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Original Article

Socio-economic life course and obesity among adults in Florianopolis, southern Brazil

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ABSTRACT

Objective: To estimate the association between socio-economic life course and body mass index (BMI), waist circumference (WC) and general and abdominal obesity in adults.
Methods: A cross-sectional analysis of a population-based cohort study of 1,222 adults (aged 22–63) from Florianopolis, southern Brazil. The socio-economic life course was analysed using the educational level of participants and their parents. Height, weight and WC were measured by specially trained staff. Linear and logistic regressions were used with adjustment for confounding factors, and data were stratified according to sex.
Results: Mean BMI and WC were about 2 kg/m^2 (95% CI: −3.3 to −0.7) and 6 cm (95% CI: −9.7 to −2.9) lower in women with a high socio-economic position, while the association was reversed in men with a high socio-economic position, with WC being about 4 cm higher (95% CI: 0.1 to 7.5). In addition, women who had always been in a high socio-economic position were less likely to have abdominal obesity (OR: 0.38; 95% CI: 0.20 to 0.76) while no such association was found in men.
Conclusion: Socio-economic life course influences BMI, WC and obesity, with differences between males and females, thereby indicating that public policies that contemplate a socio-economic life course approach can be effective for controlling obesity.

Trayectoria socioeconómica y obesidad en adultos de Florianópolis, sur de Brasil

Palabras clave:
Trayectoria socioeconómica
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Estudio transversal

RESUMEN

Objetivo: Estimar la asociación entre trayectoria socioeconómica e índice de masa corporal (IMC), circunferencia de la cintura (CC) y obesidad general y abdominal en adultos.
Métodos: Análisis transversal de un estudio de cohortes de base poblacional en 1222 adultos (22-63 años de edad) en Florianópolis, sur de Brasil. La trayectoria socioeconómica fue analizada mediante el nivel educativo de los padres y los propios participantes. La medición de altura, peso y CC fue realizada por personal especialmente entrenado. Se usaron modelos de regresión lineal y logística ajustando factores confusores y estratificando por sexo.
Resultados: El promedio de IMC y CC fue de 2 kg/m^2 (intervalo de confianza del [IC95%]: −3,3 a −0,7) y 6 cm (IC95%: −9,7 a −2,9), menor en las mujeres con mejor posición socioeconómica. Dicha asociación fue la contraria en el caso de los hombres, en los que el promedio de CC fue 4 cm mayor (IC95%: 0,1 a 7,5). Las mujeres que siempre permanecieron en mejor posición socioeconómica fueron menos propensas a tener obesidad abdominal (*odds ratio:* 0,38; IC95%: 0,20 a 0,76), mientras que en los hombres no se observó dicha asociación.
Conclusiones: La trayectoria socioeconómica se asocia al IMC, la CC y la obesidad, con diferencias entre sexos, indicando que la aplicación de políticas públicas que contemplen la trayectoria socioeconómica puede ser efectiva para el control de la obesidad.

Introduction

Throughout the world, especially in low- and middle-income countries, the prevalence of obesity is increasing,[1] and in 2014, Brazil was among the five countries with the highest overall percentage of obese people.[2] Data from 2013 indicate that 16.8% of men and 24.4% of women in Brazil reach obesity measured by body mass

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index (BMI), and with an even higher prevalence when abdominal obesity is considered, which is present in 21.8% of the male and 52.1% of the female population.[3]

The literature indicates that the socio-economic position (SEP) at every stage of life–childhood, adolescence and adulthood–has an independent relationship with obesity.[4] From a life course perspective, obesity is included among the health problems whose prevalence varies in different social groups throughout life, reflecting the cumulative exposure to deleterious factors at different ages. In this sense, having a low socio-economic status in childhood, adolescence and adulthood would also increase the likelihood of obesity, for example.[5]

However, the profile of the associations found in studies that analyzed the relation between life course and obesity differs according to the average income of the country whose population is being evaluated. In addition, most of the studies were conducted in high-income countries, especially the United States and European countries, while few were carried out in Brazil.[6–11]

Studies of the Brazilian population seem to converge on higher risk of obesity among men who have always been in the higher socio-economic strata and among women who have always been in the disadvantaged groups in terms of socio-economic status. However, different results were found according to the measure of adiposity used and the category of socio-economic life course analysed.[6,8,11]

From the perspective of life course, the effect of socio-economic aspects on obesity in adults in low- and middle-income countries, including Brazil, is still unclear. Several interventions and policies have been developed in order to prevent obesity at the population level, but the best way to act has not yet been proven,[12,13] which indicates that a better understanding of the problem is necessary. Therefore, the objective of this research was to estimate the association between socio-economic life course with BMI measurements, waist circumference (WC) and general and abdominal obesity in adulthood.

Methods

This study corresponds to a sectional sample analysis of individuals aged between 22 and 63 years who participated in the first follow-up population-based cohort *EpiFloripa Adults*. The baseline study was conducted in 2009 and included a representative sample of adults, ages 20 to 59, living in the urban zone of Florianopolis.

Florianopolis is the capital of the state of Santa Catarina (Southern Brazil), and has the third-highest human development index of all Brazilian municipalities (0.847). The population in 2010 was approximately 420,000 inhabitants in an area of 675 km^2.[14]

Details of the sampling, study population and other methodological aspects of the study baseline can be found in another publication.[15]

Data from 2012 used in this research were collected through individual face-to-face interviews in the households of all individuals surveyed in 2009. Adults who refused to participate or could not be located for an appointment by the interviewers after at least four attempts by phone and four more home visits (at least one in the evening and another during the weekend) were considered losses/refusals.

The socio-economic life course was the exposure variable, measured by the education data of the cohort participants and their parents. The education of the participants was obtained in the collection in 2009 with the questions: "Did you go to school?" and "To what grade/year did you go to school?". The education of fathers and mothers was obtained by applying two questions to the cohort members in 2012: "Did your father (mother) go to school?" and "To what grade/year did your father (mother) go to school?". All information on education was noted as successfully completed years of study.

For the creation of the variable socio-economic life course, the age of the participant was considered, bearing in mind that the educational experience of the Brazilian population has undergone important changes in recent decades, with significant increase in schooling for more recent cohorts.

To create the socio-economic life course variable, initially, the variable education of the parents and of the participants themselves was categorized as: 1) education lower than or equal to the median, and 2) education higher than the median. Next, the socio-economic life course was defined: 1) "always low" when the educational level of both parents and participants was less than or equal to the median; 2) "decreasing" when the parents' educational level was higher than the median and less than or equal to the median participants'; 3) "increasing" when the parents' educational level was less than or equal to the median and the participants' was higher than the median; and 4) "always high" when the educational level of the parents as well as the participants themselves was higher than the median. The educational level of both mother and father of the participants was used and included separately in the analyses.

The other economic and socio-demographic variables (sex, age and equivalized income) were employed to adjust the analysis and were also collected through a questionnaire applied to the participants. The sex of each participant was categorized as female or male; income and total household members were reported by the participant, with the equivalized family income[16] calculated by dividing the household income by the square root of the number of dependents for the household income. Age was calculated from the date of birth and the day of the interview.

The outcomes were BMI and WC, evaluated as continuous variables, and the prevalence of general and abdominal obesity was also calculated. General obesity was defined using the values of weight and height, while for abdominal obesity the WC values were used. The body weight and WC data were collected in 2012 and the height was measured in 2009. Body weight was measured using a digital scale (GAMA Italy Professional®) with the interviewees wearing light clothes and weight divided between both lower limbs, arms relaxed laterally to the body, shoulders relaxed and the head maintained in the Frankfurt plane.[17] Height was measured using a portable stadiometer built for the study with a tape measure having a maximum capacity of 200 cm and a graduation of 1 mm. The participant remained in the orthostatic position, barefoot, with heels, buttocks and head in contact with the stadiometer; head in the Frankfurt plane; arms relaxed laterally to the body; and shoulders relaxed.[17]

In turn, WC was measured with an inextensible anthropometric tape (Sanny) with the participant in upright position. The measure was taken at the narrowest part of the torso below the last rib. For individuals with no visible waist circumference, the perimeter at the midpoint between the iliac crest and the last rib was measured. The measurement was read at the time of expiration.[17] Individuals unable to stand, pregnant women and women who had given birth in the six months prior to the research were excluded.

The nutritional diagnosis of general obesity was defined according to the criteria of the World Health Organization[18] for a BMI $\geq$30 kg/m^2, and used the same cut-off score for both sexes. Abdominal obesity was defined according to sex, corresponding to WC values classified with cut-off scores: in men $\geq$102 cm and in women $\geq$88 cm.

Data were analyzed using Stata version 13.0, and first the description of the sample was made. Linear and logistic regression were used for multivariate analysis and considered statistically significant when $p < 0.05$. Three models for analysis were constructed: the first with the crude analysis of the relationship between socio-economic life course and markers of obesity in adulthood; the

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