Differences in disability and nutritional status among older Brazilian and English adults: the Brazilian Longitudinal Study of Aging (ELSI-Brazil) and English Longitudinal Study of Aging (ELSA) cohorts

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ABSTRACT

Background: Brazil and England are 2 countries at different stages in their demographic, epidemiological, and nutritional transitions and with distinct socioeconomic and politic contexts, but with similar universal health systems. We aimed to examine disability and its association with objective anthropometric indicators of nutritional status, including BMI, waist circumference, and waist-to-height ratio, comparing older Brazilian and English adults.

Methods: We used cross-sectional data from 2 nationally representative aging studies. For Brazil, we included 9412 participants who participated in the baseline (2015–2016) of the Brazilian Longitudinal Study of Aging (ELSI-Brazil). The English data were from 8024 participants of the wave 6 (2012–2013) of the English Longitudinal Study of Aging (ELSA). Disability was defined as difficulty to perform at least 1 activity of daily living. We used logistic regression models to examine the association between anthropometric indicators and disability, adjusted for sociodemographic and health-related characteristics, considering the interaction term between each anthropometric indicator and country.

Results: All health-related characteristics were worse in Brazil than England, although the prevalence of disability was similar among Brazilian (17.85%) and English (16.27%) older adults. Fully adjusted models showed statistically significant interaction terms between country and anthropometric indicators. The strength of the associations in Brazil was weaker compared with England. All anthropometric indicators were positively associated with disability: elevated BMI, in Brazil (OR: 1.27; 95% CI: 1.06, 1.51) and in England (OR: 1.80; 95% CI: 1.51, 2.14); elevated waist circumference, in Brazil (OR: 1.21; 95% CI: 1.02, 1.44) and in England (OR: 1.90; 95% CI: 1.51, 2.37); and elevated waist-to-height ratio, in Brazil (OR: 1.20; 95% CI: 0.96, 1.52) and in England (OR: 1.83; 95% CI: 1.37, 2.44).

Conclusions: Elevated BMI and waist circumference increased the odds of disability in both populations. However, these associations were stronger in England than in Brazil. *Am J Clin Nutr* 2021;00:1–7.

Keywords: aging, anthropometry, body mass index, activities of daily living, waist circumference

Introduction

The United Nations' data show that, nationally, population aging has been occurring worldwide. According to official data, in 2019, the population aged 65 y and over was 10.8% in Brazil (http://www.ibge.gov.br) and 18.4% in England (http://www.ons.gov.uk). Population projections estimate 2 billion people aged 60 y and over until the middle of this century. Of those, 80% will live in low- and middle-income countries (1), showing that the aging process is not homogeneous. For example, it occurred gradually in high-income countries, such as England (2). On the other hand, in low- and middle-income countries, such as Brazil,

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Supplemental Figure 1 is available from the "Supplementary data" link in the online posting of the article and from the same link in the online table of contents at https://academic.oup.com/ajcn/.

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Abbreviations used: ADL, activity of daily living; ELSA, English Longitudinal Study of Aging; ELSI-Brazil, Brazilian Longitudinal Study of Aging.

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the aging process has been happening at a fast rate, leading to a shorter time for planning and changing public policies towards the elderly (3).

These differences result in even more challenges to achieving well-being later in life in Brazil (4), a country marked by higher socioeconomic inequalities (2). In 2015, the Gini index for the United Kingdom was 33.2% compared to 51.3% in Brazil (2). However, health care systems of Brazil and England are universal and primary care orientated (5), first implemented in England (1948) and then in Brazil (1988). These differences provide a rare opportunity to compare a Western middle-income and a European high-income country, which present very distinct socioeconomic and epidemiological contexts and different stages in their demographic transitions and public system implementation.

Nevertheless, few studies have compared health indicators between these 2 countries, showing worse mortality (6), self-rated health, mobility limitation, and disability in Brazil (5). In previous comparisons using nationally representative samples, Brazilians had a higher prevalence of disability in performing activities of daily living (ADLs) than their English counterparts for 1 or more ADLs (10.7% and 9.7%, respectively) and 2 or more ADLs (36.5% and 23.2%, respectively) (5). Later in life, disability negatively impacts the quality of life and has been reported to be a major predictor of mortality (7). Therefore, preventing or delaying disability might positively influence successful aging (8). However, aging is a dynamic process leading to significant musculoskeletal changes affecting nutritional status, body composition (4), and increased disability risk (3).

Some studies have shown positive associations between worse nutritional status, assessed by anthropometric indicators, and ADL disability (9–11), in which overweight gradually increases disability at older ages (12). Longitudinal studies conducted in European (10, 11) and Brazilian (13) cities confirmed these findings. However, most of these studies used only BMI as the anthropometric indicator of nutritional status.

Therefore, we used cross-sectional data from 2 methodologically comparable and nationally representative aging studies in Brazil and England to examine disability and its association with objective anthropometric indicators of nutritional status in older adults. To the best of our knowledge, this is the first time that anthropometric indicators, including BMI, waist circumference, and waist-to-height ratio, were compared between these 2 countries. We hypothesized that the relation between elevated anthropometric indicators and disability is stronger in older Brazilian adults compared with older English adults.

Methods

Data source and design

This cross-sectional analysis was based on data from Brazil and England. Data from Brazil were extracted from the baseline of the Brazilian Longitudinal Study of Aging (ELSI-Brazil), conducted in 2015–2016. It is a nationally representative, population-based cohort study of community-dwelling individuals aged 50 y and over, aiming to investigate determinants of the aging process in a country with rapid demographic aging, poor resources, and great social inequalities. The study used a probabilistic complex sample clustered in strata according to the population size and households. ELSI-Brazil's sampling design and procedures were previously described in detail (14). Briefly, a probabilistic complex sample design, which applied a sampling procedure combining geographical stratification and a 3-stage clustering, was conducted. The final sample comprised 9412 older adults from 70 municipalities from the 5 largest geographical regions of Brazil (**Supplemental Figure 1**). ELSI-Brazil followed the standards set by the Declaration of Helsinki and was approved by the ethics board of the Oswaldo Cruz Foundation, Minas Gerais (protocol 34649814.3.0000.5091). All participants signed an informed consent form.

For England, data were extracted from the English Longitudinal Study of Aging (ELSA), an ongoing panel study of a representative cohort of men and women living in England aged ≥50 y (15). It was designed as a sister study to the Health and Retirement Study in the United States and is multidisciplinary in orientation, involving the collection of economic, social, psychological, cognitive, health, biological, and genetic data. The study commenced in 2002, and the sample has been followed up every 2 y. Data are collected using computer-assisted personal interviews and self-completion questionnaires, with additional nurse visits for the assessment of biomarkers every 4 y. Additional information on the study design and sampling procedures was previously published (15). All 8024 ELSA participants who took part in the nurse visit (i.e., physical examination) at wave 6 (2012–2013) were included in this analysis (Supplemental Figure 1). Wave 6 was used for this analysis because it is the wave closest to the year of ELSI's baseline and it had a nurse visit that collected data on the anthropometric indicators of nutritional status, including BMI and waist circumference. The ELSA was approved by the London Multicentre Research Ethics Committee (MREC/01/2/91).

Outcome

The outcome of interest was disability, measured by participants' self-reports of any difficulty in walking, transferring (i.e. getting in and out of a bed), toileting, bathing, dressing, and eating using the modified Katz index (16). In Brazil, the participants were asked to rate their performance on each activity using a Likert scale (1 = no difficulty, 2 = little difficulty, 3 = great difficulty, or 4 = unable to perform), whereas in England performance was rated using a dichotomous variable (1 = no difficulty, 2 = any difficulty). To maintain comparability between the 2 countries, disability was classified as "no" when participants reported no difficulty to perform any of the 6 activities and classified as "yes" when participants reported little or great difficulty or unable to perform at least 1 of the 6 activities.

Anthropometric indicators of nutritional status

The independent target variables were the anthropometric measures of nutritional status, including BMI, waist circumference, and waist-to-height ratio. In both cohorts, the anthropometric measures were assessed using similar procedures (i.e., participant wearing comfortable clothes and barefoot, following standard procedures). BMI was calculated by dividing weight in kilograms by height in meters squared (kg/m^2). Weight was measured using a calibrated electronic portable scale, and height was measured by a portable stadiometer. We created groups classified according to the recommended BMI by age. For those aged up to 60 y, "low BMI" (<18.5), "adequate BMI" (18.5–24.9), and "elevated BMI" (>24.9) were based on the WHO criteria (17). For those aged 60 y and over, "low BMI" (<22.0), "adequate BMI" (22.0–27.0), and "elevated BMI" (>27.0) groups were based on the Lipschitz's criteria (18). Waist circumference was measured with an inextensible metric tape positioned at the midpoint between the last rib and iliac crest with the participant standing, arms alongside the body, bare trunk, and during the expiratory phase (19, 20) and dichotomized as recommended by the WHO (17) as "adequate" (<80 cm for women and <94 cm for men) or "elevated" (≥80 cm for women and ≥94 cm for men). The waist-to-height ratio was obtained by dividing the measured waist (centimeters) by the measured height (centimeters) and further dichotomized into "adequate" (<0.5) or "elevated" (≥0.5) (21).

Potential confounding variables

We included the following sociodemographic and health-related characteristics that have been consistently associated with both disability and nutritional status (22, 23):

- Sociodemographic characteristics: sex (female and male), age (continuous), marital status (living with a partner or not living with a partner, i.e., single, widowed, or divorced), and education, in complete years of schooling. In Brazil, formal education is organized into first level (1–8 schooling years) and second level (9–11 y) and higher. We categorized years of education as incomplete first level (<8 y), complete first level up to incomplete second level (8–10 y), and complete second level or higher (≥ 11 years). We used the English educational categories of 0 level or equivalent (≤ 11 y of school), lower than Advanced level or equivalent (12–13 y), and higher (≥ 14 y) (5).
- Health-related characteristics: smoking status (yes or no); physical activity measured using the short version of the International Physical Activity Questionnaire (24) (sedentary or active according to the time spent on walking, moderate activities, and vigorous activities) (25); self-rated health (excellent/very good or good, fair, bad/very bad); number of chronic conditions, including self-reported medically diagnosed hypertension, diabetes, depression, cancer, arthritis or rheumatism, high cholesterol, stroke, and cardiovascular disease (0, 1, or ≥2).

Statistical analyses

Adjusted prevalence rates.

First, age- and sex-adjusted prevalence rates were calculated for each indicator for each country using the standard population at the individual level by the directly standardized method to allow the comparison of the prevalence rates between the 2 countries.

Univariate models.

Second, we then used logistic regression to estimate the OR and its 95% CI to examine the association between anthropometric indicators and ADL disability, considering the interaction term between each anthropometric indicator and country. The crude OR for each anthropometric indicator (i.e., BMI, waist circumference, and waist-to-height ratio) was obtained by univariate models.

Multivariate models.

The adjustments in the sequential models were performed as follows: *1*) sociodemographic characteristics, including sex, age, marital status, and education (model 1); *2*) health-related characteristics, including smoking status, physical activity, self-rated health, and number of chronic conditions (model 2); and finally, *3*) models 1 and 2 combined (fully adjusted model). Adjusted multivariate analysis was performed separately for each anthropometric indicator. Next, we split the OR of the association between anthropometric indicators of nutritional status and disability by country, considering the OR of the interaction obtained from the fully adjusted model.

Considering the distinct sampling designs of the ELSI-Brazil and ELSA studies, our analyses incorporated only each survey's probability individual weights to facilitate the joint analyses of both countries' data. All analyses were performed using STATA software (version 13.0; StataCorp) and accounted for the survey weights.

Results

Considering a statistically significant difference in age between England and Brazil (mean age: 64.4 ± 9.7 y vs. 62 ± 10.4 y, respectively) and a lower prevalence of women (23.4% vs. 29.9%, respectively), age- and sex-adjusted prevalence rates were calculated for each anthropometric indicator for each country for the descriptive analysis. The total number of missing data was similar between countries ($P = 0.76$), comprising 470 participants from England and 541 from Brazil. Those who had missing data tended to be older and to belong to the lowest education group ($P < 0.001$). As reported in **Table 1**, the prevalence of disability among older Brazilian adults (17.85%) compared with their English counterparts (16.27%) was similar.

Most of the participants had elevated anthropometric indicators: elevated BMI, 57.5% in Brazil and 60.15% in England; elevated waist circumference, 70.22% and 77.23%, respectively; elevated waist-to-height ratio, 87.46% and 83.6%, respectively. We found statistically significant differences among all anthropometric indicators of nutritional status between countries. Elevated BMI and elevated waist circumference were higher in England, whereas low BMI and elevated waist-to-height ratio were higher in Brazil. The greatest country difference was found for high waist circumference (7.01%), followed by a low BMI (3.95%). All health-related characteristics were worse in Brazil. We found greater differences between countries for self-rated health (27.26%) and the presence of 2 or more chronic conditions (16.08%) (Table 1). Considering the chronic conditions, hypertension was the most frequent (61.4%), followed by high

TABLE 1 Age- and sex-adjusted prevalence of anthropometric indicators, sociodemographic, and health-related characteristics in older Brazilian and English adults: ELSI-Brazil (2015–2016) and ELSA (2012–2013)[1]

	Adjusted prevalence, % (95% CI)		
	Brazil	England	Difference, %
Disability[2]	17.85 (17.07, 18.63)	16.27 (15.46, 17.07)	1.58
BMI[3]			
Adequate	33.12 (32.13, 34.12)	34.10 (33.0, 35.19)	0.98
Low	9.37 (8.73, 10.01)	5.42 (4.95, 5.89)	3.95*
Elevated	57.50 (56.49, 58.52)	60.15 (59.03, 61.27)	2.65*
Waist circumference[4]			
Adequate	29.78 (28.87, 30.7)	22.43 (21.45, 23.41)	7.35*
Elevated	70.22 (69.30, 71.13)	77.23 (76.25, 78.22)	7.01*
Waist-to-height ratio[5]			
Adequate	12.53 (11.85, 13.23)	16.08 (15.21, 16.95)	3.55*
Elevated	87.46 (86.77, 88.15)	83.60 (82.73, 84.47)	3.86*
Sociodemographic characteristics			
Living with a partner[6]	56.92 (55.97, 57.87)	65.96 (64.90, 67.02)	9.04*
8–10 y of education[7]	10.31 (9.70, 10.92)	28.82 (27.77, 29.87)	18.51*
<8 y of education[7]	69.31 (68.40, 70.23)	32.50 (31.42, 33.58)	36.81*
Health-related characteristics			
Current smoker[8]	16.43 (15.69, 17.18)	12.57 (11.78, 13.36)	3.86*
Physically active	53.84 (52.83, 54.86)	66.77 (65.73, 67.80)	12.93*
Fair self-rated health[9]	45.64 (44.61, 46.68)	18.38 (17.52, 19.24)	27.26*
Poor/very poor self-rated health[9]	12.42 (11.73, 13.11)	7.40 (6.81, 7.99)	5.02*
One chronic condition[10]	28.53 (27.60, 29.46)	26.71 (25.75, 27.67)	1.82
≥2 chronic conditions[10]	50.42 (49.41, 51.43)	34.34 (33.40, 35.28)	16.08*
Total *n*	9,412	8,024	

[1] Values are age- and sex-adjusted prevalences based on the directly standardized method. *$P < 0.05$. ELSA, English Longitudinal Study of Aging; ELSI-Brazil, Brazilian Longitudinal Study of Aging.
[2–9] Missing data for $n =$ [2]1, [3]798, [4]549, [5]777, [6]1, [7]103, [8]2, [9]24.
[10] Considering hypertension, diabetes, depression, cancer, arthritis or rheumatism, high cholesterol, stroke, and cardiovascular disease.

cholesterol (42.9%) and arthritis or rheumatism (38%) (data not shown).

Table 2 shows the logistic regression results between disability and anthropometric indicators. With regard to BMI, we found a significant association with disability after adjustments. The odds of disability were greater among older adults with elevated BMI compared with older adults with adequate BMI. The statistically significant interaction term between BMI and country (OR: 0.70; 95% CI: 0.55, 0.90) shows a different strength of the association by country (i.e., lower in Brazil than in England).

Waist circumference was independently and significantly associated with disability. The significant interaction terms between waist circumference and country (OR: 0.64; 95% CI: 0.48, 0.85) and waist-to-height ratio and country (OR: 0.66; 95% CI: 0.46, 0.95) found in the fully adjusted models show a different strength of the association by country, which was weaker in Brazil than in England.

The reported OR presented in Table 2 cannot be interpreted directly since the country interactions were statistically significant. Therefore, we split the OR of the association between anthropometric indicators of nutritional status and disability by country, considering the OR of the interaction obtained from the fully adjusted model.

The split ORs are presented in **Table 3**. The results show higher odds of disability when the participants had either high BMI or high waist circumference in both Brazil and England. These associations were strengthened among older English adults than Brazilians for both high BMI [OR (95% CI): 1.80 (1.51, 2.14) and 1.27 (1.06, 1.51), respectively] and high waist circumference [OR (95% CI): 1.90 (1.51, 2.37) and 1.21 (1.02, 1.44), respectively]. However, significant higher odds of disability were observed only among older English adults (OR: 1.83; 95% CI: 1.37, 2.44) for waist-to-height ratio.

Discussion

Our main findings were that older adults with elevated BMI and elevated waist circumference were more likely to have an ADL disability in both Brazil and England. These associations were stronger among English older adults. Considering the waist-to-height ratio, the association with ADL disability was significant only among older English adults.

BMI has been considered an adequate anthropometric indicator, due to its easy assessment, comparability between different populations, and strong association with body fat, regardless of changes in body composition related to aging (26). Nevertheless, some aging-related changes that potentially modify BMI might be masked, such as decreased weight, height, and muscle mass and increased visceral fat (27). Therefore, the Food and Nutrition Surveillance System has recommended higher cutoffs for older adults (28), similar to the ones proposed by Lipschitz (18).

Vlassopoulos et al. (29) showed that waist circumference tends to increase after the age of 65 y. Nearly 30% of men and 55% of women with adequate BMI (according to the WHO criteria) show

TABLE 2 Uni- and multivariate associations between anthropometric indicators of nutritional status and disability: ELSI-Brazil (2015–2016) and ELSA (2012–2013)[1]

	Disability			
	Crude analysis	Model 1	Model 2	Fully adjusted Model
BMI (vs. adequate)				
Low	1.39 (1.01, 1.94)*	1.15 (0.83, 1.62)	1.06 (0.72, 1.54)	0.96 (0.65, 1.40)
Elevated	1.99 (1.69, 2.36)*	2.19 (1.87, 2.62)*	1.66 (1.39, 1.97)*	1.80 (1.52, 2.14)*
Country (vs. England)				
Brazil	1.21 (1.01, 1.47)*	1.27 (1.04, 1.54)*	0.64 (0.52, 0.79)*	0.69 (0.55, 0.86)*
Interaction (vs. England)				
Low BMI in Brazil	1.08 (0.71, 1.64)	1.05 (0.68, 1.62)	1.34 (0.84, 2.13)	1.29 (0.80, 2.06)
Elevated BMI in Brazil	0.63 (0.50, 0.79)*	0.64 (0.51, 0.80)*	0.71 (0.55, 0.90)*	0.70 (0.55, 0.90)*
WC (vs. adequate)				
Elevated	2.43 (1.97, 2.99)*	2.38 (1.93, 2.94)*	1.83 (1.47, 2.29)*	1.90 (1.51, 2.37)*
Country (vs. England)				
Brazil	1.42 (1.12, 1.80)*	1.49 (1.17, 1.89)*	0.74 (0.57, 0.95)*	0.80 (0.61, 1.04)
Interaction (vs. England)				
Elevated WC in Brazil	0.57 (0.44, 0.74)*	0.57 (0.44, 0.74)*	0.65 (0.49, 0.86)*	0.64 (0.48, 0.85)*
WtHr (vs. adequate)				
Elevated	2.53 (1.96, 3.28)*	2.51 (1.93, 3.27)*	1.75 (1.32, 2.32)*	1.83 (1.37, 2.44)*
Country (vs. England)				
Brazil	1.52 (1.10, 2.10)*	1.60 (1.15, 2.23)*	0.72 (0.51, 1.02)	0.79 (0.56, 1.13)
Interaction (vs. England)				
Elevated WtHr in Brazil	0.56 (0.39, 0.78)*	0.54 (0.38, 0.77)*	0.69 (0.48, 0.98)*	0.66 (0.46, 0.95)*

[1]Values are ORs based on logistic regression models (95% CIs). $^*P < 0.05$. Model 1: adjusted for sociodemographic characteristics (sex including sex, age, marital status, and education). Model 2: adjusted for health-related characteristics (current smoking, physical activity, self-rated health, and number of chronic conditions). Fully adjusted model: model 1 + model 2. Total *n* of the fully adjusted models: BMI = 16,024; WC = 16,258; WtHr = 16,041. ELSA, English Longitudinal Study of Aging; ELSI-Brazil, Brazilian Longitudinal Study of Aging; WC, waist circumference; WtHr, waist-to-height ratio.

elevated waist circumference. Therefore, BMI should ideally be used in combination with waist circumference to correctly assess abdominal fat. Waist-to-height ratio has also been used to estimate visceral fat. Both measures are more sensitive than BMI and superior predicting cardiometabolic risk (21).

TABLE 3 Split ORs of the association between the anthropometric indicators of nutritional status and disability by country, derived from the fully adjusted models: ELSI-Brazil (2015–2016) and ELSA (2012–2013)[1]

	Brazil	England
BMI		
Adequate	1.00	1.00
Low	1.23 (0.93, 1.62)	0.96 (0.65, 1.40)
Elevated	1.27 (1.06, 1.51)*	1.80 (1.51, 2.14)*
Waist circumference		
Adequate	1.00	1.00
Elevated	1.21 (1.02, 1.44)*	1.90 (1.51, 2.37)*
Waist-to-height ratio		
Adequate	1.00	1.00
Elevated	1.20 (0.96, 1.52)	1.83 (1.37, 2.44)*

[1]Values are ORs based on logistic regression models (95% CIs). $^*P < 0.05$. Adjusted for sociodemographic characteristics (sex, age, marital status, and education) and health-related characteristics (current smoking, physical activity, self-rated health, and number of chronic conditions). Total *n* of the fully adjusted models: BMI = 16,024; waist circumference = 16,258; waist-to-height ratio = 16,041. ELSA, English Longitudinal Study of Aging; ELSI-Brazil, Brazilian Longitudinal Study of Aging.

In the present study, we observed significant differences in the anthropometric indicators by country—that is, 57.50% of Brazilians versus 60.15% of English were classified with elevated BMI, whereas elevated waist circumference (70.22% of Brazilians vs. 77.23% of English) and elevated waist-to-height ratio (87.48% of Brazilians vs. 83.60% of English) were also prevalent. Our results corroborate a previous comparison between England and Brazil, where obesity was more prevalent among English individuals (27.1% vs. 17%) (30) and found that waist circumference and waist-to-height ratio were more specific indicators of abdominal fat than BMI.

Different from previous studies (3, 31), we did not find any difference between low and adequate BMI and the odds of ADL disability. Underweight is one of the main determinants of physical performance via lean mass reduction and, consequently, lower muscle strength (8). Lower muscle strength has also been associated with ADL disability, primarily eating difficulties leading to undernutrition (32). According to longitudinal studies, underweight has been associated with disability onset among Brazilians (13, 33) and Americans (34, 35).

With regard to the positive association between elevated BMI and ADL disability, our findings corroborated those from previous longitudinal studies (36, 37), showing that this association is stronger among older English adults than older Brazilian adults. Moreover, overweight was associated with disability onset among older Brazilians (33) and older Americans (34, 35).

Importantly, abdominal fat, assessed by waist circumference and waist-to-height ratio, reduces muscle strength and contributes to worse disability trajectories (38), corroborating with our findings. Visceral fat is a highly metabolically active endocrine organ that secretes proinflammatory cytokines and adipokines, which are relevant for immunomodulation, energy balance, and fatty acid and glucose metabolism, all of which undergo dysregulation with increasing abdominal obesity (39) related to aging.

Prior studies also have found an association between waist circumference and disability in different countries (3, 37, 40) and in Brazil (41). Another study comparing older English and Brazilians also found that abdominal obesity was longitudinally associated with functional decline (42). With regard to the association between waist-to-height ratio and disability, our results showed that older English adults with elevated waist-to-height ratio were 1.83 times more likely to have ADL disability, whereas among older Brazilians this association was not found.

Different from our initial hypothesis, the impact of anthropometric indicators on disability was higher among English than Brazilians. Despite the fact that the physiological link between visceral fat and disability is the same for all individuals (38, 39), our results showed that individual characteristics do not explain all of the disability spectrum. We included a wide range of potential confounders in our analyses, such as sociodemographic and health-related characteristics; however, socioeconomic inequalities may persist. The differences found in the sociodemographic profile and health conditions between English and Brazilian participants might be partially explained by country-income differences, such as inequalities in health care access, lower health professional density, and lower per capita health expenditure (5). For example, the expected probability of 2 or more ADL limitations among English individuals with a lower educational level is similar to that of Brazilians with the highest educational level (5). However, in Brazil, inequalities in ADL disability are primarily explained by socioeconomic status (wealth and educational level, 92%), not by demographic or health factors (43). Moreover, we cannot ignore that Brazil, according to official recent statistics, currently shows nearly a 4-fold larger population than England, increasing the demand on their health care system.

The main limitation of the present study is its cross-sectional design that prevents us from establishing causality between nutritional status and disability, despite some longitudinal studies indicating temporality (10, 11, 13, 35–37, 40–42). However, due to the lack of anthropometric indicators in some waves, data from ELSA (2012–2013) and ELSI-Brazil (2015–2016) analyzed in this study came from distinct years and could have influenced our results. Last, although we considered the sample weights from the 2 cohorts, the complexity of the ELSI-Brazil sampling design was not taken into account in our analyses.

This study has some strengths that should be acknowledged. First, it was conducted in a large, diverse, and nationally representative sample of older adults living in Brazil and England using comparable methodologies, which allowed us to investigate differences in the impact of anthropometric indicators on disability. Although the ELSA data have been widely used, it is the first time that ELSA was compared with ELSI-Brazil to address the present research question. Second, we have used simple and easy-to-interpret standardized anthropometric indicators that have a broad potential to be used in both clinical settings and primary health care. Although Brazil and England have similar universal health systems (i.e., primary health care–orientated), low- and middle-income countries have limited resources and would benefit more from cost-effectiveness methods. Third, the analyses were adjusted for a wide range of relevant confounders, minimizing the probability of residual confounding.

In conclusion, elevated anthropometric indicators of nutritional status, including BMI and waist circumference, increase ADL disability in older Brazilian and English adults. However, these associations were stronger among ELSA participants. Waist-to-height ratio was associated with ADL disability only in English participants. Our findings highlight the need for assessing BMI associated with other abdominal obesity indicators during the evaluation of older adults by health professionals. Maintaining adequate values of these simple modifiable measures might potentially decrease or even prevent the impact of disability in high-, middle-, and low-income countries and promote successful aging.

The authors' responsibilities were as follows—MFL-C, FBdA, and CdO: designed the research; NTMY, JLT, MFL-C, and CdO: conducted the research; NTMY, JLT, MFL-C, JVdMM, and FBdA: analyzed data; NTMY, CdO, JVdMM, FBdA, JLT, and MFL-C: wrote the manuscript; NTMY, CdO, JVdMM, FBdA, JLT, and MFL-C: had primary responsibility for final content; and all authors: read and approved the final manuscript. The authors report no conflicts of interests.

Data Availability

Data described in the manuscript, code book, and analytical coding will be made publicly and freely available without restriction at http://elsi.cpqrr.fiocruz.br and https://www.elsa-project.ac.uk.

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