurse; 223520: Surgical Center Nurse; 223525: Intensive Care Nurse; 223530: Occupational Nurse; 223535: Nephrologist Nurse; 223540: Neonatologist Nurse ; 223545: Obstetric Nurse; 223550: Psychiatric Nurse; 223555: Childcare and Pediatric Nurse; 223560: Health Nurse; 223565: Family Health Strategy Nurse.
Speech Therapy:	223610: Speech therapist; 223810: Phonoaudiol ; 223815: Educational Speech Therapist ; 223825: Speech therapist in Dysphagia; 223830: Speech Therapist in Language; 223845: Speech Therapist in Voice.
Biomedicine:	221205: Biomedical.
Occupational therapy:	223620: Occupational Therapist.
Social assistance:	251605: Social Worker.
Nutrition:	223710: Nutritionist.
Medicine :	225103: Infectious Disease Doctor; 225105: Medical Acupuncturist ; 225106: Medical Examiner; 225109: Nephrologist Physician; 225110: Allergist and Immunologist ; 225112: Neurologist Physician; 225115: Angiologist Physician ; 225118: Physician Nutrologist ; 225120: Cardiologist Physician; 225121: Clinical Oncologist Physician; 225122: Pediatric Cancerologist; 225124:

	Pediatrician; 225125: Clinical Physician; 225127: Pulmonologist; 225130: Family and Community Doctor; 225133: Psychiatrist Physician; 225133: Psychiatrist Physician; 225135: Dermatologist; 225136: Rheumatologist ; 225139: Sanitary Physician; 225140: Occupational Physician; 225142: Physician of the Family Health Strategy; 225145: Doctor in Traffic Medicine; 225148: Anatomopathologist Physician ; 225150: Physician in Intensive Medicine; 225151: Anesthesiologist Physician ; 225155: Physician Endocrinologist and Metabologist ; 225160: Physiatrist; 225165: Gastroenterologist Physician; 225170: General Practitioner; 225175: Medical Geneticist; 225180: Geriatric Doctor; 225185: Physician Hematologist; 225195: Homeopathic Doctor; 225203: Physician in Vascular Surgery; 225210: Cardiovascular Surgeon Physician; 225215: Head and Neck Surgeon; 225220: Digestive System Surgeon; 225225: General Surgeon Physician; 225230: Pediatric Surgeon Physician; 225235: Physician Plastic Surgeon; 225240: Thoracic Surgeon Physician; 225250: Gynecologist and Obstetrician; 225255: Mastologist Physician; 225260: Neurosurgeon Physician; 225265: Ophthalmologist; 225270: Orthopedist and Traumatologist; 225275: Otorhinolaryngologist; 225280: Coloproctologist Physician ; 225285: Urologist Physician; 225290: Surgical Cancerologist; 225295: Hand Surgeon Physician; 225305: Cytopathologist Physician ; 225310: Doctor in Endoscopy; 225315: Physician in Nuclear Medicine; 225320: Physician in Radiology and Diagnostic Imaging; 225325: Physician Pathologist; 225330: Radiotherapist Physician ; 225335: Clinical Pathologist / Laboratory Medicine; 225340: Hemotherapist Physician ; 225345: Hyperbarista Doctor ; 225350: Clinical Neurophysiologist Physician.

Source: Brazilian Classification of Occupations – CBO [15] (own elaboration).