Chronic Non-communicable Diseases and Participation in the Labor Market: gender inequities in Brazil

Doenças Crônicas não Transmissíveis e Participação no Mercado de Trabalho: iniquidades de gênero no Brasil

Enfermedades Crónicas no Transmisibles y Participación en el Mercado Laboral: inequidades de género en Brasil

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ABSTRACT

This article aims to explore the relationship between chronic diseases and the participation of men and women in the Brazilian labor market, based on the National Health Survey (PNS) of 2019. The findings point to distinct identity and economic profiles of workers, with disadvantaged earnings for sick women compared to men and non-sick women. Chronic diseases diminish the probabilities of labor force participation, becoming more intense with comorbidities, though the effect is less prominent for women. Men's labor decisions are predominantly hindered by mental illness and stroke, while women's decisions are affected by stroke and arthritis. Asthmatic men and women with chronic kidney conditions and musculoskeletal disorder have less difficulty in economic integration. These findings can guide strategies that take into consideration diverse social groups, comorbidities, and disease typologies that impact labor markets in (un)favorable ways.

Keywords: Chronic diseases. Labor market. Gender. Brazil.

RESUMO

Este artigo tem como objetivo explorar a relação entre as doenças crônicas e a participação de homens e mulheres no mercado de trabalho brasileiro, a partir da Pesquisa Nacional de Saúde, de 2019. Os resultados apontam para perfis identitários e econômicos diferenciados dos trabalhadores, com desvantagem de rendimentos das mulheres doentes comparadas aos homens e às mulheres não doentes. As doenças crônicas reduzem as probabilidades de participação que se intensificam com as comorbidades, mas são menores para mulheres. A decisão de trabalhar dos homens é prejudicada, principalmente, pela doença mental e acidente vascular cerebral, e das mulheres pelo acidente vascular cerebral e artrite.

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Homens asmáticos e mulheres renais crônicas e doentes musculoesqueléticas têm menos dificuldade de inserção econômica. As evidências podem nortear atitudes que considerem diferentes grupos sociais, as comorbidades e a tipologia das doenças que repercutam (des) favoravelmente no mercado de trabalho.

Palavras-chave: Doenças crônicas. Mercado de trabalho. Gênero. Brasil.

RESUMEN

Este artículo tiene como objetivo explorar la relación entre las enfermedades crónicas y la participación de hombres y mujeres en el mercado laboral brasileño, con base en la Encuesta Nacional de Salud, 2019. Los resultados apuntan a diferentes perfiles identitarios y económicos de los trabajadores, con una desventaja en los ingresos de las mujeres enfermas en comparación con los hombres y las mujeres no enfermas. Las enfermedades crónicas reducen las probabilidades de participación que se intensifican con las comorbilidades, pero son menores para las mujeres. La decisión de los hombres de trabajar se ve obstaculizada principalmente por las enfermedades mentales y los accidentes cerebrovasculares, y la de las mujeres por los accidentes cerebrovasculares y la artritis. Los hombres con asma y las mujeres con enfermedad renal crónica y trastorno musculoesquelético tienen menos dificultades en la inserción económica. La evidencia puede orientar actitudes que consideren diferentes grupos sociales, comorbilidades y la tipología de enfermedades que tienen repercusiones (des)favorables en el mercado laboral.

Palabras clave: Enfermedades crónicas. Mercado de trabajo. Género. Brasil.

1 INTRODUCTION

The Brazilian epidemiological landscape has revealed the prevalence of non-communicable chronic diseases (NCDs) as a manifestation of the country's epidemiological and demographic transition. These diseases exhibit a prolonged course, disproportionately affect individuals in developing countries, and pose a threat to progress towards the 2030 Agenda for the Sustainable Development Goals. These diseases are propelled by factors including unhealthy diets, lack of physical activity, alcohol and tobacco consumption, and population aging. They constitute emerging challenges in ensuring individual health and well-being, and they hinder both personal and national development due to their impact on the labor market and the persistence of poverty (WHO, 2022; UNITED NATIONS, 2022).

In Brazil, 50.80% of the population self-reported having been diagnosed with at least one non-communicable chronic disease in 2019. Among the primary comorbidities are those related to cardiovascular diseases, mental depression, diabetes, spinal disorders, and obesity, which have increased after 2013, with higher incidence among women (FIOCRUZ, 2022; PNS, 2019). Despite women's longer life expectancy, which was 80.3 years for women and 76.8 years for men at birth in 2018, that doesn't mean women necessarily experience better living conditions than men. The prevalence of NCDs is significantly higher among women, particularly for hypertension, spinal disorders, arthritis, and depression; only for fatal outcome diseases such as cancer and stroke, is there a higher prevalence among men (NORONHA; CASTRO; GADELHA, 2023).

Chronic health problems are often associated with reduced probabilities of labor force participation and gender disparities. Scientific journals worldwide highlight the persistence of these inequalities in both developed and developing countries (BARTEL; TAUBMAN, 1979; LUFT, 1975; CAI, 2010; CHATTERJI *et al.*, 2011; EBAIDALLA; ALI, 2022). However, indications suggest that individual impairments in the labor market due to NCDs are more visible in developing countries (CAMPOS-VASQUEZ; NUNEZ, 2019).

In Brazil, Kassouf (1997), Alves and Andrade (2002), Godoy *et al*. (2007), Gomes, Brito and Rocha (2012), Silva (2012), and Oliveira (2018) find reduced participation and wages, with aggravating factors for women and workers with lower income levels. Recently, Souza, Ziegelmann and Figueiredo (2018), Oliveira (2018), Oliveira, Silveira, and Balbinoto Netto (2017) confirmed similar results. Nevertheless, Santos and Besarria (2015) report inconclusive results for cancer or opposing results for diabetes. These findings shed light on the issue of integrating individuals with chronic diseases into the labor market, as well as the persistence of intersectional

gender inequality in the country. Furthermore, the 2019 National Health Survey, a recent population-based survey that includes data on chronic diseases and the labor market provides a comprehensive and reliable overview of the health and work of the Brazilian population.

The main foundations for labor market inequalities associated with chronic diseases, for both men and women, are rooted in differences in individuals' productive attributes and economic discrimination. In the former case, the human capital theory explains that individual differences in the labor market result from decisions regarding the accumulation of human capital; education, experience, and health determine labor market outcomes (MINCER, 1958, 1974; BECKER, 1962). The theory of economic discrimination presents another way to explain these worker asymmetries, because given the characteristics of individuals, the persistence of inequalities is discriminatory (BECKER, 1971).

The objective of this article is to investigate the association between non-communicable chronic diseases and the labor force participation of men and women in the Brazilian labor market, utilizing data from the 2019 National Health Survey (PNS). To achieve this, the article provides an organic review of both national and international literature and applies the Probit model to analyze economic activity participation, while considering individuals' health conditions and gender.

This paper is organized into four sections following this introduction. The second section reviews both national and international literature regarding the relationship between chronic diseases and work. The empirical strategy is outlined in the third section, and the fourth section presents and discusses the empirical results. The final section of the article contains concluding remarks.

2 PREVIOUS STUDIES ON HEALTH-WORK RELATIONSHIPS

Scientific endeavors have been focused on quantifying the effect of poor health on labor market indicators and identifying mechanisms that produce or are associated with this effect. Internationally, Bartel and Taubman (1979) conducted studies in the 1960s in the US and found decreased labor supply and wage rates for sick men aged 50, for most diseases, with varying magnitude for each diagnosis. Luft (1975), for the same country, revealed penalties on market participation, hours worked, and wages for workers with compromised health. Sick individuals, particularly both male and female black workers, are more excluded from the workforce, and white workers experience wage reductions. Cai (2010) confirmed the positive effect of health on labor force participation for men and women in Australia. Chatterji *et al*. (2011) indicated that mental illness negatively impacts labor market participation in the US, with a greater effect on women with depression, yet they found no evidence that depression affects individuals' earnings.

Ebaidalla and Ali (2022) revealed that individuals with chronic diseases have a lower likelihood of participating in the workforce in Egypt and Tunisia. The effect of chronic diseases on labor market participation is greater and more significant for males compared to females, and for older individuals compared to younger ones. Campos-Vasquez and Nunez (2019) demonstrated that obesity does not affect men's work decisions but does impact women's decisions in Mexico. Nunez (2022) indicated that an increase in Body Mass Index (BMI) has a negative relationship with the probability of women working, and for men, only those in the obesity range show a negative association.

Pacheco, Page, and Webber (2014) concluded that both physical and mental health positively impact the likelihood of being employed, with physical health having a greater impact on male employment and mental health on female employment in New Zealand. Blundell *et al*. (2023) attributed a portion of the decline in employment for older and less educated individuals in the US and England to deteriorating health. Britton and French (2020) supported the correlation between health and employment in the UK, with empirical evidence suggesting that 5 to 10 percent of the decline in employment among individuals aged 50 to 70 can be attributed to declining health, with the most significant effects among less educated men. A significant portion of the effect stems from reduced preferences for work and decreased productivity when in poor health, though some influence comes from government incentives to not work. Tirgil (2021) revealed that only 16% of obese women were employed, while 70% of obese men were employed in Turkey between 2008 and 2016.

Andren and Palmer (2011) estimated that individuals, both men and women, with a history of diseases have lower salaries in Switzerland. Additionally, impacts vary across different disease diagnosis. Marcotte and Wilcox-Gök (2003) acknowledged that mental illnesses more commonly result in losses in the lower tail of conditional earnings distribution, particularly for women. Lin (2016) found that overweight workers receive lower wages than their normal-weight counterparts, especially for women aged 50 or older in Taiwan. Brown and Routon (2018) demonstrated increasingly severe penalties associated with high Body Mass Index (BMI) throughout the wage distribution for women, and for men, penalties may be present at specific wage levels in the US. Drydakis (2011) confirmed productivity losses due to health limitations, greater for women, and evidence of wage discrimination due to poor health, greater for Greek men. Individuals with health issues do not appear to face equitable conditions in the Greek labor market.

In Brazil, the most prevalent non-communicable chronic diseases in 2013 were hypertension (21.4%), depression (7.6%), arthritis (6.4%), and diabetes mellitus (6.2%), occurring at various age and education levels, and more frequently among women, according to data from the PNS/2013 (THEME FILHA *et al.*, 2015).

Using the same dataset, Wehrmeister, Wendt, and Sardinha (2022) demonstrated that the presence of two or more morbidities (multimorbidity) increased in the country and was inversely related to education. Other individual determinants such as age, skin color, region, and area of residence, as well as contextual factors, may reveal important differences in health estimates. An intersectional approach highlights groups that are more vulnerable.

Regarding the repercussions of individuals' diseases on the labor market, based on the 1998 National Household Sample Survey (PNAD), Alves and Andrade (2002) established that the probability of labor force participation is highly sensitive to health status for men and less sensitive for women. One explanation for this result is that men, in general, work in activities and occupations that require more physical strength than women, making their exclusion from the labor market more likely. Individuals with illnesses have lower education levels and engage in more physically demanding work.

Kassouf (1997), based on data from the National Health and Nutrition Survey of 1989, evaluated the impact of inadequate health conditions (indicated by Body Mass Index) on adult male workers aged 18 to 65 in Brazil and concluded that poor health reduces the probability of individual labor force participation and leads to lower wage rates.

Godoy *et al*. (2007) estimated individual income losses due to chronic kidney disease, with the poor being the most affected group. Gomes, Brito, and Rocha (2012) verified that poor health affects income and the probability of labor force participation, with these results worsening for women and individuals with lower income levels. Silva (2012) investigated the impact of diabetes mellitus on labor force participation, wage rates, and individual productivity. Using the Probit econometric model on PNAD data from 2008, men and women with diabetes earn lower wages compared to those who are healthy, across all regions of the country. The composition of income losses concerning gender and the incidence of diabetes arises from a lower likelihood of labor force participation associated with the types of work occupied by men and women.

Santos and Besarria (2015) estimated individual income losses due to the presence of non-communicable chronic diseases in Brazil using data from the National Household Sample Survey (PNAD) for 2008. Ordinary Least Squares (OLS) and Quantile Regression methods indicated that out of the 9 diseases studied, eight had significant results and caused wage losses, particularly for chronic renal insufficiency, depression, arthritis or rheumatism, heart disease, spinal or back disease, and asthma or bronchitis. Cancer was not statistically significant, and diabetes was associated with wage gains. Results also showed that the impact of diseases is stronger for lower income brackets.

Oliveira, Silveira, and Balbinoto Netto (2017), based on the 2013 PNS, analyzed individuals diagnosed with cardiovascular disease (CVD), aged 25 to 64, who were not engaged in agriculture or public administration in Brazil. For all income percentiles, the incidence of CVD is negatively correlated with the wages of men (0.90% to 14.80%) and women (1.20% to 18%). Less than 30% of the wage differential between men with and without a CVD diagnosis, with low wages, is attributed to their own characteristics; for men with higher earnings, no statistically significant estimates were obtained; women with CVD have lower wages, and over 40% of the wage differential with respect to women who did not report being diagnosed with CVD could be associated with their characteristics. The study found that cardiovascular diseases can significantly reduce wages and that the incidence of cardiovascular diseases in men can reduce their wages, but to a lesser extent than in women.

Oliveira (2018) indicated that depression reduces the earnings of employed women in 2008. Studies have shown that poor health quality negatively affects earnings, whether through reduced labor force participation, fewer working hours, or lower average wages. The economic consequences of depression on female labor income were analyzed using PNAD 2008 data and its Special Health Supplement. Estimation results indicated that depression reduces women's income by around 8% to 22%.

Souza, Ziegelmann and Figueiredo (2018) demonstrated a negative impact of poor health conditions on labor income and the greatest impact on individuals in the lowest income quantiles. They used 2008 PNAD data and estimated the average treatment effect and quantile treatment effect with correction for selection bias using Lewbel method which generates internal instruments from heteroskedasticity of residuals and bounds for the treatment effect.

Theoretical economic models suggest that health, as a component of human capital, affects wages through productivity (BECKER, 1962; SCHULTZ, 1961). Economic disparities between individuals would result from various human capital elements such as education, training, and health. Individuals with compromised health may be less productive and receive lower wages. However, Grossman (1972) presents health as an endogenously determined capital stock, where the demand for health increases with higher wages, but better health conditions enhance productivity and wages. Furthermore, poor health itself can be a source of wage discrimination in the labor market.

Published international studies affirm the reduced participation of sick workers in the labor market and more unfavorable outcomes for women, older individuals, and those with lower education levels. Some illnesses affect women's work decisions but not men's. These facts are confirmed in the domestic literature. Diseases, in general, reduce wages and impact women and individuals with lower income levels

more, although there is evidence that some diseases (such as depression, cancer, and diabetes) can yield disparate results. This study investigates empirical evidence with the PNS 2019, measures and discusses the participation of chronically ill according to gender, considering multimorbidities and different chronic diseases in Brazil.

3 EMPIRICAL STRATEGY

3.1 DATA SOURCE

This research utilizes microdata from the National Health Survey of 2019, conducted by the Brazilian Institute of Geography and Statistics in partnership with the Ministry of Health. The survey produces sociodemographic, health, and labor market data on a national level, enabling the association between health conditions and the labor market in the country.

Health conditions were identified through both self-reported and objective measures. Individuals are considered chronically ill if they report having received a diagnosis of a chronic disease in the survey questionnaire. According to the PNS, chronic diseases are those that persist over a long period and may have acute phases. This study investigates 14 chronic diseases diagnosed by a doctor or healthcare professional.

For this study, a first sample consisted of 46,635 employed individuals, comprising 25,356 men and 21,279 women. The second sample was expanded to include the active population of 80,714 individuals aged 18 and older, with 36,392 men and 44,322 women.

In the empirical models, the following variables were selected and utilized as Age (continuous variable) and dummies: Gender (Female dummy, taking the value 1 for women and 0 for men); Non-white (taking the value 1 for non-white skin color, such as Black or Indigenous, and 0 for white or Asian skin color); Household head (taking the value 1 for household heads and 0 otherwise); Spouse (taking the value 1 for spouses and 0 otherwise); Child 0-5 (taking the value 1 for individuals with at least one child aged 0 to 5 and 0 otherwise); Child 6-13 (taking the value 1 for individuals with at least one child aged 6 to 13 and 0 otherwise); Low education, Medium education, and High education (Education level dummies, taking the value 1 for Low education (less than high school education) and 0 otherwise, 1 for Medium education (completed high school or incomplete college education) and 0 otherwise, 1 for High education (completed college or higher education) and 0 otherwise); Urban (taking the value 1 for individuals living in urban areas and 0 for rural areas); Region dummies (Northeast, North, Central-West, Southeast, South, and Federal District, taking the value 1 for the region and 0 otherwise); Poor (Poverty dummy, taking the value 1 for poor individuals

and 0 for non-poor individuals). Poor is an individual who has a *per capita household income* of less than half a minimum wage (R$ 449.00). Finally, dummies related to diseases were included: Arthritis, Asthma, Stroke, Cancer, Cholesterol, Depression, Diabetes, Heart Diseases, musculoskeletal disorders (WRMD), Hypertension, Mental Disorders, Lung Diseases, Kidney Diseases, and the other diseases.

3.2 PROBIT MODEL

In this study, the Probit model was used to examine the probabilities of labor force participation among individuals aged 18 and above with chronic illnesses in the Brazilian labor market. The Probit model estimation follows a normal cumulative distribution function (CDF). According to Gujarati (2011) and Wooldridge (2023), the Probit model can be estimated using the following probability function given the econometric equation $I_i = \beta_1 + \beta_2 X_i$:

$$P_i = P(Y = 1 \text{v} X) = (I_i^{\square} \leq I_i) = (Z_i \leq \beta_1 + \beta_2 X_i) = F(\beta_1 + \beta_2 X_i) \quad (1)$$

Where P(Y = 1 | X) is the probability that an event occurs given the explanatory variables X, $I_i^{\square}$ is a critical index, Zi is the standardized normal variable, ZN(0, σ^2). F is the standard normal CDF represented by:

$$P(Y = 1|X) = F(I_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta_1 + \beta_2 X_i} e^{-z^2/2} dz \quad (2)$$

The marginal effect is given by the first derivative of the normal cumulative density function for each observation. Therefore, the marginal effect for the i-th individual arising from a unit change in the j-th explanatory variable is given by:

$$\frac{\partial Pi}{\partial xji} = f(Xi'\beta)\beta \quad (3)$$

Where $f(Xi'\beta) = \frac{dF(Xi'\beta)}{d(Xi'\beta)}$ is the probability density function of the normal distribution. Thus, the marginal effect for a particular dependent variable signifies a change in the probability of a given event occurring when the value of that variable changes. The direction of the marginal effect depends on the sign of βj. For positive values, an increase in Xj raises the probability of Yi = 1; for negative values, an increase in Xj decreases the probability of Yi = 1.

The functional equations are presented in (4) and (5).

$$P(Y)_j = \beta_0 + \beta_1 age_i + \beta_2 age2_i + \theta nonwhite_i + \mathbf{Child}'_i \boldsymbol{\varphi} + \mathbf{Fu}'_i \boldsymbol{\sigma} + \phi poor_i + \eta head_i + \psi urb_i + \mathbf{Hc}'_i \boldsymbol{\lambda} + \mathbf{Diseases}'_i \boldsymbol{\tau} + u_i \quad (4)$$

Where Y_j is labor force participation (1 in the workforce, 0 outside the workforce), **age** is a continuous variable, **non-white** is the non-white dummy (1) and (0) otherwise. The vector **Child** represents the variables related to children aged 0 to 5 years and children aged 6 to 13 years, and the vector **Fu** represents the regions - Northeast as the base. **Poor** is the poverty dummy. **Head** is the dummy for household head and **urb** is the urban dummy. **Hc** is the vector related to education level. The **Diseases** vector corresponds to the dummies for diagnosed chronic illnesses: Not ill (base), Arthritis, Asthma, Stroke, Cancer, Cholesterol, Depression, Diabetes, Heart Diseases, musculoskeletal disorders (WRMD), Hypertension, Mental Disorders, Lung Diseases, Kidney Diseases, and other diseases. Equation (4) is estimated for both men and women groups.

Equation (5) is the model that includes the variable related to the quantity of illnesses per individual.

$$P(Y)_j = \beta_0 + \beta_1 age_i + \beta_2 age2_i + \theta nonwhite_i + \mathbf{Child}'_i \boldsymbol{\varphi} + \mathbf{Fu}'_i \boldsymbol{\sigma} + \phi poor_i + \eta head_i + \psi urb_i + \mathbf{Hc}'_i \boldsymbol{\lambda} + \mathbf{NumDiseases}'_i \boldsymbol{\kappa} + u_i \quad (5)$$

Equation (5) is also estimated for both men and women groups, incorporating the **NumDiseases** variable as the vector of disease quantity dummies (0 disease chronic - base, 1 disease chronic, 2 chronic diseases, 3 or more chronic diseases).

4 EMPIRICAL RESULTS AND DISCUSSION

4.1 DESCRIPTIVE SUMMARY - PROFILE OF CHRONICALLY ILL WORKERS (MEN AND WOMEN) IN BRAZIL

The initial basic labor market indicators in Brazil, derived from the PNS (2019), indicate that 65% of the population in working age (PIA) above 18 years are economically active in the country. However, only 55.69% of chronically ill individuals and 77.48% of non-ill individuals are part of the labor force. Among the group of chronically ill individuals, 49.13% are women, which is relatively lower than the percentage of men (65.36%). Despite the lower relative proportion of ill women in the labor market, in absolute terms, there are 24.1 million ill women compared to 21.1 million ill men. Additionally, 41.9 million individuals are employed with chronic illnesses (21.9 million women and 19.8 million men), while 45.9 million individuals are without a chronic illness diagnosis (18.7 million women and 27.1 million men).

Chronically ill workers have an average age of 45 years and are predominantly women, non-white, household heads, with low to medium education, employed in the service sector, and informally employed (table 1).The majority resides in

the southeastern region of the country and is engaged in private employment. In comparison to non-ill workers, chronically ill individuals tend to be older, have a higher proportion of women, household heads, and fewer non-white individuals. There is a higher percentage of low and high education workers among the chronically ill, working in the service sector, intellectual occupations, in occupations related to the sciences and intellectuals, public employees and self-employed workers, residing in the southeast and south regions, and having lower levels of formal employment.

Contrary to literature from developed countries which highlights labor market difficulties for chronically ill individuals, especially older, less educated men (BLUNDEL *et al.*, 2023; BRITTON; FRENCH, 2020), the data from this research presents a less indicative profile of this nature in Brazil. It's important to note that in Brazil, women tend to perceive worse health, are more prone to chronic illnesses, and utilize medical services more frequently (CASTRO; STADUTO, 2019).

Comparatively, chronically ill women, when compared to men, are younger, have higher education, engage in intellectual professions, work in public and domestic roles, are less likely to head households, are less involved in agriculture and industry, and more in the services sector. They also tend to have lower formalization. Gender inequalities are more pronounced among employer and informally employed chronically ill women, but there is less inequality related to skin color, education, and intellectual and operational occupations.

Hypertension, cholesterol, and depression are the most prevalent conditions among chronically ill workers. Notably, a significant proportion of men have hypertension (45%), and a considerable portion of women experience depression (27%). Previous research based on the 2013 PNS had already indicated these conditions as the most prevalent in the general population and among occupied individuals (THEME FILHA *et al.*, 2015; FIOCRUZ, 2022).

The analysis reveals that chronically ill workers have fewer weekly and monthly working hours compared to their non-ill counterparts, yet their average earnings are higher. This obscures gender wage inequalities. Ill men have higher monthly wages than non-ill men, and ill women earn 96.41% of the wages of non-ill women. Furthermore, chronically ill women receive 60.90% and 69.74% of the monthly and hourly wages of ill men. Non-ill women earn 82% and 90.30% of the monthly and hourly wages of non-ill men. This demonstrates that the wage advantage of the ill is not perceivable for women, and there is greater gender wage inequality among chronically ill individuals in the country, which is detrimental to women. These asymmetries could be attributed to differences in productivity, as posited by the human capital theory, as well as economic gender discrimination.

TABLE 1 - EMPLOYED WORKERS WITH AND WITHOUT DIAGNOSED NON-COMMUNICABLE CHRONIC DISEASES, BY GENDER - BRAZIL - 2019

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VARIABLES	WITH DIAGNOSIS (%)			WITHOUT DIAGNOSIS (%)		
	General	Woman	Man	General	Woman	Man
Age (in years)	45,26	44,2	46,44	37,72	36,79	38,37
Woman	0,52	-	-	0,41	-	-
Non-white	0,52	0,52	0,52	0,56	0,54	0,57
L. Education	0,42	0,37	0,46	0,36	0,26	0,42
M. Education	0,30	0,32	0,28	0,38	0,40	0,37
H. Education	0,29	0,31	0,26	0,26	0,34	0,21
Household heads	0,66	0,62	0,70	0,58	0,54	0,62
Spouse	0,21	0,25	0,17	0,2	0,24	0,16
Child_0 to 5	0,13	0,12	0,13	0,2	0,19	0,21
Child_6 to 13	0,20	0,20	0,20	0,23	0,25	0,22
Child_14 to 17	0,14	0,14	0,13	0,13	0,15	0,11
Urban	0,90	0,92	0,87	0,88	0,92	0,86
North	0,06	0,06	0,06	0,08	0,08	0,08
North East	0,21	0,21	0,22	0,24	0,24	0,24
Southeast	0,49	0,49	0,48	0,45	0,45	0,44
South	0,16	0,16	0,16	0,15	0,15	0,15
Midwest	0,06	0,06	0,07	0,07	0,07	0,07
Federal District	0,01	0,01	0,01	0,02	0,02	0,02
Agriculture	0,08	0,03	0,13	0,08	0,03	0,12
Industry	0,19	0,12	0,26	0,21	0,10	0,29
Trade	0,17	0,16	0,17	0,19	0,21	0,18
Services	0,56	0,68	0,43	0,51	0,66	0,41
Managers	0,05	0,03	0,06	0,04	0,04	0,04
SPI	0,13	0,15	0,11	0,11	0,16	0,08
Technician	0,08	0,08	0,09	0,08	0,09	0,08
Operational	0,74	0,74	0,74	0,76	0,72	0,80
Private Emp.	0,40	0,36	0,45	0,52	0,46	0,56
Public Emp.	0,14	0,16	0,10	0,11	0,15	0,08
Domestic Emp.	0,10	0,17	0,01	0,07	0,15	0,01
Employer	0,05	0,03	0,07	0,04	0,03	0,04
Self-employed	0,32	0,27	0,37	0,27	0,22	0,31
Formal Emp.	0,49	0,48	0,51	0,54	0,54	0,55
Hypertension	0,39	0,33	0,45	...	...	...
Diabetes	0,11	0,09	0,13	...	...	...
Cholesterol	0,28	0,28	0,27	...	...	...
D. Heart	0,07	0,07	0,08	...	...	...
Stroke	0,02	0,02	0,02	...	...	...
Asthma	0,11	0,12	0,11	...	...	...

TABLE 1 - EMPLOYED WORKERS WITH AND WITHOUT DIAGNOSED NON-COMMUNICABLE CHRONIC DISEASES, BY GENDER - BRAZIL - 2019

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VARIABLES	WITH DIAGNOSIS (%)			WITHOUT DIAGNOSIS (%)		
	General	Woman	Man	General	Woman	Man
Arthritis	0,11	0,14	0,08	...	...	...
M. disorders	0,07	0,08	0,05	...	...	...
Mental	0,14	0,18	0,09	...	...	...
Depression	0,19	0,27	0,11	...	...	...
Lung	0,03	0,02	0,03	...	...	...
Cancer	0,04	0,04	0,03	...	...	...
Kidneys	0,03	0,03	0,02	...	...	...
Other diseases	0,16	0,18	0,14	...	...	...
Monthly salary	2.451,12	1.878,18	3.083,91	2.197,39	1.948,05	2.370,32
Hourly wage	16,47	13,65	19,57	13,87	13,04	14,44
Hours/ month	163,29	150,3	177,62	171,4	158,3	180,49
Hours/ week	37,58	34,59	40,88	39,45	36,43	41,54
Sample	22.093	11.448	10.645	24.542	9.831	14.711

SOURCE: PNS (2019)

NOTES: Elaboration of the authors.

Conventional signal used:

… Data not available.

International and national scientific studies present contrary data regarding wage differences between ill and non-ill individuals, but they affirm the vulnerability of chronically ill women (MARCOTTE; WILCOX-GÖK, 2003; LIN, 2016; BROWN; ROUTON, 2018; DRYDAKIS, 2011; GOMES; BRITO; ROCHA, 2012; OLIVEIRA, 2018). Some of these studies focus on specific diseases (GODOY, 2007; SILVA, 2012; OLIVEIRA; SILVEIRA; BALBINOTO NETTO, 2017), while others do not find significant results for certain illnesses (SANTOS; BESARRIA, 2015).

Data on earnings based on disease typology confirm that many chronically ill workers are better remunerated than their non-ill counterparts. However, this trend does not hold true for all illnesses. For instance, workers diagnosed with arthritis, stroke, diabetes, chronic renal diseases, and lung diseases do not experience this pattern, in terms of both hourly and monthly wages (table 2). Previous studies by Godoy (2007) and Silva (2012) have shown similar data for diabetes and chronic renal diseases in the country, although use different data sources.

Another noteworthy aspect is that, across all illnesses, chronically ill women tend to earn less than their male counterparts. For the same gender, ill women earn less than the average monthly wage of non-ill women for diseases such as arthritis, asthma, stroke, high cholesterol, diabetes, and chronic renal diseases. The gender disadvantage is evident for men diagnosed with stroke and lung diseases. Once again, two elements are crucial: the wage inequality between ill and non-ill individuals and the gender-related wage inequality specific to each disease.

TABLE 2 - EARNINGS OF WORKERS WITH CHRONIC DISEASE DIAGNOSIS, BY DISEASE TYPE AND GENDER - BRAZIL - 2019

CHRONIC DISEASES	(R$)		
	General	Woman	Man
Arthritis	2.123,77	1.593,52	3.088,99
	15,96	12,12	22,93
Asthma	2.415,23	1.871,40	2.843,82
	14,72	12,97	16,10
Stroke	1.597,85	1.194,14	1.776,17
	12,65	9,43	14,07
Cancer	2.967,42	2.573,50	3.512,85
	19,08	16,12	23,18
Cholesterol	2.728,83	1.749,51	3.499,56
	17,84	12,63	21,93
Depression	2.383,06	2.067,72	3.147,50
	16,27	15,04	19,24
Diabetes	2.125,75	1.428,80	2.730,00
	14,09	10,99	16,78
Heart disease	2.782,49	1.494,41	3.408,10
	17,01	10,53	20,15
Musculoskeletal disorders	2.276,74	2.057,37	2.637,69
	16,01	16,10	15,85
Hypertension	2.222,91	1.624,51	2.640,26
	14,99	12,07	17,03
Mental	2.806,40	2.052,05	4.152,18
	18,24	13,53	26,63
Lung	2.198,34	2.128,54	2.237,11
	13,72	14,03	13,55
Kidneys	1.860,35	1.358,22	2.487,73
	15,55	11,68	20,38
Other diseases	2.696,29	2.172,25	3.400,97
	18,45	16,18	21,51

SOURCE: PNS (2019)
NOTE: Elaboration of the authors.

Similarly, the study indicates that chronically ill individuals, in general, earn more than non-ill individuals. However, this pattern is reversed when the ill individual has low education, resides in rural areas or the central-west region, is engaged in technical and operational activities, or works as a self-employed worker or domestic worker (table 3). The wage advantage is evident for ill men is visible from every perspective. The gender wage disadvantage for ill women is confirmed, but it reverses when ill women have medium to high education levels, live in the North, Northeast, or Federal District, work in the services sector, engage in skilled occupations, Science professionals and intellectuals (SPI) and techniques, and is salaried.

TABLE 3 - EARNINGS OF WORKERS (MONTHLY AND HOURLY) WITH AND WITHOUT CHRONIC DISEASE DIAGNOSIS, BY PERSONAL AND LABOR MARKET CHARACTERISTICS - BRAZIL - 2019

continua

VARIABLES	WITH DIAGNOSIS (R$)			WITHOUT DIAGNOSIS (R$)		
	Man	Woman	General	Man	Woman	General
White	4.185,94	2.395,78	3.248,88	3.054,09	2.551,09	2841,44
	26,59	16,83	21,48	18,57	16,69	17,78
Non-white	2.051,20	1.398,62	1.707,90	1.848,45	1.440,04	1.685,48
	13,00	10,72	11,80	11,26	9,97	10,75
L. Education	1.565,94	961,93	1.281,30	1.478,81	976,78	1.326,87
	10,26	8,10	9,24	8,69	7,00	8,18
M. Education	2.544,68	1.390,09	1.902,07	1.996,32	1.300,85	1.697,08
	15,52	10,20	12,56	11,63	8,51	10,29
H. Education	6.397,51	3.483,64	4.736,18	4.773,18	3.465,89	4.088,21
	40,72	23,90	31,13	30,62	23,08	26,67
Household heads	3.268,44	1.919,22	2.604,07	2.644,46	2.008,5	2.405,24
	20,78	14,13	17,50	16,33	13,83	15,39
Urban	3.336,42	1.946,57	2.586,79	2.544,62	2.023,32	2.322,18
	21,17	14,12	17,37	15,49	13,50	14,64
Rural	1.367,23	1.044,10	1.239,61	1.310,26	1.062,36	1.241,39
	8,74	7,94	8,43	8,02	7,68	7,93
North	2.094,97	1.507,53	1.801,17	1.828,37	1.474,59	1.689,81
	15,61	11,99	13,80	11,61	10,57	11,20
North East	2.054,11	1.400,54	1.714,24	1.516,13	1.326,38	1.438,89
	13,49	10,65	12,01	9,49	9,35	9,44
Midwest	2.738,39	1.784,34	2.256,78	2.555,68	1.953,66	2.312,01
	15,97	12,59	14,26	15,87	13,27	14,82
Federal District	5.161,44	3.455,40	4.157,50	3.864,05	3.088,21	3.507,49
	30,28	22,75	25,85	25,02	20,14	22,77
Southeast	3.632,43	2.042,24	2.787,51	2.692,82	2.228,91	2.500,63
	23,29	14,86	18,81	16,60	14,80	15,85
South	3.217,04	2.029,7	2.595,57	2.859,59	2.193,15	2.589,68
	18,99	14,09	16,42	15,87	13,92	15,08
Agriculture	1.571,03	968,13	1.438,4	1.358,45	1.101,84	1.325,42
	9,83	7,12	9,24	7,93	7,64	7,89
Trade	2.634,86	1.444,53	2.025,14	2.074,21	1.760,13	1.935,49
	15,43	10,27	12,79	11,70	10,44	11,15
Services	4.032,05	2.089,09	2.797,05	2.946,40	2.031,05	2.462,18
	26,49	15,36	19,42	19,12	14,17	16,50
Industry	2.587,29	1.527,46	2.232,62	2.165,20	2.003,84	2.132,77
	15,86	10,40	14,03	12,26	12,38	12,28

TABLE 3 - EARNINGS OF WORKERS (MONTHLY AND HOURLY) WITH AND WITHOUT CHRONIC DISEASE DIAGNOSIS, BY PERSONAL AND LABOR MARKET CHARACTERISTICS - BRAZIL - 2019

conclusão

VARIABLES	WITH DIAGNOSIS (R$)			WITHOUT DIAGNOSIS (R$)		
	Man	Woman	General	Man	Woman	General
Managers	9.570,17	5.462,05	8.038,01	5.106,89	5.609,60	5.299,10
	55,70	32,09	46,89	28,31	32,59	29,95
SPI	7.407,8	4.024,53	5.352,03	5.838,01	3.968,57	4.758,50
	50,91	28,56	37,33	34,76	27,52	30,58
Technical	3.579,66	2.609,06	3.109,70	3.750,37	2.240,02	3.118,26
	24,47	18,59	21,63	29,87	15,36	23,79
Operational	1.825,20	1.189,45	1.491,78	1.730,81	1.272,60	1.554,58
	11,23	9,18	10,16	10,05	8,51	9,46
Private Emp.	2.584,84	1.945,49	2.284,96	2.088,48	1.857,93	2.005,6
	15,10	12,18	13,73	11,83	11,11	11,57
Public Emp.	5.246,54	3.161,8	3.920,63	4.164,88	2.926,71	3.447,41
	33,30	21,76	25,96	26,36	20,49	22,96
Employer	8.540,66	4.962,82	7.381,66	6.073,06	6.290,49	6.144,34
	50,71	31,19	44,39	46,12	37,32	43,24
Self-employed	2.058,24	1.335,67	1.733,03	1.960,09	1.580,76	1.835,16
	15,34	12,27	13,96	12,03	12,53	12,20
Domestic Emp.	1.196,66	827,83	842,78	1.154,04	850,58	880,36
	7,26	8,07	8,03	7,18	7,04	7,05

SOURCE: PNS (2019)

NOTE: Elaboration of the authors.

4.2 PROBABILITIES OF PARTICIPATION IN THE LABOR MARKET - THE INFLUENCE OF CHRONIC DISEASES

The research findings refer to the specifications which include the number of chronic diseases (table 4) and the typology of the individuals' diseases (table 5). The results gathered in table 4 show that, in general, adult individuals have a 65.75% probability of participating in the Brazilian labor market. The presence of non-communicable chronic diseases reduces this possibility, and it intensifies when two, three, or more diseases are simultaneously associated in the same patient. An adult who has been diagnosed with one chronic disease has a 5.22% decreased chance of participating in the Brazilian labor market. If there is another pathological condition, this reduction increases to 10.37%. The combination of three or more pathologies further reduces this possibility (14.41%).

TABLE 4 - PROBABILITIES OF PARTICIPATION IN THE LABOR MARKET. MARGINAL EFFECTS - BRAZIL - 2019

VARIABLES	General		Man		Woman	
	dy/dx	Std. Er.	dy/dx	Std. Er.	dy/dx	Std. Er.
Woman	(3)-0,2422	0,0070	-	-	-	-
Age	(3)0,0375	0,0015	(3)0,0278	0,0018	(3)0,0380	0,0021
Age2	(3)-0,0005	0,0000	(3)-0,0004	0,0000	(3)-0,0006	0,0000
Non-White	0,0075	0,0077	0,0038	0,0094	0,0152	0,0104
Urban	(3)0,0436	0,0079	(2)-0,0206	0,0089	(3)0,1202	0,0111
North	-0,0005	0,0086	(2)0,0220	0,0114	(1)-0,0200	0,0117
Southeast	(3)0,0513	0,0085	(3)0,0371	0,0106	(3)0,0655	0,0121
South	(2)0,0229	0,0103	0,0116	0,0134	(3)0,0401	0,0135
Midwest	0,0176	0,0117	(2)0,0315	0,0138	0,0086	0,0162
FD	0,0157	0,0178	-0,0108	0,0262	(1)0,0390	0,0233
M. Education	(3)0,0926	0,0081	0,0539	0,0103	(3)0,1228	0,0110
H. Education	(3)0,1430	0,0088	(3)0,0642	0,0113	(3)0,2016	0,0122
Household heads	(3)0,1382	0,0118	(3)0,1622	0,0146	(3)0,0941	0,0159
Spouse	(3)0,1021	0,0115	0,1627	0,0109	(2)0,0349	0,0172
1 Disease	(3)-0,0522	0,0086	(3)-0,0689	0,0107	(2)-0,0289	0,0119
2 Diseases	(3)-0,1038	0,0114	(3)-0,1239	0,0129	-0,0632	0,0153
3+ Diseases	(3)-0,1441	0,0117	(3)-0,1931	0,0143	(3)-0,0897	0,0161
Poor	(3)-0,2032	0,0097	(3)-0,1748	0,0118	(3)-0,1966	0,0129
Child_0 to 5	(3)-0,0340	0,0100	(3)0,0967	0,0118	(3)-0,1145	0,0133
Child _6 to 13	(2)0,0252	0,0100	(3)0,0898	0,0101	-0,0124	0,0139
y = Pr(y)	(2)0,6576	-	(3)0,7926	-	(3)0,5408	-

SOURCE: PNS (2019)

NOTES: Elaboration of the authors.

Statistical significance:

(1) p<0.1.

(2) p<0.05.

(3) p<0.01.

Factors such as female gender, having children aged 0 to 5 years, and being in a state of monetary poverty decrease the likelihood of participating in the labor market. On the other hand, age, higher education levels, household headship, and having children between 6-13 years of age, living in urban areas and in more developed Brazilian macro-regions (Southeast and South), enable greater participation of individuals in this Brazilian market.

Research by Werhmeister, Wendt, and Sardinha (2022) contributes to understanding the subject by confirming that increased multimorbidity in the country from 2013-2019 is related to the most vulnerable groups. Besides individual determinants, poverty, region, area of residence, and life context can reveal significant differences in health in a country of continental dimensions and historical inequalities. These intersecting factors highlight the greatest vulnerabilities.

The gender approach in the research confirms the asymmetry already highlighted in other themes in the national literature. Men have a greater likelihood of engaging in activities in the labor market (79.26%). However, chronic diseases hinder this engagement, and the negative responses to insertion due to the presence of one disease (-6.88%), two (-12.39%), or three or more diseases (-19.30%) are magnified.

Other elements, such as age, higher education, household headship, and the presence of children, residence in the northern, southeastern, and central-west regions of the country, increase the probabilities of participation in the labor market. Family poverty and urban residence reflect opposite results. Skin color did not yield statistically significant results.

From the perspective of female presence in the labor market, there are fewer chances of their participation in economic activities (54.08%) compared to men. The impact of chronic diseases reduces this probability, magnified by comorbidities, as evidenced for men, but to a lesser extent percentage wise. Women affected by one disease, two diseases, or three or more diseases see their prospects for economic activity decrease by 2.89%, 6.31%, and 8.97%, respectively.

Age, education, and household headship are positive factors for female economic inclusion, while the presence of children aged 0 to 5 years and family poverty reduce this participation, as expected in Brazilian research. Living in urban areas, in the developed regions of the country (Southeast, South, and Federal District), contributes to female activity. Skin color did not yield statistically significant results.

A few important qualifications: the penalty of female insertion into the labor market due to chronic disease is smaller for women and even less relevant when two or three or more diseases are associated for the same patient. It's also a fact that while men's responsibility for the family positively influences this event of economic participation, age, and especially the education of the adult female population, contributes significantly to this. Furthermore, the realization of fatherhood and motherhood results in different behaviors for men and women, as evidenced by the results obtained from the 2019 PNS.

The following information reveals the probabilities of economic activity for the adult population in the labor market, according to the specificity of non-communicable chronic diseases in Brazil (table 5). The results of the Probit model applied to the microdata of the 2019 PNS indicate that, of the 10 diseases, along with other non-mentioned diseases, of which results were statistically significant, 9 are negatively related to the individual's likelihood of being inserted in the labor market. Stroke is the condition that most affects this outcome, as a patient diagnosed with a stroke reduces their participation by 22.35%. Neoplasms (8.67%), arthritis (7.92%), mental illness (7.56%), diabetes (7.20%), cholesterol (6.11%), depression (4.54%), and hypertension (3.97%) compromise the economic participation of these individuals. Data for heart diseases, asthma, lung diseases, and kidney diseases were not significant. People with Musculoskeletal disorders have greater chances of insertion in the labor market (11.80%).

TABLE 5 - PROBABILITY OF PARTICIPATION OF INDIVIDUALS IN THE LABOR MARKET, ACCORDING TO THE TYPOLOGY OF CHRONIC DISEASES - BRAZIL - 2019

VARIABLES	GENERAL	MAN	WOMAN
	dy/dx	dy/dx	dy/dx
Woman	(3)-0,2752	-	-
Age	(3)0,0415	(3)0,0317	(3)0,0441
Age2	(3)-0,0005	-0,0004	-0,0006
Non-White	(2)0,0146	(1)0,0122	(1)0,0222
Urban	(3)0,0539	-0,0196	0,1375
North	-0,0071	(3)0,0196	(3)-0,0259
Southeast	(3)0,0554	(1)0,0532	(1)0,0572
South	(3)0,0335	(3)0,028	(3)0,044
Midwest	0,0201	0,0426	0,0032
Federal District	0,0258	(3)-0,0004	(3)0,0424
M. Education	(3)0,0987	(3)0,0587	(3)0,1236
H. Education	(3)0,139	(3)0,047	(3)0,1969
Household heads	(3)0,1184	0,1441	(3)0,08
Spouse	(3)0,0888	(1)0,1701	(1)0,0171
Hypertension	(3)-0,0397	(2)-0,0262	(2)-0,0462
Diabetes	(2)-0,072	-0,0829	-0,0475
Cholesterol	(3)-0,0611	-0,0332	-0,0739
Heart disease	-0,0111	(3)-0,0451	(3)0,0505
Stroke	(3)-0,2235	(1)-0,245	(1)-0,2119
Asthma	-0,0239	0,0441	-0,0631
Arthritis	(3)-0,0792	-0,0705	-0,0814
M. disorders	(3)0,118	(3)0,0217	(3)0,1751
Mental	(3)-0,0756	(3)-0,2731	0,0321
Lung	-0,0736	(2)-0,0752	(2)-0,1033
Cancer	(2)-0,0867	(1)-0,1875	(1)-0,0053
Kidneys	0,0410	(3)-0,1238	(3)0,1987
Other diseases	(3)-0,1122	(3)-0,2104	(3)-0,0286
Depression	(1)-0,0454	(3)-0,1537	(3)-0,0059
Poor	(3)-0,1929	(3)-0,1755	(3)-0,2026
Child_0 to 5	(3)-0,0449	(3)0,1058	(3)-0,1273
Child _6 to 13	(1)0,0209	(3)0,0898	(1)-0,0139
y = Pr(y)	(3)0,5408	(1)0,7907	(3)0,5343

SOURCE: PNS (2019)

NOTES: Elaboration of the authors.

Statistical significance:

(1) $p<0.1$.

(2) $p<0.05$.

(3) $p<0.01$.

According to this Probit model specification, the adult male individual studied has a greater probability of participating in the labor market in Brazil (78.07%). Of the 9 diseases with statistically significant results, 8 negatively influence men's insertion into economic activity. Mental illness (27.31%) and stroke (24.59%) are the most detrimental to this economic movement; cancer (18.75%) and depression (15.37%) are also relevant in this aspect. Kidney disease (12.38%), diabetes (8.29%), and hypertension (2.62%) have a lesser influence. Other diseases reduce male participation in the labor market by 21.04%. Cholesterol, heart disease, arthritis, musculoskeletal disorders, and lung diseases did not yield statistically significant results. On the other hand, individuals with asthma have their participation increased by 4.41% in the Brazilian market.

Factors such as age, education, household headship, and the presence of children increase the probability of male participation in the labor market. Residing in the southern-central region of the country indicates a similar trend. However, living in urban areas and in a state of poverty reduces this possibility.

The probabilities of female insertion are lower than those of men in the Brazilian labor market (53.43%). Of the 7 diseases whose results were statistically significant, 6 are negatively related to women's chances of economic participation, with stroke (21.19%) being the condition that most affects a woman's decision. Arthritis (8.14%), cholesterol (7.39%), asthma (6.31%), and hypertension (4.62%) point in this direction. However, women diagnosed with kidney diseases (19.87%) and musculoskeletal disorders (17.71%) have a higher probability of insertion in the labor market.

Older women, non-white individuals, household heads, and those with higher educational levels participate more in the market. Residents of urban areas and those in the Southeast and South also have these same chances. On the other hand, poverty and motherhood related to younger children, aged 0 to 5 years, hinder this insertion.

The gender considerations can be summarized as follows: women participate less in the labor market compared to men. The impact of diseases affects the presence of both men and women, and comorbidities bring more problems for both sexes, with greater intensity for men. The chances of insertion differ according to individuals' specific diseases and their sex, mostly hindering insertion, but some diseases do not do so for men (asthma) and women (kidney and musculoskeletal disorders).

CONCLUSION

This article has explored the relationships between chronic diseases and their repercussions on the participation of men and women in the labor market in Brazil. Sick women, compared to men, are younger, more educated, engaged in intellectual professions, public and domestic employees, less likely to head households, work less in agriculture and industry, and more in the service sector. They also have lower formalization rates. As previous research indicated, hypertension, cholesterol, and depression are the most common among employed men and women, but the proportion of hypertensive men and depressive women is noteworthy.

The wage disadvantage of diseased women in relation to men is affirmed for all studied diseases and compared to non-diseased women for some studied diseases. This latter disadvantage is reversed if a woman has higher education, lives in less developed areas, works in services, holds more qualified and salaried professions. Moreover, gender wage inequality among employed chronic disease patients is more pronounced.

In general, the occurrence of chronic disease reduces the chances of labor market participation, and this reduction intensifies with the association of two, three, or more diseases. Despite the negative interference of factors related to social groups that should have priority as public policy for labor market inclusion, such as women, mothers of young children, and the poor, the penalty of female insertion into the labor market due to chronic disease is smaller for women and even less relevant with the association of two or three or more diseases for the same patient, compared to men. The region of urban and more developed residence, age, and education favor women. The realization of parenthood results in different economic behaviors for men and women, favoring men and disadvantaging women. It appears that the greater difficulty for men's economic participation arises from male work profiles, which are usually more related to physical strength and dependent on good health. For women, the challenge might be more in achieving better wages.

The research shows that the decision to work for men is hindered by mental illness and stroke, cancer and depression, and for women, by stroke, arthritis, cholesterol, asthma, and hypertension. Asthmatic men and women with kidney diseases or musculoskeletal disorders have less difficulty in labor market insertion. However, the highest incidence among those who obtained employment is hypertension for men and depression for women. Depression impairs men's participation but not the employment; hypertension compromises women's participation but not their employment. Therefore, there is a suggestion to advance in methodologies to investigate the chances of absorption in the market with variable controls.

Despite the method of response capture through self-reporting in the National Health Survey (PNS) and the higher demand for women's health services and more

medical diagnoses, the results are current and valuable as components of a set of information that can guide policy decisions on the subject. Policies that consider different social groups and their identities can have favorable repercussions on the labor market. Paying attention to the typology of diseases for men and women will lead to more accurate approaches from the perspective of the Brazilian labor market.

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