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ORIGINAL ARTICLE

How may the reduction of some cardiovascular diseases affect Brazilian population's life expectancy?

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This study aimed to analyze the impact of cardiovascular diseases (CVDs) on life expectancy (LE) in the Brazilian population; and to identify how the hypothetical reduction in mortality from 5 to 30%, as well as the hypothetical scenario with no deaths (i.e., elimination) of these diseases would affect LE. This is a simulation study using national cross-sectional data. To identify the impact of CVDs on LE, we used multiple decrement life table models, considering hypothetical CVDs reductions in mortality from 5 to 30% and their elimination. The estimated overall potential gains in LE [years (%)] from the elimination of ischemic disease, hypertensive disease, and cerebrovascular disease were 1.44y (2%) and 1.31y (1.7%), 0.51y (0.7%) and 0.75y (1%), and 1.28y (1.8%) and 1.62y (2.1%), for males and females, respectively. The largest gains in LE were observed among those who live in Brazil's Northeast region. For the overall population, the estimated gains in LE linked to a 5% reduction in CVD mortality for males and females were 0.07y (0.1%) and 0.06y (0.08%) for ischemic disease, 0.02y (0.03%) and 0.04y (0.05%) for hypertensive disease, and 0.06y (0.08%) and 0.07y (0.09%) for cerebrovascular disease. A hypothetical decrease of 30% in mortality by CVDs would lead to gains in LE, for males and

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females, of 0.41y (0.6%) and 0.37y (0.5%) for ischemic disease, 0.15y (0.2%) and 0.22y (0.3%) for hypertensive disease, and 0.36y (0.5%) and 0.45y (0.6%) for cerebrovascular disease. Thus, investment towards improving CVDs, including CVD prevention efforts, would increase LE in Brazil, especially in less developed regions.

Keywords: Hypertension. Cardiovascular disease. Ischemia. Life expectancy. Life tables. Mortality. Prevention. Brazil.

Introduction

According to the World Health Organization (WHO, 2016), approximately 71% of deaths worldwide in 2016 were due to non-communicable diseases (NCDs), in which the leading cause was cardiovascular diseases (CVDs). As a result, the WHO proposed an action plan aiming to reduce the major risk factors for NCDs, such as salt intake, excessive alcohol consumption, smoking, and physical inactivity, as a strategy to reduce the proportion of morbidity and mortality from these diseases (WHO, 2013).

Especially for CVD mortality, both primary prevention and improvements in access to health systems may mitigate the number of deaths from this disease group (GUIMARÃES *et al.*, 2019; SCHMIDT *et al.*, 2011). In this context, physical activity is a useful non-pharmacological approach to reducing mortality. A cohort study found that most physically active subjects showed protective effects (ranging from 20% to 60%) against some CVDs, compared to those less active (NODA *et al.*, 2005). This is alarming information for the Brazilian context, in which only 35% of children/adolescents, 22.5% of adults, and 18.4% of older adults are physically active (AUBERT *et al.*, 2018; BÖHM *et al.*, 2016; MIELKE *et al.*, 2015).

Specifically, one study verified the dose-response association between leisure-time physical activity and mortality, pooling data from 6 studies (n=661,137; 116,686 deaths) (AREM *et al.*, 2015). Compared to physically inactive individuals, authors observed a 33% lower mortality risk of CVDs (hazard ratio 0.67, 95% confidence interval 0.65 – 0.70) among those performing at least the recommended minimum of physical activity according to the 2008 Physical Activity Guidelines for Americans (i.e., 150 to 300 min/week of moderate activity or 75 to 150 min/week of vigorous activity); which is similar to that proposed by the WHO (2010) for people › 18 years old.

This made us question whether increasing the Brazilian population's physical activity level would increment their life expectancy by reducing mortality due to CVDs. In this regard, the multiple decrement life table (MDLT), proposed by Chiang (1968), has been used to identify how a cause of death can affect life expectancy in a specific population. The MDLT estimates life expectancy by age group, considering the hypothetical situation of elimination of a particular cause of death. This approach also estimates the probability of dying for all other causes, estimating the impact of a given disease on population life expectancy.

Although we understand that physical activity is not the only factor responsible for reductions in mortality, it was chosen as an example in this study to respond to the reduction in a specific and eventual scenario. Considering this, based on previous literature (AREM *et al.*, 2015), we considered 30% as the upper threshold of reduction in CVDs, starting at 5% to show how even small changes would affect life expectancy.

Therefore, the objectives of this study were: to analyze the impact of CVDs, namely ischemic disease, hypertensive diseases, and cerebrovascular disease on the life expectancy of the Brazilian population; and to identify how a hypothetical reduction from 5% to 30% in mortality and a scenario with no deaths (i.e., elimination) from these diseases would affect the life expectancy of this population.

Methods

This is a simulation study based on cross-sectional sociodemographic and mortality data available by DATASUS of 2010 BRASIL, [undated]). Data from 2010 were chosen because it was the most recent census year. Brazilian censuses are usually performed every ten years; however, data from 2020 are not available. In this regard, the use of reliable population count data (i.e., provided by official sources) can avoid distortions of information (BARBONI, 2002). The DATASUS comprises all data regarding the National Health Service, responsible of managing cross-national data related to the general population such as morbidity, mortality, health indicators, and epidemiology (including information about illiteracy rates, subjects with low income in each region (i.e., defined as 1/4 of a minimum wage [in 2010, the minimum wage was R$ 510, approximately $ 266]), and cause of death based on the International Classification of Diseases (ICD-10). These data are available online and presented according to sex, age group, and place of death/birth (BRASIL, [undated]). It is estimated that this system covers about 95% of the country's health-related information (LIMA; QUEIROZ, 2014). Furthermore, sociodemographic information about Human Development Index (HDI) was obtained from the Brazilian Institute of Geography and Statistics (IBGE, [undated]).

To construct life tables, we used the data stratified by sex and age group. The computing process was described elsewhere (SILVA, 2001). Briefly, the MDLT model is based on competitive risk theory, in which different risks compete to claim a person's life and the hypothetical effect of eliminating a specific cause of death does not nullify the effects of other causes of death on a given population. Taking the present study as an example, people who hypothetically did not die from CVD were exposed to other causes of death, such as traffic accidents, respiratory diseases, urban violence, etc. Thus, the model proposed by Chiang seems to be coherent with reality and has been widely used in the literature (BARBONI; GOTLIEB, 2004; GOTLIEB, 1981; SOUZA; SIVIERO, 2020).

To estimate the probability of surviving by age group, the survival number of each age group was divided by the survival initial values, according to sex (SILVA, 2001). Moreover,

mortality data regarding ischemic diseases (ICD I20 – I25), hypertensive diseases (ICD I10 – I15), and cerebrovascular disease (ICD I60 – I69) were used.

Hence, we built three statistical models, according to country region and sex: the actual scenario of CVDs' impact on Brazilian's life expectancy; the hypothetical Brazilian's life expectancy if CVDs were eliminated; and the hypothetical scenarios considering 5%, 10%, 15%, 20%, 25% and 30% reductions in CVDs in life expectancy for this population. Table 1 presents sociodemographic characteristics of Brazilian regions according to the 2010 demographic census.

TABLE 1
Human Development Index, illiteracy rate, and people with low income
Brazil – 2010

Regions	Human Development Index	Illiteracy rate (%)	People with low income (%)
North	0.684	11.10	28.95
Northeast	0.66	18.50	29.76
Southeast	0.754	5.30	9.16
South	0.756	5.0	9.68
Midwest	0.753	7.0	9.58
Brazil total	**0.727**	**9.40**	**6.62**

Source: Ministério da Saúde. DATASUS. Available on: http://www.datasus.gov.br.

The descriptive analysis was presented in proportion, according to sex and age group. The results of life tables and MDLT were presented in years estimated to live in each age group. The mortality data were corrected according to the previous recommendation (BARBONI, 2021). All statistical analyses were performed in Microsoft Excel, package Office 365.

Results

Figure 1 shows the distribution of causes of death by sex and age group. We noted an increase in the number of deaths by CVDs from age 40 onwards, for both sexes.

Besides, we eliminated each CVD (i.e., ischemic, hypertensive, and cerebrovascular diseases) to obtain hypothetically gains in life expectancy in each region. Among the diseases, cerebrovascular diseases have the greatest influence on life expectancy (Table 2). Moreover, a hypothetic reduction of 5% to 30% in each CVD was also applied, and, both men and women who live in the Northeast region would benefit from the elimination of hypertensive disease and cerebrovascular disease compared to those who live in other regions. With regard to elimination of ischemic disease, similar gains in life expectancy were noted between Northeast and Southeast regions (men), and between Northeast and South (women).

FIGURE 1
Distribution of percentages of death by some cardiovascular disease, according to sex and age group
Brazil – 2010

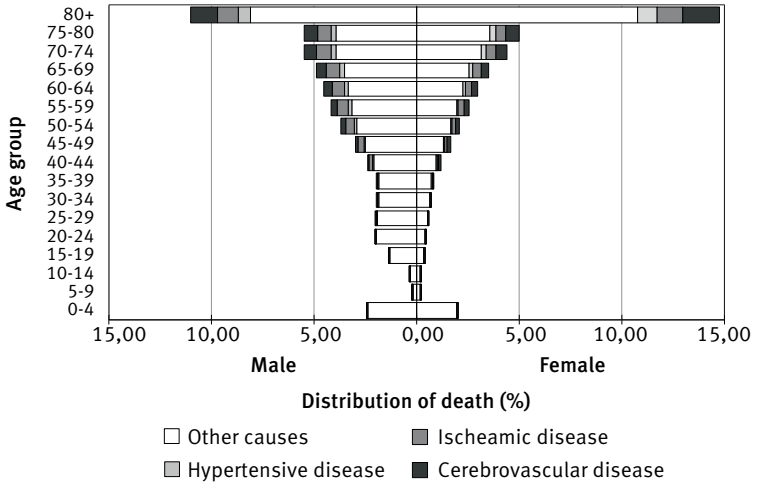


TABLE 2
Potential gains in life expectancy calculated by the life table and the Multiple Decrement Life Table eliminating ischemic disease; hypertensive disease, and cerebrovascular disease; in the latter case, considering a 30% reduction
Brazil – 2010

Regions	Hipotetic – 5%		Hipotetic – 10%		Hipotetic – 15%		Hipotetic – 20%		Hipotetic – 25%		Hipotetic – 30%		Hipotetic elimination	
	Years	%	Years	%	Years	%	Years	%	Years	%	Years	%	Years	%
Ischemic disease														
Male														
North	0.053	0.079	0.11	0.16	0.16	0.24	0.22	0.32	0.27	0.40	0.32	0.48	1.13	1.67
Northeast	0.064	0.096	0.13	0.19	0.19	0.29	0.26	0.39	0.33	0.49	0.39	0.58	1.38	2.05
Southeast	0.069	0.097	0.14	0.19	0.21	0.29	0.28	0.39	0.35	0.49	0.42	0.59	1.48	2.08
South	0.066	0.093	0.13	0.19	0.20	0.28	0.27	0.37	0.33	0.47	0.40	0.57	1.42	1.99
Midwest	0.067	0.096	0.13	0.19	0.20	0.29	0.27	0.39	0.34	0.48	0.41	0.58	1.44	2.04
Brazil total	0.067	0.095	0.13	0.19	0.20	0.29	0.27	0.39	0.34	0.48	0.41	0.58	1.44	2.05
Female														
North	0.045	0.061	0.09	0.12	0.14	0.18	0.18	0.25	0.23	0.31	0.28	0.37	0.95	1.28
Northeast	0.062	0.082	0.12	0.17	0.19	0.25	0.25	0.33	0.32	0.42	0.38	0.50	1.33	1.76
Southeast	0.062	0.078	0.12	0.16	0.19	0.24	0.25	0.32	0.31	0.40	0.38	0.48	1.32	1.67
South	0.065	0.082	0.13	0.17	0.20	0.25	0.26	0.33	0.33	0.42	0.40	0.50	1.41	1.78
Midwest	0.054	0.069	0.11	0.14	0.16	0.21	0.22	0.28	0.27	0.35	0.33	0.42	1.14	1.47
Brazil total	0.061	0.079	0.12	0.16	0.18	0.24	0.25	0.32	0.31	0.40	0.37	0.48	1.31	1.68

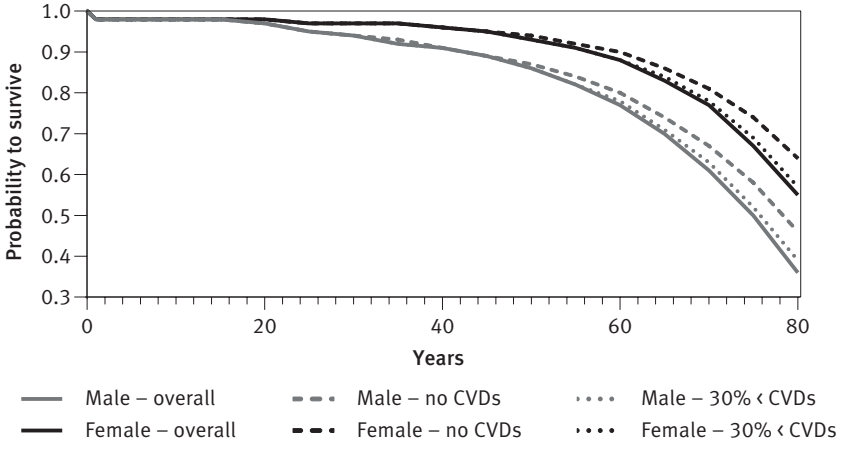
(continue)

(continued)

Regions	Hipotetic – 5%		Hipotetic – 10%		Hipotetic – 15%		Hipotetic – 20%		Hipotetic – 25%		Hipotetic – 30%		Hipotetic elimination	
	Years	%	Years	%	Years	%	Years	%	Years	%	Years	%	Years	%
Hypertensive disease														
Male														
North	0.026	0.039	0.05	0.08	0.08	0.12	0.11	0.16	0.13	0.20	0.16	0.24	0.55	0.81
Northeast	0.031	0.046	0.06	0.09	0.09	0.14	0.12	0.18	0.16	0.23	0.19	0.28	0.65	0.97
Southeast	0.023	0.032	0.05	0.06	0.07	0.10	0.09	0.13	0.11	0.16	0.14	0.19	0.46	0.65
South	0.018	0.025	0.04	0.05	0.05	0.08	0.07	0.10	0.09	0.13	0.11	0.15	0.37	0.52
Midwest	0.025	0.035	0.05	0.07	0.07	0.11	0.10	0.14	0.12	0.18	0.15	0.21	0.51	0.72
Brazil total	0.024	0.035	0.05	0.07	0.07	0.10	0.10	0.14	0.12	0.18	0.15	0.21	0.51	0.72
Female														
North	0.034	0.045	0.07	0.09	0.10	0.14	0.14	0.18	0.17	0.23	0.20	0.28	0.71	0.96
Northeast	0.045	0.059	0.09	0.12	0.13	0.18	0.18	0.24	0.23	0.30	0.27	0.36	0.96	1.27
Southeast	0.033	0.042	0.07	0.08	0.10	0.13	0.13	0.17	0.17	0.21	0.20	0.26	0.69	0.88
South	0.029	0.037	0.06	0.07	0.09	0.11	0.12	0.15	0.15	0.18	0.18	0.22	0.60	0.77
Midwest	0.033	0.043	0.07	0.09	0.10	0.13	0.13	0.17	0.17	0.22	0.20	0.26	0.70	0.90
Brazil total	0.036	0.046	0.07	0.09	0.11	0.14	0.14	0.18	0.18	0.23	0.22	0.28	0.75	0.96
Cerebrovascular disease														
Male														
North	0.061	0.089	0.12	0.18	0.18	0.27	0.25	0.36	0.31	0.46	0.37	0.55	1.34	1.98
Northeast	0.062	0.092	0.12	0.18	0.19	0.28	0.25	0.37	0.31	0.47	0.38	0.56	1.37	2.03
Southeast	0.055	0.077	0.11	0.15	0.17	0.23	0.22	0.31	0.28	0.39	0.33	0.47	1.18	1.66
South	0.060	0.084	0.12	0.17	0.18	0.25	0.24	0.34	0.30	0.43	0.37	0.51	1.33	1.86
Midwest	0.057	0.081	0.12	0.16	0.17	0.25	0.23	0.33	0.29	0.41	0.35	0.50	1.25	1.78
Brazil total	0.058	0.083	0.12	0.17	0.18	0.25	0.24	0.34	0.30	0.42	0.36	0.51	1.28	1.82
Female														
North	0.078	0.105	0.16	0.21	0.24	0.32	0.32	0.43	0.40	0.54	0.48	0.65	1.75	2.35
Northeast	0.082	0.109	0.16	0.22	0.25	0.33	0.33	0.44	0.42	0.56	0.51	0.67	1.84	2.44
Southeast	0.067	0.085	0.13	0.17	0.20	0.26	0.27	0.34	0.34	0.43	0.41	0.52	1.45	1.84
South	0.078	0.099	0.16	0.20	0.24	0.30	0.32	0.40	0.40	0.51	0.48	0.61	1.77	2.24
Midwest	0.069	0.089	0.14	0.18	0.21	0.27	0.28	0.36	0.35	0.45	0.42	0.55	1.51	1.95
Brazil total	0.073	0.094	0.15	0.19	0.22	0.28	0.30	0.38	0.37	0.48	0.45	0.58	1.62	2.08

Figure 2 shows the probability of survival by sex and age group for: the actual estimate; the hypothetical situation of elimination of CVDs; and the hypothetical situation of 30% reductions in deaths by CVDs. In general, survival is better for females than for males. Moreover, the 30% reduction in CVDs showed a beneficial effect on the probability of survival for both sexes (at 80+ years the probability to survive improved from 0.36 to 0.49 in males and 0.55 to 0.57 in females).

FIGURE 2
Cumulative survival probability for males and females overall ("male – overall" and "female - overall"); without cardiovascular diseases (no CVDs); and with 30% reduction cardiovascular diseases (30% ‹ CVDs). Cardiovascular diseases consist of ischemic diseases; hypertensive diseases; and cerebrovascular disease
Brazil – 2010



Discussion

With the elimination in mortality by ischemic, hypertensive, and cerebrovascular diseases, we estimated that Brazilian life expectancy would approximately increase in the range of 0.51-1.44 and 0.75-1.62 years, in males and females, respectively. Further, a 5% reduction in CVDs would be linked to gains in life expectancy of about 0.024 to 0.067 years in men and 0.036 to 0.073 years in women, and if the reduction of CVDs were 30% the estimates of gains of LE would be 6 to 7 times higher than those observed with a 5% reduction in CVDs. Also, the reduction in ischemic and cerebrovascular diseases presented the major gains in life expectancy among the disease groups analyzed.

It is important to consider that although all the potential gains in life expectancy seem low, these estimates are calculated for the general population, and not only for those affected by the causes of death considered in the present study. In that regard, although these estimates may simplistically appear as small effects, they have an enormous impact on all society, in line with Rose's proposal to shift the distribution of a given risk factor in the entire population (MIRANDA *et al.*, 2019; ROSE, 1985). Such population-wide benefits have been recently demonstrated the effects of salt reduction strategies on hypertension (BERNABE-ORTIZ *et al.*, 2020; MARKLUND *et al.*, 2020) and BMI (WANG *et al.*, 2011). Lastly, the most salient gains in life expectancy were observed among those who live in the Northeast region of Brazil, a region that concentrates large proportions of socioeconomically disadvantaged groups relative to the rest of the country.

In this study, it was observed that women have more probability of surviving when compared to men; these data remained even when CVDs were removed from the statistical model, similar to what was found in previous studies (GOTLIEB, 1981; SARKAR; ISLAM, 2018; SIVIERO; SOUZA; MACHADO, 2019). A possible explanation could be the fact that men tend to get more involved in risk behaviors than women (SANTOS *et al.*, 2019; SIVIERO; SOUZA; MACHADO, 2019). In this regard, a report published in Brazil suggests that men have more chances to be killed by fire weapons, being between 91 and 96% of casualties from this cause of death (WAISELFSZ, 2016).

The MDLT analysis also allowed us to identify possible discrepancies in CVDs mortality between Brazilian regions. Then, our analysis revealed that hypertensive and cerebrovascular diseases have especially more impact on life expectancy among those who live in the Northeast region. Moreover, a previous study aiming to identify the trends in death by CVDs from 1980 to 2012, presented that, while the adjusted rate of death decreased in the most developed area, these values increased in the Northeast region (GUIMARÃES *et al.*, 2019).

In Brazil, the Northeast is less developed than the other regions. The literature has presented that some factors linked to development, such as "highly socioeconomic status" (BENSENOR *et al.*, 2015) and "better scholarship" (GOULART *et al.*, 2012), are associated with better cardiovascular outcomes, which can help explain our findings. Furthermore, when compared to other country regions, the higher prevalence of risk factors to CVDs in the Northeast are additional issues that may explain the higher number of deaths by CVDs in this region. Earlier studies showed high blood glucose and high blood pressure (SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2005), as well as low physical activity levels (WERNECK *et al.*, 2018) among those living in the Northeast. These findings point out that, although enhancements in health surveillance had been shown in the last decades, improvements aiming to balance health inequalities between Brazilian regions still are needed.

It was also observed that, in 2010, more than 200,000 deaths were due to stroke, ischemic, and hypertensive diseases in Brazil (BRASIL, [undated]). Taking into account the relevance of these NCDs to human life, previous evidence suggested that healthy lifestyle-based interventions could be used as a low-cost way to mitigate the negative effect of this disease group on health status (NODA *et al.*, 2005). In this sense, a condition was simulated in which the Brazilian population achieved the minimum required physical activity levels according to international guidelines; consequently, enjoying the protective effects of physical activity on CVDs (AREM *et al.*, 2015).

Certainly, Brazil has some challenges to face regarding CVDs, including improvement in early diagnosis (MACINKO; LEVENTHAL; LIMA-COSTA, 2018) as well as health promotion strategies, mainly including physical activity routines among the overall Brazilian population (AUBERT *et al.*, 2018; BÖHM *et al.*, 2016; MIELKE *et al.*, 2015).

Notwithstanding the relevance of our findings, it is necessary to point out the main limitation of this study. Although it is estimated that death registration in Brazil has reliable

indicators, the data from DATASUS can present a lack of information about the classification of cause of death (i. e., underreporting of deaths), which may underestimate the death rate, especially in less developed regions (JORGE; LAURENTI; GOTLIEB, 2007). In this sense, even with the recognized advance in the coverage of the Mortality Information System over the past decades (LIMA; QUEIROZ, 2014; QUEIROZ *et al.*, 2017), the North and Northeast regions of Brazil still present a lower coverage of deaths when compared to other regions of the country (IBGE, 2013; QUEIROZ *et al.*, 2017). Therefore, caution is necessary when comparing the results of this study between regions, since the magnitude of the gains may vary according to them. However, despite this limitation, the findings of our research lead to more expressive gains in life expectancy among those in the Northeast region, which seems to be consistent with the previous literature (GUIMARÃES *et al.*, 2019; LEITE *et al.*, 2015). In addition, it was not possible to estimate interactions of different diseases on mortality.

We sought to identify variation in hypothetical gains in life expectancy according to sex and country region, which may contribute to more specific public policies. The analyses performed herein were based on official data, especially because they are more reliable than other sources. Then, it is possible to provide more precise estimations about health in the Brazilian population. Besides, our results showed potential gains in life expectancy, which could be reached through nationwide physical activity policies, which have the potential to reduce mortality by CVD. Taken together, this nation-wide analysis affords an estimation of overall gains in life expectancy to follow gradual reductions or the elimination of CVDs, and the scope of its population-wide impact on the entire country.

In conclusion, we observed that the elimination of ischemic, hypertensive, and cerebrovascular diseases might improve life expectancy by approximately 0.72% to 2.05% in males and 0.96% to 2.08% in females. When considered hypothetical scenarios of 5% to 30% of reduction in these diseases, increase in life expectancy of 0.024 to 0.41y (in males) and 0.036 to 0.45y (in females) might be reached; showing that more investments and efforts to improve CVDs prevention are necessary, especially in less developed regions.

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Resumo

Como a redução de algumas doenças cardiovasculares pode afetar a expectativa de vida da população brasileira?

O presente estudo objetiva analisar o impacto das doenças cardiovasculares (DCV) na expectativa de vida (EV) da população brasileira e identificar como a EV seria afetada pela redução hipotética de 5% a 30% e pela eliminação da mortalidade por essas doenças. Trata-se de um estudo de simulação que utiliza dados transversais a nível nacional. A análise foi realizada por meio do modelo de tábuas de vida de múltiplo decremento, considerando reduções na mortalidade por DCV de 5% a 30%, assim como a sua eliminação. Os ganhos potenciais estimados na EV, em anos e porcentagem, por meio da eliminação das doenças isquêmica, hipertensiva e cerebrovascular foram de, respectivamente, para homens e mulheres, 1,44 (2%) e 1,31 (1,7%), 0,51 (0,7%) e 0,75 (1%), 1,28 (1,8%) e 1,62 (2,1%). Os maiores ganhos ocorrem entre os residentes na região Nordeste. Além disso, para a população em geral, os ganhos estimados em EV a partir de uma redução de 5% na mortalidade por DCV, em homens e mulheres, foram de 0,07 (0,1%) e 0,06 (0,08%), para doença isquêmica, 0,02 (0,03%) e 0,04 (0,05%), para doença hipertensiva, e 0,06 (0,08%) e 0,07 (0,09%), para doença cerebrovascular. Já uma redução hipotética de 30% na mortalidade por DCV foi acompanhada de ganhos na EV, para homens e mulheres, de 0,41 (0,6%) e 0,37 (0,5%), para doença isquêmica, 0,15 (0,2%) e 0,22 (0,3%), para doença hipertensiva, e 0,36 (0,5%) e 0,45 (0,6%), para doença cerebrovascular. Assim, mais investimentos e esforços orientados para a prevenção de DCV aumentariam a EV no Brasil, principalmente nas regiões menos desenvolvidas.

Palavras-chave: Hipertensão. Doença cardiovascular. Isquemia. Expectativa de vida. Tábuas de vida. Mortalidade. Prevenção. Brasil.

Resumen

¿Cómo puede afectar la reducción de algunas enfermedades cardiovasculares la esperanza de vida de la población brasileña?

Los objetivos de este estudio fueron analizar el impacto de las enfermedades cardiovasculares (ECV) en la esperanza de vida (EV) de la población brasileña e identificar cuánto afectarían a la EV una hipotética reducción del 5 al 30% o la eliminación de la mortalidad por estas enfermedades. Este es un estudio de simulación que utiliza datos transversales nacionales. El análisis de datos se hizo utilizando modelos de tablas de vida de múltiples decrementos, considerando reducciones en la mortalidad por ECV del 5% al 30% así como su eliminación. Las ganancias potenciales estimadas para la EV [años (%)] vinculadas a la eliminación de la enfermedad isquémica, enfermedad hipertensiva, y la enfermedad cerebrovascular fueron 1,44 (2%) y 1,31 (1,7%), 0,51 (0,7%) y 0,75 (1%), y 1,28 (1,8%) y 1,62 (2,1%), para varones y mujeres, respectivamente. Las mayores ganancias en la EV fueron observadas en la población de la región

noreste de Brasil. Las ganancias estimadas en EV ligadas a una reducción del 5% en la mortalidad por ECV en hombres y mujeres fueron 0,07 (0,1%) y 0,06 (0,08%) para enfermedad isquémica, 0,02 (0,03%) y 0,04 (0,05%) para enfermedad hipertensiva, y 0,06 (0,08%) y 0,07 (0,09%) para enfermedad cerebrovascular. Una disminución hipotética del 30% en la mortalidad por ECV se acompañaría de ganancias en EV, para hombres y mujeres, de 0,41 (0,6%) y 0,37 (0,5%) para enfermedad isquémica, 0,15 (0,2%) y 0,22 (0,3%) para enfermedad hipertensiva, y 0,36 (0,5%) y 0,45 (0,6%) para enfermedad cerebrovascular. Esfuerzos orientados a la prevención de las ECV aumentarían la EV en Brasil, especialmente en las regiones menos desarrolladas.

Palabras clave: Hipertensión arterial. Enfermedad cardiovascular. Isquemia. Esperanza de vida. Tablas de vida. Mortalidad. Prevención. Brasil.

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