Perceived neighborhood characteristics and the functional performance of elderly people in the Belo Horizonte Metropolitan Area, Minas Gerais State, Brazil: a quantile regression analysis

Características percebidas da vizinhança e o desempenho funcional de pessoas idosas na Região Metropolitana de Belo Horizonte, Minas Gerais, Brasil: uma análise utilizando regressão quantílica

Características percibidas del vecindario y el desempeño funcional de personas mayores en la Región Metropolitana de Belo Horizonte, Minas Gerais, Brasil: un análisis utilizando regresión cuantílica

Renzo Joel Flores Ortiz [1]
Fabiane Ribeiro Ferreira [1,2]
Maria Fernanda Lima-Costa [1,3]
Cibele Comini César [1,4]

Abstract

This study aims to examine the relationship between neighborhood characteristics and the functional performance of elderly people living in the Belo Horizonte metropolitan area, Minas Gerais State, Brazil. Data of a representative sample of 2,033 elderly were analyzed using quantile regression. Functional performance was measured by the number of activities of daily living (ADL) the elderly had difficulty to perform. The neighborhood characteristics evaluated were: maintenance, trust, insecurity and defective sidewalks. Functional performance was found positively associated with the characteristic defective sidewalks, whose effect increased as the number of ADL the elderly had difficulty to perform increased. The results suggest that inadequate sidewalk conditions can contribute to functional losses in elderly people, especially among those who are functionally more compromised.

Aged; Frail Elderly; Health of the Elderly

[1] *Núcleo de Estudos em Saúde Pública e Envelhecimento, Fundação Oswaldo Cruz/ Universidade Federal de Minas Gerais, Belo Horizonte, Brasil.*
[2] *Departamento de Fisioterapia, Universidade Federal de Minas Gerais, Belo Horizonte, Brasil.*
[3] *Departamento de Medicina Preventiva e Social, Universidade Federal de Minas Gerais, Belo Horizonte, Brasil.*
[4] *Departamento de Estatística, Universidade Federal de Minas Gerais, Belo Horizonte, Brasil.*

Correspondence
R. J. Flores Ortiz
Núcleo de Estudos em Saúde Pública e Envelhecimento, Fundação Oswaldo Cruz/ Universidade Federal de Minas Gerais.
Av. Augusto de Lima 1715, Belo Horizonte, MG 30190-002, Brasil.
renzojfo@gmail.com

Introduction

The characteristics of the environment within which people live, or neighborhood characteristics, can potentially influence a person's functional performance, especially the functional performance of elderly people, who have in the neighborhood the main, or even the only, diameter of living space [1,2]. Defining functional performance as what a person does in the current or usual environment [3], neighborhood characteristics may influence the functional performance of elderly people by facilitating or by hindering their engagement in activities and participation in daily life [1,3,4]. For instance, while neighborhood characteristics like well-maintained sidewalks and the presence of public recreational facilities can encourage the elderly to engage in activities and participation [5,6], other neighborhood characteristics like poor public lighting and the lack of pedestrian crossings are more likely to lead the elderly to activity limitations and participation restrictions [7,8], or disabilities, using the general term.

Limitations in activities and restrictions in participation induced by insecurity issues in the neighborhood may be attenuated with interventions such as an increase in police presence and the implementation of neighborhood watch programs [8,9]. Thus, disability is not necessarily a permanent condition, or related solely to the presence of morbidities. In certain cases, as exemplified, disability conditions may be overcome, either by creating environmental facilitators or by eliminating environmental barriers for expanded performance of actions and tasks in daily living [3].

Several neighborhood characteristics have been identified as being associated with the functional performance of elderly people. These include aesthetics, safety, quality, accessibility, social cohesion, weather, noise, lighting, traffic, green spaces, handicap parking, healthcare services and uneven sidewalks [8,10,11,12,13,14,15,16,17,18]. Although there is an important and growing body of literature providing evidence of the relationship between neighborhood characteristics and the functional performance of elderly people, in many studies key limitations regarding methodological issues are observed. For instance, functioning measures are commonly operationalized as binary and multinomial variables, a methodological approach which is likely to result in the loss of information [19]. Also, functioning studies commonly make use of regression analysis methods which allow the modeling of only the mean of the response variable, and hence are capable of providing a rather simplified description of the relationship between response and explana-

tory variables. Because functional performance is a characteristic which can present certain heterogeneity among elderly people , the summarizing of a data analysis to a single position of the response distribution is a methodological approach which can also result in the loss of information [20].

Introduced in 1978 by Roger Koenker and Gilbert Basset, quantile regression [21] is a regression analysis method that can be an alternative to mean-based regression methods. In fact, compared to a mean-based regression method like linear regression, quantile regression can be interpreted as an extension [22]. In common, both approaches deal with a continuous response variable that is linear in unknown parameters, but while linear regression models the mean of the response as a function of the explanatory variables, quantile regression models the percentiles of the response as a function of the explanatory variables [20]. Because any percentile can be modeled, quantile regression allows the examination of changes at any position of the response variable distribution, and also, because multiple percentiles can be modeled, it is still possible to examine changes in the distribution shape [20]. Therefore, compared to linear regression, which allows the examination of changes only at a central position of the response distribution, the mean, quantile regression can provide a broader description of the relationship between response and explanatory variables [22]. In the context of functioning studies, if we consider a response variable which consists of a population's levels of functioning, quantile regression allows one to examine the effects of the explanatory variables at distinct functioning levels. In contrast, mean-based regression methods would allow one to examine the effects of the explanatory variables only at the mean functioning level, and thus not exploring all available information of the functioning variable.

The present study aims to examine the relationship between neighborhood characteristics and the functional performance of the elderly who live in the Belo Horizonte metropolitan area, Minas Gerais State, Brazil. Unlike the majority of functioning studies which operationalize functioning measures as categorical variables and make use of mean-based regression analysis methods, we operationalize a functioning measure as a count variable and make use of a percentile-based regression analysis method, quantile regression. With this methodological approach we hope to perform a broader data analysis, which includes examining the effects of neighborhood characteristics at distinct functioning levels.

Methods

Source of data

This study uses data from the *Belo Horizonte Metropolitan Area Health Survey* (*Inquérito de Saúde da Região Metropolitana de Belo Horizonte*, abbreviated as ISBH in Portuguese) undertaken in 2010 [23]. The ISBH is a health survey designed to provide a representative sample of the non-institutionalized adult population living in the Belo Horizonte metropolitan area. The survey sampling procedure consisted of a two-stage cluster probabilistic sampling wherein in the first stage were selected census tracts and in the second stage were selected households of the selected tracts. All household residents aged 20 and older were invited to a face-to-face interview. Of the 7,500 households initially sampled, 5,798 participated in the survey and 12,979 residents were interviewed. Our study subjects were the residents aged 60 years and older who accounted for a sample of 2,271 individuals. According to Brazilian legislation, individuals aged 60 and older are classified as elderly [24]. The 2010 ISBH was approved by the Ethics Committee for Research with Human Beings of the René Rachou Research Center, Oswaldo Cruz Foundation (project protocol n. 10/2009). Further details may be found in Lima-Costa et al. [23].

Study variables

The response variable is the number of activities of daily living (ADL) performed with difficulty by the elderly, a measure of functional performance which was operationalized as a count variable. A total of 15 ADL were evaluated, of which eight are considered basic ADL (getting out of bed, eating, combing one's hair or brushing one's teeth or washing one's face, walking from one room to another at the same level, bathing, dressing, toileting and cutting the nails of one's feet) and the remaining seven are classified as instrumental ADL (climbing ten steps, taking medication, walking two or three blocks, going out shopping, preparing one's own meal, taking a bus and undertaking household chores). These ADL have been validated and used in studies with elderly populations in Brazil [2,25,26,27].

The explanatory variables are organized into three groups: sociodemographic, health and neighborhood variables. The sociodemographic variables are: age, gender (female/male), occupational status (not working/working), place of residence (metropolitan Belo Horizonte/Belo Horizonte), education (illiterate/incomplete primary education/complete primary education or more) and role in the household (head/spouse/other relations). The health variables are: regular use of medication (no/yes), use of healthcare services within the past 15 days (no/yes), number of comorbidities (none/1 to 3/more than 3) and physical activity during leisure time (sedentary leisure/little activity-less than 3 times a week/physically active-at least 3 times a week). Finally, the neighborhood variables, our main predictors, are: maintenance (fair/good), trust (no/yes), insecurity (no/yes) and defective sidewalks (no/yes). The variables in this group were developed based on individual-level subjective measures (perceptions) as described below.

The measure of maintenance was based on the question "*are you satisfied with the way the block where you live is cared for?*" (no/yes). A "yes" answer was interpreted as an indicator of a neighborhood with good maintenance, while a "no" answer was interpreted as an indicator of a neighborhood with fair maintenance. The measure of trust was based on the question "*do you think you can trust most people?*" (no/ yes). A "yes" answer was interpreted as an indicator of trust. The measure of insecurity was based on the question "*concern when leaving home: fear of being robbed?*" (no/ yes). A "yes" answer was interpreted as an indicator of insecurity. Lastly, the measure of defective sidewalks was based on the question "*concern when leaving home: fear of falling due to sidewalk defects?*" (no/ yes). A "yes" answer was interpreted as an indicator of defective sidewalks.

Data analysis

We applied the quantile regression for count data approach [28] to estimate quantile regression models at every five percentiles in the 55th-95th percentile interval of the distribution of the number of ADL performed with difficulty. A total of nine quantile regression models were estimated with this procedure. Since 55% of the elderly had no difficulty in performing ADL, there is limited value in computing quantile regression models below the 55th percentile because all percentiles are zero and will not vary as a function of the explanatory variables. Each fitted model included the neighborhood, sociodemographic and health variables groups, where these last two groups include the variables that are considered potential confounders. From each fitted model the effects of the neighborhood variables and their standard errors were computed. These results are then presented graphically: the estimated effects and their 95% confidence intervals (95%CI) were plotted against the corresponding percentiles. In quantile regression models, the

explanatory variables effects can be interpreted as rates of changes in the percentiles of the response variable distribution when the values of the explanatory variables vary [22].

The quantile regression for count data approach [28] was applied using 5,000 simulated samples and the standard errors of the explanatory variables effects were computed using the delta method [29]. Sample weights were included in the estimation process. Data analysis was carried out using R software version 3.1 (The R Foundation for Statistical Computing, Vienna, Austria; http://www.r-project.org).

Results

A total of 2,271 individuals aged 60 and older participated in the 2010 ISBH, of which 238 (approximately 11%) presented missing data in at least one of the study variables and were excluded from the data analysis. The complete and missing data samples were similar with respect to age (p = 0.13), gender (p = 0.70) and occupational status (p = 0.35). Summary statistics of the study sample are presented in Table 1. On average the elderly had difficulty in performing 2.7 ADL and were 70 years old, the majority were female (60.9%), did not work (82%), resided in the capital, Belo Horizonte (64.9%), did not have complete primary education (63%) and were heads of households (70.2%). Regarding health characteristics, most participants made regular use of medication (71%), had not made use of healthcare services within the past 15 days (72.5%), had one and up to three chronic health conditions (64.9%) and reported sedentary leisure (75.1%). Lastly, regarding neighborhood characteristics, were found the prevalences of 86.4% for good maintenance, 60.4% for trust, 58.4% for insecurity and 41.8% for defective sidewalks. The percentage of elderly with some difficulty in performing ADL, that is, the disability prevalence in the study sample, was 45% (Figure 1).

The percentiles of the number of ADL performed with difficulty stratified by categorical explanatory variables are presented in Table 2. In this analysis we highlight the results for the variables occupational status, education and practice of physical activity: 95% of the elderly who worked had difficulty in performing less than four ADL, 95% of those who completed primary education or more had difficulty in performing less than nine ADL and 95% who were physically active had difficulty in performing less than seven ADL.

Figure 2 presents the quantile regression estimated effects in the 55th-95th percentile interval of the distribution of the number of ADL performed with difficulty for the neighborhood characteristics. The shaded areas surrounding the effects estimates represent 95%CI.

The effects of maintenance, trust and insecurity were not statistically significant in all the percentiles analyzed. To notice, the confidence intervals of the effects of these variables include the zero axis, or are very close, so that statistical significance is not clear to conclude. On the other hand, the effect of defective sidewalks was clearly statistically significant through the entire percentile interval, in addition to have varied. Precily, while for the elderly with difficulty in few ADL (55th percentile), defective sidewalks were associated with an increase of one ADL performed with difficulty, for the elderly with difficulty in many ADL (95th percentile), defective sidewalks were associated with an increase of six ADL.

Discussion

The prevalence of disability found in the study sample (45%) is close to that found in Ferreira et al. [2] (47.1%) and Costa e Silva et al. [30] (45.5%), two other Brazilian studies that have also used basic and instrumental ADL to measure the functional status of elderly people. The procedure of combining basic and instrumental ADL items into one measure of functional status was based on the dimensionality of the ADL instrument used in the 2010 ISBH survey, which was found to have one dimension according to a recent study [31]. The dimensionality of an instrument reflects the number of constructs being measured [32].

The comparison of disability/functioning indicators can be difficult because there are different ways of measuring functional status. For instance, in addition to the performance in ADL, functional status can be measured by evaluating mobility conditions through tasks such as transferring (changes in body positions), walking (short and long distances) and climbing stairs [33,34]. Furthermore, surveys have been used to assess more basic functions related to range of motion, strength and endurance, as well as the higher end of the functional spectrum, which includes walking medium and long distances and practicing vigorous exercise [33]. The comparison of disability indicators also requires attention because there are different definitions and theoretical models of disability. Following the World Health Organization's International Classification of Functioning, Disability and Health, in addition to limitations in activities, disability is defined also by restrictions in participation and impairments in body functions and structures, or more

Table 1

Summary statistics of the study variables (n = 2,033). *Belo Horizonte Metropolitan Area Health Survey*, Minas Gerais State, Brazil, 2010.
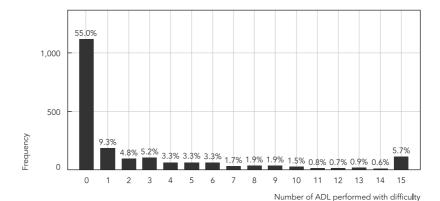
Variable	n (%)
Response variable	
Number of ADL performed with difficulty [mean (SD)]	2.7 (4.3)
Sociodemographic characteristics	
Age [mean (SD)]	70.0 (8.1)
Gender	
Female	1,238 (60.9)
Male	795 (39.1)
Occupational status	
Not working	1,667 (82.0)
Working	366 (18.0)
Place of residence	
Metropolitan Belo Horizonte	714 (35.1)
Belo Horizonte	1,319 (64.9)
Education	
Illiterate	197 (9.7)
Incomplete primary education	1,281 (63.0)
Complete primary education or more	555 (27.3)
Role in the household	
Head	1,427 (70.2)
Spouse	407 (20.0)
Other relations	199 (9.8)
Health characteristics	
Regular use of medication	
No	590 (29.0)
Yes	1,443 (71.0)
Use of healthcare services within the past 15 days	
No	1,474 (72.5)
Yes	559 (27.5)
Number of comorbidities	
None	543 (26.7)
1-3	1,319 (64.9)
More than 3	171 (8.4)
Physical activity * during leisure time	
Sedentary leisure	1,526 (75.1)
Little activity (less than 3 times a week)	178 (8.8)
Physically active (at least 3 times a week)	329 (16.2)
Neighborhood characteristics	
Perceived maintenance	
Fair	276 (13.6)
Good	1,757 (86.4)
Perceived trust	
No	805 (39.6)
Yes	1,228 (60.4)
Perceived insecurity	
No	846 (41.6)
Yes	1,187 (58.4)
Perceived defective sidewalks	
No	1,183 (58.2)
Yes	850 (41.8)

ADL: activities of daily living; SD: standard deviation.

* Physical activity defined as any bodily movement produced by skeletal muscles that results in energy consumption.

Figure 1

Distribution of the number of ADL performed with difficulty. *Belo Horizonte Metropolitan Area Health Survey*, Minas Gerais State, Brazil, 2010.

ADL: activities of daily living.

precisely, by the interaction of these components in a context [3].

The present study showed that the functional performance of the elderly who live in the Belo Horizonte metropolitan area was positively associated with defective sidewalks, and furthermore, that the effect of this neighborhood characteristic increased as the functional status of the elderly became more compromised. To our knowledge these results provide evidence which can be considered new: although sidewalk measures were already known to be associated with function related outcomes in older adults [15,18,35,36,37,38], no similar evidence was found with regard to the variation of the effect of sidewalk measures on function outcomes. As shown in Figure 1, while for the elderly with difficulty in few ADL (55th percentile), defective sidewalks were associated with an increase of one ADL performed with difficulty, for the elderly with difficulty in many ADL (95th percentile), defective sidewalks were associated with an increase of six ADL. Thus, a possible practical interpretation we can draw from this result is that inadequate sidewalk conditions may contribute to functional losses in elderly people, especially among the elderly who already have a more compromised functional status.

The information about the effects of neighborhood characteristics at distinct functioning levels can be important for policy planning pur-

poses. For instance, knowing that the elderly who present more compromised functional status are at risk of a greater functional loss due to the influence of defective sidewalks, a policy maker may have more support to plan interventions better tailored to the needs of this specific group of the population. With respect to interventions in the urban environment to preserve or foment functioning, one can especially highlight those related to accessibility and safety [39]. In the city of Belo Horizonte, an example of accessibility-related intervention was implemented in 2010, when the municipality established that all sidewalks in the city should henceforth provide tactile guides and wheelchair ramps [40].

Defective sidewalks or, more generally speaking, inadequate sidewalk conditions, may exert a particular influence on the performance of social related tasks like walking a few blocks and going out shopping, which are two of the seven instrumental ADL evaluated in this study. The findings of White et al. [18], for instance, support such a statement, since the authors found, in a sample of 436 elderly people, a statistically significant association between uneven sidewalks and limitations in social related tasks which included: visiting family and friends in their homes, going out with others to public places and taking part in organized social activities. The link between inadequate sidewalk conditions and limitations in
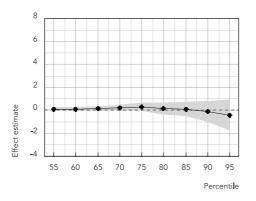
Table 2

Percentiles of the number of activities of daily living performed with difficulty stratified by categorical explanatory variables. *Belo Horizonte Metropolitan Area Health Survey*, Minas Gerais State, Brazil, 2010.

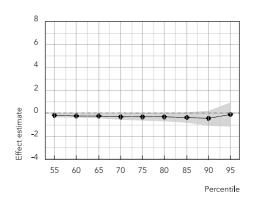| Variable	Percentile														
	25th	30th	35th	40th	45th	50th	55th	60th	65th	70th	75th	80th	85th	90th	95th
Sociodemographic characteristics															
Gender															
Female	0	0	0	0	0	1	1	2	3	4	5	6	8	11	15
Male	0	0	0	0	0	0	0	0	1	1	2	3	5	7	11
Occupational status															
Not working	0	0	0	0	0	1	1	2	3	3	5	6	8	11	15
Working	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4
Place of residence															
Metropolitan Belo Horizonte	0	0	0	0	0	0	1	1	2	3	4	5	7	10	15
Belo Horizonte	0	0	0	0	0	0	0	1	1	2	3	5	7	9	15
Education															
Illiterate	0	0	0	1	2	3	4	5	6	7	9	10	14	15	15
Incomplete primary	0	0	0	0	0	0	1	1	2	3	4	6	7	10	15
Complete primary education or more	0	0	0	0	0	0	0	0	0	1	1	2	3	4.2	9
Role in the household															
Head	0	0	0	0	0	0	0	1	1	2	3	5	6	9	13
Spouse	0	0	0	0	0	0	0	1	1	2	3	5	6	9	15
Other relations	0	0	0	1	1	3	4	5	6	7	8	12	15	15	15
Health characteristics															
Regular use of medication															
No	0	0	0	0	0	0	0	0	0	1	1	2	3	5	10
Yes	0	0	0	0	0	1	1	2	3	4	5	6	8	11	15
Use of healthcare services within the past 15 days															
No	0	0	0	0	0	0	0	1	1	2	3	4	6	8	14
Yes	0	0	0	0	0	1	2	3	4	5	6	8	9.7	13	15
Number of comorbidities															
None	0	0	0	0	0	0	0	0	0	0	1	1	3	5	8.7
1-3	0	0	0	0	0	0	1	1	2	3	4	6	8	10	15
More than 3	0	1	2	3	3	4	4.8	6	6	8	9	10	11.3	15	15
Physical activity															
Sedentary leisure	0	0	0	0	0	0	1	2	3	4	5	6	8	11	15
Little activity (less than 3 times a week)	0	0	0	0	0	0	0	0	1	1	2	3	4	5	8.2
Physically active (at least 3 times a week)	0	0	0	0	0	0	0	0	0	0.9	1	1.6	2.5	4	7.2
Neighborhood characteristics															
Perceived maintenance															
Fair	0	0	0	0	0	1	1	2	2	3	4	5	6	9	13
Good	0	0	0	0	0	0	0	1	1	3	4	5	7	10	15
Perceived trust															
No	0	0	0	0	0	0	1	1	2	3	3	5	6.4	9	13
Yes	0	0	0	0	0	0	0	1	1	3	4	5	7	10	15
Perceived insecurity															
No	0	0	0	0	0	0	0	0	1	1	3	4	6	8	13
Yes	0	0	0	0	0	1	1	1	2	3	5	6	8	10	15
Perceived defective sidewalks															
No	0	0	0	0	0	0	0	0	0	0.1	1	2	3	5	9
Yes	0	0	1	1	1	2	3	4	5	6	7	9	10	14	15

Figure 2

Quantile regression estimated effects in the 55th-95th percentile interval of the distribution of the number of ADL performed with difficulty for the neighborhood characteristics. *Belo Horizonte Metropolitan Area Health Survey*, Minas Gerais State, Brazil, 2010.
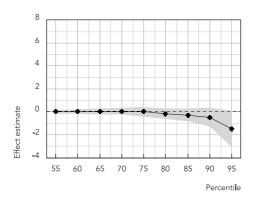
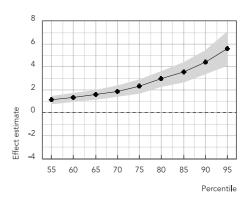2a) Maintenance (good compared to fair)

2b) Trust (yes compared to no)

2c) Insecurity (yes compared to no)

2d) Defective sidewalks (yes compared to no)

ADL: activities of daily living.

social related tasks has also been found in qualitative studies. Strath et al. [35], performing content analysis, identified that poorly maintained and missing sidewalks were among the neighborhood characteristics which most discouraged activity behavior in a sample of 37 older adults. Furthermore, the influence of inadequate sidewalk conditions is not only restricted to hindering the performance of social related tasks, but also to foster falls, fear of falling and fall-related injuries, which are important contributing factors for decreased mobility and increased functional dependence [41,42,43].

Although the quantile regression models do not appoint statistically significant associations between functional performance and the characteristics of maintenance, trust and insecurity, the descriptive analysis (Table 1) still provides results worth commenting on. For instance, since trust can be an important predictor of functioning [44] and of better health [45,46], it is worrisome to find a high prevalence of a lack of trust (40.9%). Also, the study sample shows a high prevalence of insecurity (59.5%), another worrisome result since insecurity can be a neighborhood hurdle to elderly functioning [47,48]. However, it is important to highlight that there is evidence that the fear of crime, which can be interpreted as a proxy measure for neighborhood insecurity, can also strengthen trust among neighbors [49]. Furthermore, the des-

criptive analysis shows a high prevalence of good maintenance (85.2%), which is an important result since maintenance is a characteristic that is often associated with activity behavior [50,51].

The description of the percentiles of the response variable stratified by categorical explanatory variables (Table 2) revealed that the elderly who work, have primary education level or higher, and are physically active have difficulty in performing few ADL. To some degree these results support previous evidence which showed that working, having some level of education and the practice of physical activity are protection factors for disability in older adults [2,52,53].

Two methodological issues can be considered as key strengths of our study: the operationalization of the functional performance measure and the data analysis method. To highlight the fact the broader data analysis achieved in this study was possible due to the combination of these two methodological approaches. While the operationalization of the functional performance measure as a count variable provided a wide range of functioning levels, quantile regression then allowed the analysis of distinct functioning levels.

Although quantile regression can provide important information not captured by usual mean-based regression methods it also has its disadvantages. These include increased computing time required for bootstrapping and other computational procedures and the fact that some aspects of the method are still being developed and have not yet been implemented in mainstream statistical software [54,55]. However, software packages currently exist that are capable of performing quantile regression analyses, including SAS (SAS Inst., Cary, USA), Stata (StataCorp LP, College Station, USA), and R [55].

The limitations of our study should also be considered. First, although subjective neighborhood measures are closer to a person's perception, they make the study susceptible to same-source bias, a type of bias that occurs when a third unobserved factor, like psychological disposition, influences both a respondent's reporting on his/her neighborhood and on his/her health [56].

Second, there are inherent limitations due to the use of secondary data. It should be noted that the data used were not collected to meet our specific research questions and, more importantly, that direct measures of neighborhood characteristics were not available. As a matter of fact, such measures were developed from measures of individual characteristics, which were used as proxy.

This study, therefore, calls attention to the different impacts that neighborhood characteristics may exert on the functional performance of elderly people, an evidence which, to our knowledge, still has not been presented in the literature. We also call attention to the practical contribution of our study, which is not only limited to addressing the fact that sidewalk conditions are important for elderly functioning. But furthermore, we have also addressed the issue of to whom sidewalk conditions can be more important. Based on our results we can say that sidewalk conditions are more important to the elderly who present more compromised functional status (95th percentile), since to these elderly the variable defective sidewalks was found associated with a greater functional loss. Thus, in conclusion, our study suggests that inadequate sidewalk conditions can contribute to functional losses in elderly people, especially among the elderly who already have a more compromised functional status.

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Resumo

Este estudo pretende examinar a relação entre características da vizinhança e o desempenho funcional de pessoas idosas que vivem na região metropolitana de Belo Horizonte, Estado de Minas Gerais, Brasil. Dados de uma amostra representativa de 2,033 idosos foram analisados utilizando regressão quantílica. O desempenho funcional foi medido pelo número de atividades da vida diária (AVD) que os idosos tiveram dificuldade para executar. As características da vizinhança avaliadas foram: manutenção, confiança, insegurança e passeios defeituosos. O desempenho funcional foi encontrado associado positivamente com a característica passeios defeituosos, cujo efeito aumentou à medida que o número de AVD que os idosos tiveram dificuldades para executar aumentou. Os resultados sugerem que condições inadequadas de passeios podem contribuir para perdas funcionais em pessoas idosas, especialmente entre aqueles que são funcionalmente mais comprometidos.

Idoso; Idoso Fragilizado; Saúde do Idoso

Resumen

Este estudio pretende examinar la relación entre las características del vecindario y el desempeño funcional de las personas mayores que viven en la región metropolitana de Belo Horizonte, Estado de Minas Gerais, Brasil. Datos de una muestra representativa de 2,033 personas mayores fueron analizados utilizando regresión cuantílica. El desempeño funcional se midió por el número de actividades de la vida diaria (AVD) que las personas mayores tuvieron dificultad para ejecutar. Las características del vecindario fueron: mantenimiento, confianza, inseguridad y aceras defectuosas. El desempeño funcional fue encontrado asociado positivamente con la característica aceras defectuosas, cuyo efecto aumentó a medida que el número de AVD que las personas mayores tuvieron dificultad para ejecutar aumentó. Los resultados sugieren que condiciones inadecuadas de aceras pueden contribuir para pérdidas funcionales en personas mayores, especialmente entre aquellos que son funcionalmente más comprometidos.

Anciano; Anciano Frágil; Salud del Anciano