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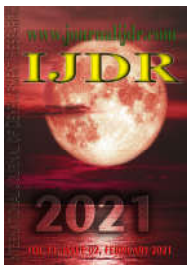

RESEARCH ARTICLE OPEN ACCESS

INDEX OF ACCESSIBILITY TO HEALTH REGIONS: AN EQUITY INDICATOR FOR THE ELDERLY POPULATION

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ABSTRACT

Introduction: The collective health needs to include accessibility to PHC services, especially due to the demographic changes that influence the demand at this healthcare level. **Objective:** To access the geographical accessibility to BHU using the public bus lines, by health regions, the general population and the elderly according different age groups. **Method:** The population survey, and the number of stops and bus lines were carried out using secondary data, provided by official websites. The geographic access dimension expressed by calculating the accessibility indexes and chance ratios, by health region, both for general population and for elderly, who were stratified into age groups. **Results:** Seven health regions assessed, in which general population accessibility indexes ranged from 0,434 to 4,287. When accessibility indexes were observed specifically for elderly people over 80 years old, we observed a ratio of up to 214,692 times lower than the rest of the population in their region. **Conclusion:** The principle of healthcare equity compromised in Distrito Federal, once differences are observed in bus transportation opportunities regarding the places of healthcare offer in Basic Health Units, in advance of chronological age and in the geographic accessibility indexes for this population.

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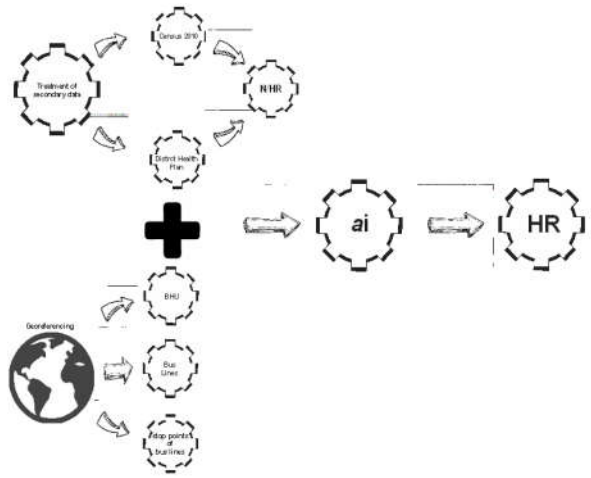
INTRODUCTION

The access to healthcare services is present in the countries' priority agenda is a complex and multidimensional topic that has the geographic accessibility as one of these dimensions (1). Geographical accessibility in health is considered a fundamental element and one of the great challenges for Brazilian public health system, considering the diversity of a country with continental dimensions (2).Geographical disparities associated with socio-economic inequalities affect health access in different levels of care, especially to the Primary Health Care (PHC) (3). Geographical accessibility is intrinsically associated with mobility, whether in the spatial layout of roads, in the public transport organization or in the urban landscape, through the contribution of collective consumption, such as those related to public health services (4, 5). Furthermore, mobility restrictions may negatively or positively impact on PHC access, especially in the elderly population characterized by frailties associated with age and comorbidities, whose treatment is primarily performed at this healthcare level(3).Thus, healthcare access barriers, especially for this age population, can be aggravated by urban spatial conditions (6). Indicators of geographical accessibility have been reported in the scientific literature as a strategy to obtain clear, logical and coherent information, being representative parameters of a phenomenon to be assessed (7, 8). In Brazil, the application of such indicators is highlighted after the recent PHC restructuring associated with the implementation of the Family Health Strategy (FHS) territorialization guideline by Health Regions (HR)(9), and the allocation of teams in basic health units (BHU) (9). This action is emphasized in relation to the understanding of the geographical accessibility impact on PHC services access, as well as on universalization the Unified Health System (SUS) fundamental principle (10). This research aimed to access the geographical

accessibility to BHU using the public bus lines, by health regions, the general population and the elderly according different age groups.

METHODS

The analytical and cross-sectional study that was performed according with the diagram showed in Figure 1. The data used to stratify the population by age and by Administrative Region(AR) were obtained from the projections and estimates for Brazilian population and Federation Units reported by the Brazilian Institute of Geography and Statistics (IGBE)(11).



Legend: BHU - Basic Health Unit; I*a* - Geographic Accessibility Index; RC - Reason of Chance; N/HR - Number of Health Regions

Figure 1. Study execution diagram

Distrito Federal, the place where the research performed, is one of the 27 autonomous federative units in Brazil, where the country capital is located, and comprises 33 Administrative Regions – ARs. These ARs - initially known as satellite cities- are characterized by the highest rate of economic and social inequality in Brazil, with basic infrastructure, security, education and health deficiencies(12–15). For identifying ARs by Health Regions (HR), the District Health Plan 2020-2023 - PDSDF 2020/2023 (Federal District) was used. (Health Department of the Federal District, 2019). The distribution of AR's by HR is described in Chart 1. For calculating populations by HR, the population of each AR that constitutes the HR was used. Then, demographic filters were applied to characterize the age groups by HR, as detailed in the procedures section. We used georeferencing data from the citizen information system (SIC/SESDF/2020) to locate the BHU. The bus lines location and their stop points were obtained by the Geocentric Reference System for las Americas 2000- SIRGAS 2000/UTM, zone 23 South (16).

Procedures: Three groups were stratified by elderly and HR demographics, as follows: GA1 (60 to 69 years), GA2 (70 to 79 years) and GA3 (aged 80 years or older), according to IBGE predictability (11). For this investigation, the geographical accessibility concept was considered as proposed by Donabedian (18) and referenced by other authors (19,20). To determine the geographic accessibility index (Ia) to PHC, we related the location of BHUs from each HR in Distrito Federal, distributed in all seven HR, with the population of these areas. A buffer of 1 km was stipulated around BHU, via Google Maps, to identify bus stop points and their active lines. The relationship between stop points by bus lines was carried out by the product between number of active stops and the number of bus lines divided by 100.

Also, geometric means were calculated to identify the relationship between the number of stops and bus lines per health region, as follows:

$\overline{XG_{y1}}$ – Geometric mean of the variable *i*

^{ni} -Number of events*i*

$$\overline{XG_{y1}} = \sqrt[ni]{X_1 + X_2 + X_n}$$

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$$\overline{XG_{y1}} = \sqrt[ni]{X_1 + X_2 + X_n}$$

Analysis: To determine the final product of Ia, we considered a number of BHU, multiplied by the stop points and bus lines geometric means, proportionalized by the each HR population, multiplied by 100 (10).

Where:

I*a*= Accessibility index
nº BHU= Number of Basic Health Units
$\overline{XG_{pi}}$ = Geometric Mean of stop points within the 1km BHU radius
$\overline{XG_{li}}$ = Geometric Mean of bus lines within the 1km BHU radius
HRP_i = Health Region Population*i*

$$Ia = \left\{\frac{(n^{o}BHU * XG_{pi} * \overline{XG_{li}})}{HRP * 100}\right\}$$

The same procedure for calculating I*a* was performed for each elderly age group, taking into account their respective HR and demographic frequency. To determine the Chance Ratio (CR), we calculated how many times the population of each HR had a chance to geographic access to the BHU, compared with the age ranges of elderly in each HR. Thus, the result was the I*a* ratio of the HR total population and the elderly population of the same region. For better visual response to the resulting value, the same procedure of the Ia calculation was applied, multiplying by 100. Like I*a*, the CR was performed for each age group of elderly, taking into account their respective HR and demographic frequency.

Where:

CR_i= Chance Ratio*i*
Ia_{TRi} = Total Accessibility Index by Region *i*
Ia_{Fi} = Age Group Accessibility Index i

$$CR_i = \left(\frac{IATRi}{IAFi}\right)$$

This study complies with the ethical precepts established by the parameters outlined in Resolution 510/2016 of the National Council of Health (NCH).

RESULTS

From the Distrito Federal's population, i.e., 3,052,546 people in 2020, 51.9% were women and 48.1% were men (12). In this context, the elderly reaches the number of 346,221 persons, representing 11.3% of the Distrito Federal total population. Demographic pyramid for this reality represented in Figure 2. The elderly was distributed differently in the 33 Federal District's ARs, which comprises the seven HR, where there are 152 BHU located in the different HR (Table 1). For geographic access by public bus transportation, the seven HR have 2,261 stop points and 5470 active bus lines within a radius of 1km per BHU, whose relationship between them detailed by HR (Table 1). Four BH- located in the ARs of Brazlândia, Fern, Lago Sul and Fecal- were excluded from the study because they were inactive during the data-gathering period. 87 bus stop points were also excluded for analysis because they did not have active bus lines. The most of elderly lives in Southwest region (25.4%), followed by those living in the Central (21%), West (15.5%) and South-Central (12%) regions. The East, North and South regions do not exceed 12% each, being respectively 6%; 11.2% and 8.8%. The Central HR is a home for a large part of elderly people over 70 years (45.89%), of which 15.61% are long-term persons.

Chart 1. Distribution of Administrative Regions by Health Regions. Source: Author - (*) RA 32 - Sol Nascente/Pôr do Sol, created by the Law 6.359/2019, was counted in RA 9 - Ceilândia. (**) RA 33 – Arniqueira, created by the Law 6.391/2019, was counted in RA 20 – ÁguasClaras

Health Region	Administrative Region	Health Region	Administrative Region
CENTRAL	RA1 - Brasília (Asa Norte)	SOUTHWEST	RA3 - Taguatinga
	RA1 - Brasília (Asa Sul)		RA12 - Samambaia
	RA11 – Cruzeiro		RA15 - Recanto das Emas
	RA16 - Lago Sul		RA 20 - Águas Claras (**)
	RA18 - Lago Norte		RA 30 - Vicente Pires
	RA 22 - Sudoeste/Octogonal	SOUTH	RA2 - Gama
	RA 23 - Varjão		RA13 - Santa Maria
SOUTH CENTRAL	RA8 - N. Bandeirante	EAST	RA7 – Paranoá
	RA10 - Guará		RA14 - São Sebastião
	RA17 - R. Fundo I		RA 27- Jd. Botânico
	RA19 –Candangolândia		RA 28 - Itapoã
	RA 21- R. Fundo II	NORTH	RA5 - Sobradinho I
	RA 24 - Park Way		RA 6 - Planaltina
	RA 25 - SCIA (Estrut.)*		RA 26 - Sobradinho II
	RA 29 - S.I.A*		RA 31 - Fercal
WEST	RA4 - Brazlândia		
	RA9 - Ceilândia (**)		

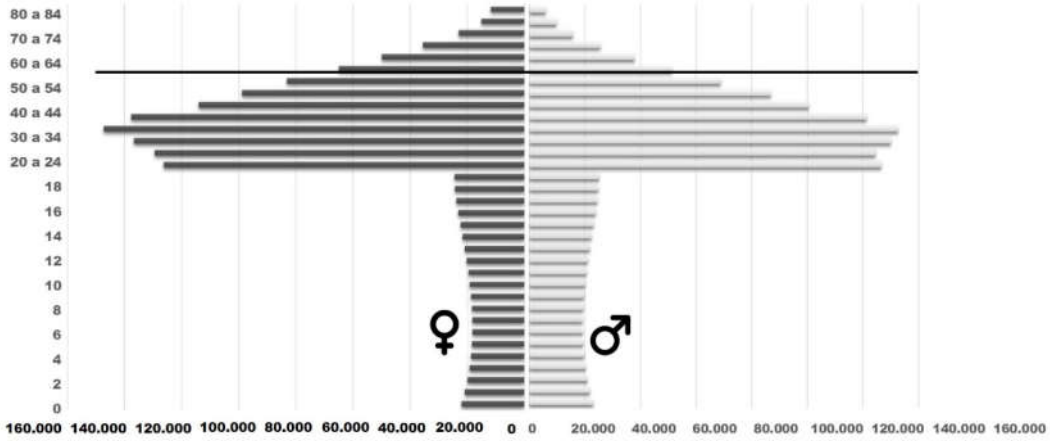

Figure 2. Distrito Federal demographic distribution planned for 2020, data based on the last census[11]

Table 1. Geographic Accessibility Index (I*a*) to the Basic Health Units for elderly and the total population in Distrito Federal by Health Region

HR	Population (N=3.052.546)	Elderly (N=345.221)	n.of BHU (N=152)	LSBL	Population I*a*	Elderly I*a*
Central	392.698	72.560	9	7,37	2,029	0,375
South-Central	380.797	41.696	18	4,93	4,287	0,469
East	313.563	20.946	24	0,42	0,434	0,029
North	355.006	38.928	28	1,27	0,935	0,103
West	507.851	53.658	22	8,81	3,677	0,389
Southwest	829.672	87.872	33	4,43	3,544	0,375
South	272.959	30.561	18	1,88	2,233	0,250

Legend: HR - Health Region; BHU - Basic Health Unit; LSBL - List of stop points and bus lines; Ia - Accessibility Index.

Table 2. The chance ratio of the different age groups regarding the Distrito Federal general population and BHU geographic access by health region in relation to the elderly, stratified by age group

HR	60 to 69 years (n=204.089)	I*a*	CR	70 to 79 years (n=99.777)	I*a*	CR	+ than 80 years (n=42.355)	I*a*	CR
Central	39259	0,203	10,003	21971	0,114	17,873	11330	0,059	34,660
South Central	24261	0,273	15,696	12394	0,140	30,724	5041	0,057	75,540
East	13932	0,019	22,507	5506	0,008	56,949	1508	0,002	207,933
North	23779	0,063	14,929	10713	0,028	33,138	4436	0,012	80,028
West	30122	0,218	16,860	16727	0,121	30,361	6809	0,049	74,585
Southwest	54994	0,235	15,087	23711	0,101	34,991	9167	0,039	90,506
South	17742	0,145	15,385	8755	0,072	31,177	4064	0,033	67,165
FD Total	204089	0,165	15,781	99777	0,083	33,601	42355	0,035	90,059

Legend: HR - Health Region; I*a*- Accessibility Index; CR – Chance Ratio of the general population with geographic access regarding the number of elderly into the health regions.

The East HRhas, within its elderly population, the majority (66.51%) of the youngest (60-69 years old). The geographic accessibility indexes in the seven Distrito Federal health regions showed a variation of 6.95 between the maximum and minimum points (Table 1).When comparing the total population's I*a* with the elderly's, an average variation of -2.164±1,302 points was observed. Regarding the ratio of inhabitants per BHU in each HR, we perceived that the highest values are found in the Central and Southwest regions (43,633 inhabitants/BHU and 25141.58hab/BHU, respectively), with a descending representativeness in the other regions(West 23084.14 inhabitants/ BHU, Centro South 21155.39 hab/ BHU, South 15164.39 hab/BHU, East 13065.13 and North 12678.79 hab/ BHU). This study verified the relationship specifically for each age group of elderly in each Health Region, as shown in Table 2. In this analysis, we found an exponential reduction in the Chance Ratio (CR) to the geographic access of elderly to BHU (CR = >69years =15.78±3.68; >79years = 33.60±11.69 and <80years = 90.06±54.83), where the more life decades advance the RC increases (almost three times) compared with the elderly under 70 years. In general, the elderly population has a 46.48 lower chance ratio than the younger population in the Distrito Federal.

DISCUSSION

The equity of the Distrito Federal population in health access is compromised due to the differences observed in this study, including territorial distribution and public transportation supply. In fact, the relationship between urban accessibility indicators and primary health services, showed here, highlights the inequalities for general population and, in particular, for elderly. In addition, when we verify the public transport offer by bus, the lowest lines per stop relationships are those found in the East, North and South regions, which directly impacts on accessibility rates. These health regions are composed of administrative regions with socioeconomic conditions lower than the rest of the Distrito Federal regions (21–23). A similar reality observed in the cities of São Paulo and Recife (24.25), which implies a greater accessibility for regions close to metropolitan center and more favorable socioeconomic conditions, being the lowest rates consequently found in peripheral and poor regions (26). The Basic Health Units are important points of PHC, as they potentiate the capacity of solving health issues and prevent the diseases worsening, especially the chronic ones (16). Moreover, geographic access to these units represents a relevant indicator for the health system effectiveness evaluation. In this sense, regardless of personal and/or social disadvantages, transportation provides the access means to essential opportunities for people (27–29), which was not a reality found in a few Distrito Federal health regions.

About the elderly, they are into the age group with the highest demand health services use, therefore, a higher frequency of health systems use due to chronic comorbidities, such as hypertension, diabetes, arthritis and others (30–32). Thus, the displacement of elderly to PHC services has repercussions on their healthy and active aging, as recommended by the WHO(17). However, we observed that about 90,000 elderly individuals living in the Eastern, North and South health regions have these opportunities for essential services access compromised in relation to the other regions. This fact may be related with the absence of articulation between public health policies and urban mobility, repercussions on the urban centers planning and management and interfering in the health access opportunities. A similar reality was reported for the state of Santa Catarina, where the results indicated the heterogeneity in the health network distribution and its respective accessibility (7). The relevance of transport system and other systems that represent the urban policies is to prioritize public and public transport, and to valorize the most fragile users' needs, the social inclusion, the traffic management and the investments minimization (18). The research reveals that the scenario, regarding access to PHC, worsens when aging evolution observed. The decline between the chance ratios, when compared to the 60-69 to 70-79 ranges is greater in the West, Southwest and Center-South regions, from 70-79 to 80-89 in West, Southwest and Center-South, and from 80-89 to 90 or more in Southwest, Central and East.

All health regions affected, with the worsening of access to bus transport with the users advancing age. In addition, these demises by bus- transport mean that most popularizes the connection to services (35)- indicate that this part of population will either be excluded or will become a burden to their families. The East region, for example, presents, among the four age groups, the worst chance ratios and this ratio is 207,933 times lower for elderly aged ninety years or more- the most fragile- than for an individual in the general population. For elderly, especially the poorest, once that three of the Administrative Regions into this health region have low per capita income (21.23), any difficulties posed to access may represent the interruption or discontinuity of healthcare (36,37). Similar to the East region reality, the Southwest and North regions have respectively the worst chance ratios. Thus, we understand the severity of results among the elderly, since deficiencies in urban mobility are directly related with social exclusion, denoting that correlation acts as the cause and consequence of exclusion (38,39). There is also the important impact on the quality of life of this population (19–21). The urban mobility difficulties, impacted by geographical impediments to PHC, negatively affect social interaction, the individuals well-being and the city's economic development, which are social health determinants (22). Associated with these factors and by the extent of the negative consequences to the society's health, especially to the long-term persons- population group with the fastest growing- and also the number of the other elderly affected by capacity loss in all domains (physical, mental/emotional and social autonomy). Highlight the attention that should be given to the situation by public authorities, society and family by distributing the compensatory responsibilities among entities (23–26). Thus, equality in access to health services is not enough, once social inequalities are perceived in the differences in health status, form and when to arrive at services, requiring differentiated treatment according to the social follow-ups (27).

Geographic accessibility, by buses as public transportation, is one of the factors that can contribute to reduce these inequities to health access, considering equity as the result and application of financial resources. From this perspective, expanding access to primary health care by public transportation might be benefic to the health system, since it could avoid the elderly's access to the other healthcare levels, which would reduce burden to these individuals' health and to the SUS. (27, 28). The present study emphasizes the representative merit of its sample, once Brasília, the country capital and located in the Federal District, is the fourth most populous city in Brazil and has the second highest GDP per capita among the Brazilian states' capitals and with health indexes above most other Brazilian states (17, 50,51).

CONCLUSION

Based on these study findings, we observed that the accessibility to BHU by bus as a transportation mean into the health regions of the Brazilian capital is not equitable a reality similar to that found in other Brazilian metropolises, perhaps in other parts of the world. This Distrito Federal reality is really worse in the population over 60 years old, with progressive reduction of the access opportunity among individuals over 80 years. A greater strengthening between science areas, public policies, planning and operation is necessary, expanding the articulation between the epistemological and theoretical-practical fields and the ethical-political health positioning, especially for those elderly whose needs reflect dependence, dissociating longevity from a mere social burden and intensifying the dignity of aging with health access. We suggest that further researches gather traffic data, including those on the frequency of health services used by patients, especially by the elderly. In this context, we also suggest the need to evaluate the access and transportation conditions itself, considering the perceptions of these variables from elderly's perspective.

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REFERENCES

1. Assis MMA, de Jesus WLA. 2012. Acesso aos serviços de saúde: Abordagens, conceitos, politicas e modelo de análise. Cienc e Saude Coletiva. 2012;17:2865–75.
2. Castro MC, Massuda A, Almeida G, Menezes-Filho NA, Andrade MV, de Souza Noronha KVM, et al. 2019. Brazil's unified health system: the first 30 years and prospects for the future. Lancet. 394:345–56.
3. Freitas FFQ, Rocha AB, Moura ACM, Soares SM. 2020. Older adults frailty in primary health care: A geoprocessing-based approach. Cienc e Saude Coletiva. 5:4439–50.
4. Araújo MRM de, Oliveira JM de, Jesus MS de, Sá NR de, Santos PAC dos, Lima TC. 2011. Transporte público coletivo: discutindo acessibilidade, mobilidade e qualidade de vida. Psicol Soc., 23:574–82. doi:10.1590/S0102-71822011000300015.
5. Bernardes A. 2018. A democratização do debate e da tomada de decisões podem nortear a mobilidade urbana com equidade social. In: Taco PW gonzales, Sousa AM de, Silva PB, editors. Acessibilidade e Mobilidade Urbana na perspectiva da Equidade e Inclusão Social. Goiânia, GO: Kelps. p. 43–5.
6. Oliveira AG De, Motta RA, Brasil N, Souza MLR, Karnokowski MGO, Taco PWG, et al. 2012. Direitos dos idosos relacionados à sua mobilidade. Rev dos Transp Públicos.130:85–100.
7. Cirino S, Gonçalves LA, Gonççalves MB, Cursi ES de, Coelho AS. 2016. Avaliação de acessibilidade geográfica em sistemas de saúde hierarquizados usando o modelo de p-medianas: aplicação em Santa Catarina, Brasil. Cad Saude Publica., 32:e00172614.
8. Wigley AS, Tejedor-Garavito N, Alegana V, Carioli A, Ruktanonchai CW, Pezzulo C, et al. 2020. Measuring the availability and geographical accessibility of maternal health services across sub-Saharan Africa. BMC Med.18:1–10.
9. de Faria RM. 2020. The territorialization of primary health care of the brazilian unified health system. Cienc e Saude Coletiva., 25:4521–30.
10. Cirino S, Gonçalves LA, Gonçalves MB, Cursi ES de. 2018. Modelo não linear de localização de instalações de serviços de saúde com indicador de acessibilidade incorporado. Cad Saude Publica. 34. doi:10.1590/0102-311x00185615.
11. Instituto Brasileiro de Geografia e Estatística. IBGE. 2020. Projeções e estimativas da população do Brasil e das Unidades da Federação. Instituto Brasileiro de Geografia e Estatística. 2020. https://www.ibge.gov.br/apps/populacao/projecao/. Accessed 19 Sep.
12. Aguiar RC. 2003. Brasília: da utopia à dura realidade. Soc e Estado.18:401–3.
13. Göttems LBD, Evangelista M do SN, Pires MRGM, Silva AFM da, Silva PA da. 2009. Trajetória da política de atenção básica à saúde no Distrito Federal, Brasil (1960 a 2007): análise a partir do marco teórico do neo-institucionalismo histórico. Cad Saude Publica. 25:1409–19. doi:10.1590/S0102-311X2009000600023.
14. Instituto Brasileiro de Geografia e Estatística. IBGE. Indicadores Sociais Municipais - Uma análise dos resultados do universo do Censo Demográfico 2010. Estud Pesqui informação Demográfica e Socioeconômica. 2011;28:149.
15. Distrito Federal. Secretaria de Saúde do Distrito Federal. Plano Distrital de Saúde 2020-2023. Brasília, DF; 2019. http://www.saude.df.gov.br/wp-conteudo/uploads/2019/09/PDS-2020-2023-arquivo-para-consulta-pública.pdf. Accessed 19 Sep 2020.
16. Instituto Brasileiro de Geografia e Estatística. IBGE. Presidência. Altera a caracterização do Sistema Geodésico Brasileiro. 2005. http://geoftp.ibge.gov.br/metodos_e_outros_documentos_de_referencia/normas/rpr_01_25fev2005.pdf. Accessed 19 Sep 2020.
17. World Health Organization W. Good health adds life to years: Global brief for World Health Day 2012. World Health Organization; 2012.
18. Silva A. 2016. Mobilidade urbana e equidade social: possibilidades a partir das recentes políticas de transporte público na Metrópole do Rio de Janeiro. GOT - J Geogr Spat Plan. 1:293–317. doi:10.17127/got/2016.10.014.
19. Alves F, Cruz S, Ribeiro A, Bastos Silva A, Martins J, Cunha I. 2020. Walkability Index for Elderly Health: A Proposal. Sustainability.12:7360. doi:10.3390/su12187360.
20. Silva Júnior ES da, Medina MG, Aquino R, Fonseca ACF, Vilasbôas ALQ. 2010. Acessibilidade geográfica à atenção primária à saúde em distrito sanitário do município de Salvador, Bahia. Rev Bras Saúde Matern Infant. 10 suppl 1:s49–60. doi:10.1590/S1519-38292010000500005.
21. Pedraza DF, Nobre AMD, Albuquerque FJB de, Menezes TN de. 2018. Acessibilidade às Unidades Básicas de Saúde da Família na perspectiva de idosos. Cien Saude Colet.;23:923–33. doi:10.1590/1413-81232018233.11702016.
22. Coletiva LG-C& S, 2012. Undefined. Determinantes sociais da saúde do idoso. SciELO Public Heal. https://www.scielosp.org/article/csc/2012.v17n1/123-133/. Accessed 20 Jan 2021.
23. Minayo MC de S. 2019. O imperativo de cuidar da pessoa idosa dependente. Cien Saude Colet., 24:247–52. doi:10.1590/1413-81232018241.29912018.
24. Dawson WD, Bangerter LR, Splaine M. 2020. The Politics of Caregiving: Taking Stock of State-Level Policies to Support Family Caregivers. *Public Policy Aging Rep.,* 30:62–6. doi:10.1093/ppar/praa005.
25. McGinnis JM, Williams-Russo P, Knickman JR. 2002. The case for more active policy attention to health promotion. Health Aff., 21:78–93.
26. Yakita A. 2020. Economic development and long-term care provision by families, markets and the state. *J Econ Ageing.,* 15:100210.
27. Barros FPC de, Sousa MF de. 2016. Equidade: seus conceitos, significações e implicações para o SUS. *Saúde e Soc*. 25:9–18. doi:10.1590/S0104-12902016146195.
28. Lobo C, Cardoso L, Daniela +, Lessa A, Giovanni Δ, Miranda C. Acessibilidade ao sistema de transporte coletivo por ônibus: indicadores para os municípios da periferia metropolitana e os campos de Belo Horizonte, Brasil. Rev Colomb Geogr |. 29:190–206. doi:10.15446/rcdg.v29n1.76010.

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