Migration surrogates and their association with obesity among within-country migrants

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Abstract

Limited studies have evaluated the link between acculturation and health outcomes of within-country migrants. The objective of this study was to evaluate whether well-known acculturation surrogates were associated with obesity among Peruvian rural-to-urban migrants. We performed a cross sectional survey, the PERU MIGRANT study, using single-stage random sampling. Evaluation included weight, height, and waist circumference (WC) as well as acculturation surrogates. Obesity was assessed using body mass index (BMI) and WC. Length of residence, age at migration, language proficiency and language preferences (Spanish or Quechua) were assessed in logistic regression models to calculate odd ratios (OR) and 95% confidence intervals (CI) adjusting for potential confounders. A total of 589 rural-to-urban migrants were enrolled. The mean age was 47.8 (SD: 11.7, range: 30-92) and 280 (47.5%) were males. Obesity prevalence assessed by BMI was 30.4% among women and 10.7% among men (p<0.001), whereas abdominal obesity assessed by WC was 29.1% among women and 19.1% among men (p<0.01). Obesity was associated with older age at first migration, language speaking proficiency and language preferences. The association between obesity and acculturation surrogates is variable in this population. Thus, acculturation per se can explore positive channels associated with better health outcomes. The patterns shown in this report suggest a more complex association for these factors.

Keywords

acculturation; obesity; adults; body mass index; waist circumference

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INTRODUCTION

Obesity is one of the main risk factors associated with cardiovascular disease (CVD), including all-cause and CVD mortality (1). In addition, many recognized CVD risk factors such as obesity, physical inactivity, diabetes, and hypertension are on the rise in all regions, including low- and middle-income countries (2, 3).

Migrant populations can be more affected by unhealthy practices due to disparities in health and access to care (4). Besides, when more acculturated, migrants tend to increase their risk of obesity and other chronic health conditions, leading to a decline in their health status advantages (5, 6). Most of the studies, however, have generally focused on behaviors and disease conditions among migrants residing in the United States.

Acculturation, a process of adaptation and exchange of behavior patterns resulting when groups of human beings with different cultures come into continuous contact (7), has been described in the literature using several surrogates, including length of residence (8), age at migration (9), language use and proficiency (10, 11), and others (12). However, limited reports have assessed the association between acculturation and obesity among rural-to-urban migrants. Thus, it is important to evaluate it in the current context of increased urbanization in low- and middle-income countries.

The objective of this study was to evaluate acculturation using length of residence, age at first migration, self-reported language proficiency, and language preference, and its association with obesity among Peruvian rural-to-urban migrants.

METHODS AND PROCEDURES

Study design, setting and participants

A cross sectional survey, the PERU MIGRANT study (13), was performed using a single-stage random sampling and involving migrants from rural to urban areas in Peru. Potential participants, born in the rural setting of Ayacucho, who migrated to, and were currently living in the urban setting of Lima, were asked to participate. The area called "Las Pampas de San Juan de Miraflores" was the setting where this study was carried out. The sampling frame for this migrant group was the local census performed in 2000, updated in 2006, to identify all those who stated they had been born in the department of Ayacucho and were currently living in Lima. A total of 589 (82.7%) of 712 enrolled participants completed the study.

Data collection

Community health workers were trained to recruit participants and conduct interviews using validated questionnaires. Questions were asked in Spanish or Quechua languages by bilingual health workers depending on the participant's preference. Socio-demographic, migration, alcohol use, smoking, and acculturation variables were collected. Workers were also trained to obtain clinical measurements using standardized methods and calibrated tools. Measurements included were height, weight, and waist circumference (WC). Total height was measured to the nearest 0.1 cm using a stadiometer, whereas weight was obtained from the individual wearing light clothes to the nearest 0.05 kg using a SECA 940 electronic scale. WC was measured in triplicate at the midpoint between the lower rib and the iliac crest in the horizontal plane while the participant was standing.

Variables definition

Obesity was the outcome of interest. Two different variables were used to assess obesity. Firstly, body mass index (BMI) categorized using accepted guidelines (BMI   30 kg/m^2) (14). Secondly, WC with specific cut-offs (WC   97 cm for men and   94 cm for women) according to the Latin-American Consortium of Studies in Obesity (LASO) (15). Exposure variables were length of residence in urban areas evaluated in two categories (< 30 and   30 years), age at first migration divided into three categories (< 10, 10–17, and   18 years), and language proficiency based on the self-report of how well participants speak Spanish. Possible responses were categorized into two groups for analysis: "very well" and "pretty well" were grouped in one category (acculturated), whereas "not too well" and "not at all" were grouped in the other (not acculturated). Language preference for listening was evaluated by the question "If available on the radio, what language would you prefer to listen to?" Possible responses were categorized into two groups: "Only Spanish" and "Quechua or Spanish/Quechua". A Spanish version of the questionnaire is available at http://www.biomedcentral.com/content/supplementary/1471-2261-9-23-S1.doc (13).

Statistical analysis

Statistical analysis was performed using STATA 10 for Windows (STATA Corporation, College Station, Texas, US). Initially, a brief description of the socio-demographic, acculturation surrogates and health-related variables was performed according to obesity. A multi-deprivation index was also considered to evaluate socio-economic status.

Categorized variables were assessed in logistic regression models to calculate adjusted odd ratios (OR) and 95% CI. Potential confounders used in the adjusted model were age, gender, education level, socio-economic status using a deprivation index, alcohol use, smoking status, and physical activity assessed by the metabolic equivalent task (MET) score.

Ethical issues

Ethical approval for this study was obtained from IRBs at Universidad Peruana Cayetano Heredia in Peru and London School of Hygiene and Tropical Medicine in the UK.

RESULTS

A total of 589 rural-to-urban migrants were included in the analysis. The mean age was 47.8 years (SD: 11.7, range: 30–92) and 280 (47.5%) were males. Overall, obesity prevalence assessed by BMI was 30.4% among women and 10.7% among men (p<0.001). On the other hand, abdominal obesity assessed by WC was 29.1% among women and 19.1% among men (p<0.01). A description of characteristics and health-related variables are shown in Table 1. Table 2 shows results adjusted for several potential confounders. Obesity, assessed using BMI, was associated with age at first migration (p = 0.03), particularly for those migrating at   18 years, Spanish speaking ability (P = 0.03), and language preferences (P = 0.04). Abdominal obesity, assessed using Latin-American Consortium of Studies in Obesity cut-offs for WC, was associated with age at first migration (P = 0.04) and language preferences (P = 0.01).

DISCUSSION

The objective of this study was to evaluate the association between several acculturation surrogates and obesity, a well-known risk factor for CVD. Among Peruvian rural-to-urban migrants, we demonstrated that obesity was associated with age at first migration, language proficiency, and language preferences.

Reasons for migration depend upon life phase (16). Those migrating before adolescence travel with their families who migrate to improve their economic status, having better opportunities for education, but they are also more likely to become more acculturated, which has a greater impact on their behavior and consequently on their health (17). In our report, however, the odds of obesity, using both markers separately, was greater at older age at migration. These contradictory findings could be explained by environmental exposures, including nutrition patterns. Diet among population from Andean regions is based on carbohydrates, which might influence migrant's health; however, this hypothesis requires confirmation. Previous reports described the effect of acculturation on obesity among migrants, who mostly migrated to developed countries for economic reasons (6, 18, 19). Mass-migration in Peru, however, largely took place for the purpose of escaping from terrorism rather than for economic reasons (20). In that sense, this population was not simply a small self-selected group. It is therefore essential to use other study designs for appropriate analysis of the impact of migration on health among this type of population.

Language has been also used as acculturation surrogate in previous reports, including fluency and preferences in social interactions (10, 11). In our context, Quechua is the usual language in Andean rural areas, while Spanish is the common language in urban areas. Many studies have previously reported the association between language and over-weight related behaviors (5), and health practices (21). In our study, we show an association between obesity and self-reported ability to speak Spanish. Thus, greater acculturation, measured as self-reported fluency in Spanish, was a risk factor for obesity after adjusting for potential confounders. This observation follows the same direction as that observed in Latino populations living in the US where better language (English) fluency is a sign of greater acculturation (8, 19, 22).

Preference for listening Spanish, however, was associated with lower odds of obesity. Although our model was adjusted for potential confounders, we found opposite results compared to language proficiency. This study therefore expands on the available literature suggesting that measures of language proficiency and preference, although related, do not assess acculturation in the same way. As recently reported, language preference (for listening in this case) tends to reflect participants' underlying cultural values, but also social networks, political ideology, and social identity (23). Thus, the interpretation of questions regarding language preference might change depending on the participants' context and background. On the other hand, language proficiency may directly influence access to health care and broader social determinants of disease (23). Language preference might be an indicator of migrants' adoption of unhealthy lifestyles, a marker of acceptance of health-promoting practices, or a proxy for language proficiency and barriers to health access (24). In this study, we believe that language preference for listening in Spanish amongst within-country migrants – assessed by ideal language for listening to radio programs – could either be a marker of enhanced attitudes or access towards health promoting practices. However, complex studies are needed to improve our understanding of the mechanisms and interactions between variables. Longer residence in urban environment was not associated with obesity as having been reported in previous studies (6, 18).

Strengths of this study include the use of a well-defined within-country migrant population, the assessment of several surrogates of acculturation on obesity, as well as the use of two different obesity indicators. Both obesity indicators have been independently associated with CVD and mortality. While BMI relates to overall obesity, WC assesses mainly abdominal obesity and mainly the amount of visceral fat (25). However, cut-offs derived from other populations for use in our population have been questioned. In this manuscript, using proposed WC cut-offs for our population, we could reach similar results using BMI. This study, however, has some limitations. First, the sample size was small compared to previous

studies, which prevents a complete evaluation of the association between acculturation and obesity. Second, although age at first migration and language preference were associated with obesity, dietary patterns were not measured. This could explain the inverse association found in this study compared to other studies (9, 16). Finally, acculturation is a complex process, comprising multiple dimensions, and cannot be completely evaluated through simple variables or cross sectional studies. Although we used previously reported variables associated with chronic diseases and health-related conditions; further studies are needed to confirm our findings.

In conclusion, acculturation is a process affecting rural-to-urban migrants. Length of residence, age at migration, language proficiency, and language preferences are easily evaluable surrogates that can be used to assess the migration and health association among within-country migrants. While traditionally acculturation surrogates have been described to be associated with negative health outcomes, largely interpreted by the adoption of negative lifestyle risk factors, in this paper we report some findings in the opposite direction. That is, acculturation considering language preference for listening in Spanish - the hosting language - showed lower odds of obesity. This reflects that acculturation per se can also explore positive channels associated with better health outcomes. Different approaches and more complex studies with greater sample sizes are needed to more fully understand mechanisms of unhealthy behaviors in low- and middle-income countries.

Acknowledgments

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Table 1

Distribution of socio-demographic and health-related variables according to length of residence and age at first migration

Variables	General obesity [a]		Abdominal obesity [a, b]	
	BMI < 30 (N = 465)	BMI ≥ 30 (N = 124)	No (N = 444)	Yes (N = 143)
Age				
Mean (SD)	47.7 (12.1)	48.2 (9.8)	46.9 (11.9)	50.5 (10.5)
Gender				
Female (%)	215 (46.2%)	94 (75.8%)	219 (49.3%)	90 (62.9%)
Education level				
None/some elementary school (%)	130 (28.0)	53 (42.7)	122 (27.6%)	60 (42.0%)
Complete elementary school (%)	75 (16.2)	24 (19.4)	71 (16.0%)	28 (19.6%)
Some high school (%)	259 (55.8)	47 (37.9)	250 (56.4%)	55 (38.5%)
Multi-deprivation index				
Yes (%)	78 (16.8%)	29 (23.4%)	71 (16.0%)	36 (25.2%)
Current smoking				
Yes (%)	49 (10.5%)	10 (8.1%)	48 (10.8%)	11 (7.7%)
Alcohol use: heavy drinker				
Yes	38 (8.2%)	10 (8.1%)	35 (7.9%)	13 (9.1%)
Physical activity				
Moderate/high physical activity	329 (71.7%)	80 (65.0%)	313 (71.5%)	95 (66.9%)
Low physical activity	130 (28.3%)	43 (35.0%)	125 (28.5%)	47 (33.1%)
Length of residence				
< 30 years	207 (46.5%)	49 (43.0%)	209 (48.9%)	47 (36.2%)
≥ 30 years	238 (53.5%)	65 (57.0%)	218 (51.1%)	83 (63.8%)
Age at first migration				
< 10 years old	112 (24.3%)	20 (16.1%)	112 (25.4%)	20 (14.1%)
10 – 17 years old	256 (55.5%)	73 (58.9%)	243 (55.1%)	85 (59.9%)
≥ 18 years old	93 (20.2%)	31 (25.0%)	86 (19.5%)	37 (26.0%)
How well speak Spanish				
Not too well / no at all	124 (27.0%)	31 (25.6%)	114 (26.0%)	41 (29.3%)
Very well / pretty well	336 (73.0%)	90 (74.4%)	325 (74.0%)	99 (70.7%)
Language preferences for listening				
Quechua or Spanish	340 (74.2%)	101 (84.2%)	320 (73.4%)	120 (85.7%)
Only Spanish	118 (25.8%)	19 (15.8%)	116 (26.6%)	20 (14.3%)

[a] Results may not add due to missing values

[b] Calculated according to cut-offs of LASO study

Table 2

Association between acculturation and obesity assessed as BMI and waist circumference: adjusted odds ratios (95% CI)

	BMI 30 kg/m² Adjusted model [a]	LASO criteria (WC) Adjusted model [a]
Length of residence		
< 30 years	1 (Ref)	1 (Ref)
30 years	1.20 (0.72-1.99)	1.47 (0.91-2.37)
Age at first migration		
< 10 years old	1 (Ref)	1 (Ref)
10 to 17 years old	1.75 (0.99-3.12)	1.79 (1.03-3.12)
18 years old	2.15 (1.07-4.33)	1.97 (1.02-3.79)
How well speak Spanish		
Not too well / no at all	1 (Ref)	1 (Ref)
Very well / pretty well	1.77 (1.05-2.99)	1.27 (0.79-2.05)
Language preferences for listening		
Quechua or Spanish	1 (Ref)	1 (Ref)
Only Spanish	0.56 (0.32-0.98)	0.51 (0.30-0.87)

[a] Adjusted by age, sex, education level, deprivation index, alcohol consumption, smoking status and physical activity