# Overweight in Sateré-Mawé indigenous residents of an urban area in Parintins, Amazonas

## Sobrepeso em indígenas Sateré-Mawé residentes em área urbana de Parintins, Amazonas

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## ABSTRACT

### Objective

To verify overweight prevalence in the Sateré-Mawé indigenous population over 18 years of age, residing in the city of Parintins (AM), Brazil, and to assess its associated variables.

### Methods

Household survey performed in the urban area of Parintins in 2017, visiting new households in each interview, completing the census universe. Self-declared Sateré-Mawé, over 18 years of age, residing in the city for a period longer than one year were considered eligible. Overweight was considered for body mass index values ≥ 25 kg/m$^2$ or ≥ 27 kg/m$^2$, for those over 60 years of age. Household information on social assistance, as well as individual information such as speaking the indigenous language, years living in the city and also in the indigenous territory, income, work, schooling, marital status, leisure and transport physical activity level, and time watching television per week were retrieved. The hierarchical logistic model analysis was carried out, calculating the odds ratio and confidence interval (95%).

### Results

A total of 174 subjects participated in the survey, 42% being overweight. Those who spoke the Sateré-Mawé language, number of years living in the city, working outside home and being married had a positive effect on the outcome, but lost significance in the final model. Only transport insufficient physical activity (OR=2.24, 95% CI=1.01-4.98) and being in the age group from 30 to 59 years (OR=8.79, 95% CI=3.41-22.64) maintained statistical significance.

### Conclusion

Efforts to provide visibility to the health situation of urban indigenous populations in Brazil are necessary. Poor transport infrastructure in the city seems to favor transport physical activity levels as a necessity, in addition to age, which is commonly associated with overweight.

**Keywords**: Health of indigenous peoples. Nutrition surveys. Nutritional status. Overweight. Urban area.

## RESUMO

### Objetivo

*Verificar a prevalência de sobrepeso em indígenas Sateré-Mawé maiores de 18 anos de idade, residentes na cidade de Parintins (AM), Brasil, identificando as variáveis associadas.*

### Métodos

*Um inquérito domiciliar foi realizado em 2017 na cidade de Parintins e identificou novos domicílios em cada entrevista, alcançando o universo censitário. Foram elegíveis os autodeclarados Sateré-Mawé maiores de 18 anos e residentes há mais de um ano na cidade. O sobrepeso foi considerado para valores de índice de massa corporal ≥25 kg/m² ou ≥27 kg/m² para os maiores de 60 anos de idade. Coletou-se informações domiciliares sobre bolsa família, bem como individuais como falar a língua indígena, anos morando na cidade e na terra indígena, renda, trabalho, escolaridade, estado civil, nível de atividade física no lazer e no deslocamento e tempo assistindo televisão na semana. Foi utilizado o modelo logístico hierarquizado, calculando a razão de chances e intervalo de confiança (95%).*

### Resultados

*Participaram do estudo 174 pessoas no total, sendo que 42% deles estavam com sobrepeso. Falar a língua Sateré-Mawé, a quantidade de anos residindo na cidade, trabalhar fora de casa e ser casado tiveram efeito positivo no desfecho, porém perderam significância no modelo final. Somente atividade física insuficiente no deslocamento (OR=2,24 IC 95%=1,01-4,98) e a faixa etária dos 30 a 59 anos (OR=8,79 IC 95%=3,41-22,64) mantiveram-se significativas.*

### Conclusão

*Esforços para dar visibilidade à situação de saúde das populações indígenas urbanas no Brasil são necessários. A fraca infraestrutura de transporte na cidade parece favorecer a atividade física no deslocamento como necessidade, além da idade, já comumente associada ao sobrepeso.*

**Palavras-chave**: *Saúde de populações indígenas. Inquéritos nutricionais. Estado nutricional. Sobrepeso. Área urbana.*

# INTRODUCTION

Brazil is the country in Latin America with the greatest ethnic diversity in terms of indigenous populations [1]. However, the percentage of indigenous people in the country represent less than 0.5% of the total population, constituting a population minority with associated difficulty in accessing health information [1-3]. Such scarcity of health information seems to be more serious for the indigenous population residing in urban areas. Brazil's census data showed that in 2010, 36.2% of the indigenous population lived in urban areas, and this population is exposed to greater inequity in terms of mortality of their children and adolescents, when compared to their non-indigenous peers in urban areas, regardless of gender, age and region of residence [2,4].

Obesity is associated with an increased incidence of chronic non-communicable diseases such as diabetes, hypertension and cardiovascular diseases [5]. Data on mortality according to race/color category in Brazil, indicated for the year 2012 that of the five main causes of death recorded for indigenous people, two made up the group of chronic non-communicable diseases: diabetes and cerebrovascular diseases [6].

Studies investigating the nutritional profile of indigenous adults of different ethnic groups in Brazil who reside in indigenous territories have shown an increase in the prevalence of overweight and obesity-associated diseases such as arterial hypertension, diabetes mellitus and dyslipidemia [7-10]. Few studies address the health situation of indigenous people living in urban areas in Brazil. The studies dealing with the indigenous population in urban areas usually maintain an ethnographic

or demographic focus [11-14]. We sought to verify the prevalence of overweight in the Sateré-Mawé indigenous population living in the city of Parintins in the state of Amazonas, identifying its associated variables.

## METHODS

The Sateré-Mawé indigenous ethnic group belongs to the cultural area of the Tapajós-Madeira rivers [15]. It makes up the Mawée linguistic family and is part of the Tupi linguistic trunk [15]. The 2010 Demographic Census detected 13,310 Sateré-Mawé individuals registered in Brazil [2]. The state of Amazonas accounted for approximately 11,880 Sateré-Mawé, with 1,430 residing in urban households [2]. Data extracted from the Multidimensional Statistics Bank platform referring to the 2010 Demographic Census for the municipality of Parintins (Amazonas), indicated a total population of 1,043 Sateré-Mawé, 393 in urban areas and out of these, approximately 198 older than 18 years in the city of Parintins.

In 2017, a household survey was carried out in the urban area in the city of Parintins, considering the city's master plan and the definition of household according to the *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics) [16]. Individuals of both genders self-declared Sateré-Mawé indigenous people, over 18 years of age, who had lived in the city of Parintins for more than 1 year, took part in the survey. In order to complete the population universe estimated by the Demographic Census, we started by contacting key informants belonging to that ethnic group in the city and then, in each interview carried out, the respondent was asked to indicate the location of other Sateré-Mawé households [2]. This methodology had been previously used in a participatory socio-demographic census with that population [17].

In order to avoid the loss of eligible individuals who might be absent from home, three visits were made. Data of individuals passing through the city, as well as pregnant women and people with some type of physical or mental disability were disregarded, because they could cause changes in the outcome. The research was approved by the Ethics Committee in Human Research under nº 57016916.0.0000.5240.

Overweight was considered as an outcome, using the value of Body Mass Index (BMI), obtained by the ratio of weight (in kilograms) by the square of height in meters, with the outcome for BMI values ≥ 25 kg/m2 [18], and BMI ≥ 27.0 kg/m2 for individuals over 60 years of age [19].

The procedures for measuring weight (in kilograms) and height (in centimeters) followed the protocol recommended by Lohman et al. [20]. An electronic Seca 872 scale (Hamburg, Germany) was used, with a precision of 100 g and a maximum load of 150 kg. To measure height (in centimeters), the SECA model 214 anthropometer (Hamburg, Germany) was used, with a precision of 0.1 cm. All weight and height measurements were performed by the same evaluator.

In each household, all the individuals over 18 years of age who declared themselves Sateré-Mawé were interviewed. Information was collected through a questionnaire at the household level: receipt of Government family allowance and at the individual level: ability to speak the Sateré-Mawé language (yes/no, by self-report); proportion of years lived in indigenous territory (ratio between years lived in indigenous territory and the age of the participant); number of years living in Parintins; individual monthly income (the amount reported in Br Reais was classified as low, medium and high income terciles); working outside home (yes/no), schooling in three categories, namely: "elementary or uneducated" (including incomplete and complete elementary school and those who attended the education of young people and adults at the elementary level); "high school level", (including

incomplete and complete high school and those who attended the education of young people and adults at high school level) and "after high school or higher education" (technical, pre-university, higher and postgraduate courses) and marital status (being/not being married or living with a companion).

For the classification of the level of physical activity in the domains of leisure and transport, a methodology similar to the National Health Survey [21] was used; the classification was determined according to the cut-off point which was based on the self-declared sum of time (minutes) of physical activity per week; those who did not complete 150 minutes/week of moderate physical activity and/or 75 minutes during the week of vigorous activity were considered insufficiently active [22]. Sedentary behavior was measured based on the time reported watching television during the week, with the cut-off point being values above 3 hours on weekdays [21].

The data collected were transcribed in the Excel 2013 spreadsheet editor program (Microsoft) and were reviewed using the freely accessible statistical program R, version 3.2.4 (R Foundation, 2016). Descriptive statistics presented measures of central tendency and distribution of the independent variables. Each independent variable was tested in relation to the outcome, through logistic regression ($\alpha=0.05$). The final model was proposed through a hierarchical analysis [23] via logistic regression, considering the presence of overweight as an outcome, keeping the variables that in any of the stages of the analysis presented a *p*-value ≤0.05. The final model was tested using the Hosmer-Lemeshow goodness-of-fit statistics ($\alpha=0.05$) and the adjusted Odds Ratios (OR) were calculated for each category of the independent variable, with their relevant confidence intervals (95%).

The analysis of the relationship between the independent variables and the outcome was based on the proposal of a hierarchical analysis and on the concept of social determinants in health [23,24]. The significant variables were progressively inserted ($\alpha=0.05$), from the most distal to the most proximal layers (Chart 1), until reaching the final model. For the construction of the theoretical model, the variables associated with overweight in the Brazilian population [25], as well as the information gathered by some studies that measured the effect of acculturation on overweight in indigenous populations that migrated to the urban condition in some countries in Latin America [26-28] and Canada [29].

**Chart 1** – Hierarchical model for the outcome "overweight" in the population.

| Hierarchical level | Independent variable |
|---|---|
| 1º - Domicile (DISTAL) | Home receives family allowance |
| 2º - Indigenous sociocultural bond | Speak Sateré-Mawé |
| | Proportion of years lived in indigenous territory |
| | Years living in Parintins |
| 3º - Socioeconomic | Individual monthly income |
| | Work outside the domicile |
| | Education |
| | Marital status |
| 4º - Behavioral | Level of physical activity in leisure time |
| | Level of physical activity in transport |
| | Hours watching television per week |
| 5º - Biological (PROXIMAL) | Gender |
| | Age |

# RESULTS

A total of 212 eligible participants were contacted, among which 174 agreed to participate in the survey. The 38 losses were recorded for the following reasons: a) head of household refused to

participate (14 cases), b) individual refusals (11 cases) and c) individuals absent after three contact attempts (13 cases). The data collected from the 174 Sateré-Mawé are shown in Table 1.

**Table 1** – Description of the population according to the independent variables considered (n=174). Parintins (AM), Brazil, 2017.

| Variables/Category | n | % |
|---|---|---|
| Receives Government family allowance | | |
| No | 136 | 78.2 |
| Yes | 38 | 21.8 |
| Speaks Sateré-Mawé | | |
| No | 34 | 19.5 |
| Yes | 140 | 80.5 |
| Proportion of years lived in indigenous territory[a] | | |
| Less than 1/4 | 53 | 30.5 |
| 1/4 to 1/2 | 51 | 29.3 |
| 1/2 to 3/4 | 34 | 19.5 |
| More than 3/4 | 36 | 20.7 |
| Individual monthly income[b] | | |
| Low | 55 | 31.6 |
| Mean | 58 | 33.3 |
| High | 61 | 35.1 |
| Work outside the domicile | | |
| Yes | 73 | 42.0 |
| No | 101 | 58.0 |
| Education | | |
| Basic or uneducated | 48 | 27.6 |
| High school | 60 | 34.5 |
| After high school or higher | 66 | 37.9 |
| Marital status | | |
| Not married / not living together | 68 | 39.1 |
| Married / lives together with partner | 106 | 60.9 |
| Level of physical activity in leisure time | | |
| Insufficient | 115 | 66.1 |
| Active | 59 | 33.9 |
| Level of physical activity during transport | | |
| Insufficient | 112 | 64.4 |
| Active | 62 | 35.6 |
| Hours watching television per week | | |
| Less than 3 hours a day | 128 | 73.6 |
| 3 hours or more per day | 46 | 26.4 |
| Nutritional status[c] | | |
| Eutrophy | 101 | 58.0 |
| Overweight | 73 | 42.0 |
| Gender | | |
| Male | 86 | 49.4 |
| Female | 88 | 50.6 |
| Age | | |
| 18 to 29 years of age | 84 | 48.3 |
| 30 to 59 years of age | 66 | 37.9 |
| 60 years or older | 24 | 13.8 |
| Years living in Parintins (mean±standard deviation) | 13.8±10.2 | |

Note: [a]The ratio between the reported years residing in the Andirá-Marau Indigenous Territory (from the Sateré-Mawé ethnic group) and the age calculated from the date of birth informed by each participant was considered. [b]The tertiles were used, corresponding to the following quoted values of individual monthly income in Reais in the year 2017: low (below R$ 172.00), medium (R$ 172.00 to 940.00) and high (above R$ 172.00 BRL to 940.00). [c]The Body Mass Index (BMI) value greater than or equal to 25.0kg/m$^2$ was used as a cut-off point for overweight for participants under 60 years of age and values greater than or equal to 27.0 kg/m$^2$ for those aged 60 and over.

The population surveyed had an almost similar distribution between genders, with 50.6% female; the largest portion of the population (48%) was composed of people between 18 and 29 years of age. Overweight was found in 42% of people surveyed. As for the levels of physical activity in transport and leisure, the majority was classified as insufficiently active (66.1% and 64.4% respectively).

The average number of years living in the city of Parintins was 13.8±10.2 years. Regarding the socioeconomic and demographic characteristics, the largest portion of the population was married or living with a companion (60.9%) and reported not working outside home (58.0%). As for information about the indigenous sociocultural bond, the largest portion of the population reported they were aware of it and that they spoke the Sateré-Mawé language (80.5%).

Table 2 shows the separate effect of each independent variable on overweight individuals. Statistical significance (*p*-value ≤0.05) was observed, indicating a direct/positive effect for the following separated variables: Sateré-Mawé language (β=1.235, referring to people speaking the language), years living in Parintins (β=0.029 , referring to each year of residence in the city of Parintins), work (β=1.123, in people who worked outside home), marital status (β=1.097, in people who were married or who lived with a companion), level of physical activity in transportation (β=0.634, in people who are insufficiently physically active in transport) and age (β=0.834).

**Table 2** – Simple model[a] considering the coefficients (β) of the independent variables for the presence of the overweight outcome (n=174). Parintins (AM), Brazil, 2017.

| Independent variable | β | *p*-value |
|---|---|---|
| Receives Government family allowance | 0.007 | 0.98 |
| Speaks Sateré-Mawé | 1.235 | 0.00* |
| Proportion of years lived in indigenous territory | 0.09 | 0.51 |
| Years living in Parintins | 0.029 | 0.05* |
| Individual monthly income | 0.303 | 0.11 |
| Work outside the domicile | 1.123 | 0.00* |
| Education | -0.13 | 0.49 |
| Marital status | 1.097 | 0.00* |
| Level of physical activity in leisure time | 0.622 | 0.06 |
| Level of physical activity in transport | 0.634 | 0.05* |
| Hours watching television per week | 0.325 | 0.34 |
| Gender | -0.181 | 0.55 |
| Age | 0.834 | 0.00* |

Note: *p-value ≤0.05. [a]Binomial logistic regression considering the model with each independent variable in relation to the presence of the overweight outcome (dependent variable).

Table 3 shows the final logistical model for the overweight outcome, highlighting that at the first hierarchical level, the variable was not statistically significant. At the second hierarchical level, the variables associated with speaking the Sateré-Mawé language and years living in the city were significant, both with a direct/positive effect on the outcome. The 2nd level variables maintained statistical significance when the significant 3rd level variables were added: working outside home and being married/living together, both also having a direct/positive effect. At the 4th hierarchical level, all the previous variables maintained statistical significance in the presence of the level of transport physical activity, with a direct/positive effect on the outcome for the insufficiently active category.

At the 5th and final level, the biological variable of age classes was significant, with a direct/positive effect for the 30-59 age group (OR=8.79; 95% CI=3.41-22.64) compared to the reference category (18 to 29 years of age), keeping the other variables constant. In the final model

considering the 5th hierarchical level, there was also a 2.24 chance (95% CI=1.01-4.98) of being overweight in those individuals who were insufficiently active in transportation when compared to those who were active. All other variables retained in the previous hierarchical levels: speaking the Sateré-Mawé language, years living in the city, working outside home and being married/living together, lost statistical significance with the entry of the age biological variable.

Table 3 – Final hierarchical model[a] for overweight, with odds ratio (OR), and 95% confidence intervals (95% CI) (n=174). Parintins (AM), Brazil, 2017.

| Hierarchical level | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| | OR | (95% CI) | OR | (95% CI) | OR | (95% CI) | OR | (95% CI) |
| Domicile (DISTAL) [b] | | | | | | | | |
| Indigenous sociocultural bond | | | | | | | | |
| Speak Sateré-Mawé | | | | | | | | |
| No | | Ref. | | Ref. | | Ref. | | Ref. |
| Yes | 3.89* | (1.56-9.70) | 2.75* | (1.05-7.20) | 2.97* | (1.12-7.88) | 1.38 | (0.46-4.18) |
| Years living in Parintins [c] | 1.04* | (1.00-1.07) | 1.03* | (1.00-1.06) | 1.03* | (1.00-1.06) | 1 | (0.97-1.04) |
| Socioeconomic | | | | | | | | |
| Work outside the domicile | | | | | | | | |
| No | | | | Ref. | | Ref. | | Ref. |
| Yes | | | 2.26* | (1.16-4.39) | 2.33* | (1.19-4.75) | 1.97 | (0.94-4.13) |
| Marital status | | | | | | | | |
| Not married | | | | Ref. | | Ref. | | Ref. |
| Married | | | 2.44* | (1.22-4.91) | 2.58* | (1.26-5.25) | 1.32 | (0.57-3.04) |
| Behavioral | | | | | | | | |
| Level of physical activity in transport | | | | | | | | |
| Active | | | | | | Ref. | | Ref. |
| Insufficiently active | | | | | 2.22* | (1.09-4.53) | 2.24* | (1.01-4.98) |
| Biologic (PROXIMAL) | | | | | | | | |
| Age | | | | | | | | |
| 18 to 29 years | | | | | | | | Ref. |
| 30 to 59 years | | | | | | | 8.79* | (3.41-22.64) |
| 60 years or more | | | | | | | 2.09 | (0.64-6.80) |

Note: *p-value ≤0.05. [a]This is the final hierarchical model, via logistic regression, for the overweight outcome adjusted by the Hosmer-Lemeshow statistic. [b]Indicates that at the corresponding hierarchical level, no variable was significant considering α=0.05. [c]It is a discrete independent variable. Ref: This is the reference category for the odds ratio (OR).

## DISCUSSION

In 2017, 42% of the Sateré-Mawé population over 18 years of age residing in the city of Parintins was overweight, with the age group from 30 to 59 years of age having a greater chance (9 times) of being overweight than the youngest age group (18 to 29 years). People classified as insufficiently active in transport were also more likely (a little more than twofold) to be overweight than those active in transport.

The prevalence of overweight (42.0%) was lower than the lowest prevalence (49.1%) observed in Brazilian capitals (Vitória, ES), according to the results of the 2019 nationwide telephone survey. The same survey indicated that 60.9% of the Manaus (Amazonas) population was overweight [30]. The prevalence found in our study is also lower than that observed in the Brazilian population (60.3%), according to the results of the 2019 National Health Survey [31]. The comparisons made here should be taken with caution, given the possibility of variation in the age composition of the populations being compared (although they are all studies carried out with people over 18 years of age), in addition to the lack of published studies with information on the nutritional profile of indigenous populations in urban areas in Brazil, which makes comparison difficult.

Although information on people's food consumption was not collected, the reality observed in the city of Parintins for the indigenous population surveyed seems to agree with the dietary pattern of high consumption of fish and manioc flour [32-35], associated with an increasing presence of ultra-processed foods and sugars [33,34]. We understand it as a riverine pattern of food consumption in the city, although it is commonly observed in studies on food consumption in rural areas in the Northern region of Brazil [32-35]. In fact, in the city of Parintins, the most accessible source of animal protein for the general population is fresh fish, sold at street markets in the city at a much more affordable price and usually sold at popular stalls close to the stalls of manioc flour, both goods that are sold at affordable prices and highly sought as food.

In the simple model, that is, considering each variable separately with the outcome, positive associations were found with age [36,37], insufficient physical activity level in transport [38], as well as being married or living together with a partner [36,37], these being variables classically associated with overweight in the non-indigenous Brazilian population residing in urban areas. Still in the simple model, longer time (in years) living in the city of Parintins and having skills in the Sateré-Mawé language were also positively associated with overweight. These variables composed, in the theoretical model proposed in this study, the level of "indigenous sociocultural bond", equivalent to the concept of acculturation [39] used in some studies with indigenous populations who migrated to urban areas in some countries, especially in South America [26-28, 40].

Acculturation, a concept developed in the social sciences, is understood here as a complex process of cultural diffusion between two (or more) social groups in contact, in the sense of producing an increasing linguistic and cultural similarity among these groups [39]. Studies in developed countries pointed out that greater acculturation, measured by the ability of immigrants from other countries to speak the local language, was associated with better health status [41,42]. In a study with an indigenous population in Peru that migrated from rural to urban situations, living in Lima, indicated an association of acculturation with the presence of overweight, namely, the variables: longer time of residence in the city and speaking well Spanish (as opposed to the indigenous Quechua language) [43].

The discrete variable "years living in Parintins" was significantly associated with overweight up to the 4th hierarchical level of the final model. A study with a Latino population of Mexican origin residing in the United States proposed the measurement of modifiable risk factors for chronic diseases such as overweight and smoking, comparing the individuals who were born in the country and those who lived there after emigrating [44]. The study found a lower chance of being overweight in the group that immigrated in the United States; however, the protective effect diminished as time went by in the city. A longitudinal study in Peru with a population that migrated from the rural region of the Andes to the capital (Lima), found an increase of around 12% in the prevalence of obesity in this group over the course of 10 years of study, and no association with this magnitude was found in the comparison groups surveyed [45].

The tested level of "indigenous sociocultural bond" in this investigation sought an approximation with the concept of acculturation, already studied in related research with indigenous populations in the Americas [26-29,40]. Data collected (not tested) showed that out of the total of 174 participants, most (134, or 77.0%) reported they were not born in the city of Parintins, and more than half (109, or 62.6%) indicated they were born in the Andirá-Marau Indigenous Territory. It is known that the acculturation process occurs faster in children than in adults [39]. Some studies with indigenous populations of South America who migrated from rural to urban conditions indicate

that the acculturation process is different according to the age at which the indigenous/migrant arrives in the urban environment [45,46].

In the final model, positive associations with age and insufficient level of physical activity during transport remained significant, and those were variables associated with overweight in the non-indigenous Brazilian population [25,36-38]. Only the intermediate age category, from 30 to 59 years of age, maintained a positive association with overweight, and a strong effect (OR=8.79, 95% CI=3.41-22.64) in relation to the youngest category, from 18 to 29 years. This fact is also observed for the non-indigenous population in Brazil, with an increase in the prevalence of overweight occurring until at least 64 years of age [30,31].

The greater chance of overweight in people who were insufficiently active in transport has already been pointed out in other studies [38,47]. Parintins is a city located in the Parintins fluvial archipelago on the Amazon River giving its name to the municipality with 102,033 inhabitants, according to the 2010 Demographic Census (Instituto Brasileiro de Geografia e Estatística) [2]. Although it is the second municipality in the state of Amazonas in terms of population, the city of Parintins does not have a public transport system, and the population's transport are usually carried out using their own private means (walking, cycling, motorcycle or car) or through third-party services (motorcycle taxi, tricycles and taxis). Both cycling and walking are forms of one-person transport (although it is common for 2 people to ride a bicycle using an adapted seat) that is still important in the city of Parintins.

What seems to occur, however, is not what would appear to be an "option" for a more physically active way of life, but the need to supply the insufficient transport infrastructure in the city associated with a financial impossibility of regularly acquiring/using more comfortable individual means of transport (motorcycle or car) and less exposed to local weather such as sunshine and strong heat or rain (seasonal event of great importance in the region). This reality is common in developing countries like Brazil, where physical activity in transport is more associated with the most disadvantaged socioeconomic strata and has low social recognition [38,47].

## CONCLUSION

Just under half (42%) of the Sateré-Mawé population over 18 years of age in the city of Parintins was overweight. The variables investigated associated with the "indigenous sociocultural bond", namely indigenous language and time residing in the city and in the indigenous territory, were not associated with overweight in the final model, in contrast to variables at the biological (older age) and behavioral level (physical inactivity in transport).

An important piece of information to be analyzed in research on the health of indigenous populations in urban areas is the age of first migration to the city. Such information is associated with greater exposure to acculturation, understood as a mediating variable at the behavioral level, which may influence the level of physical activity and eating habits, with consequences for nutritional status. It is suggested that studies on the nutritional profile of indigenous populations in urban areas collect information not only on the ability in the indigenous language and the aforementioned age of first migration to the city, but also other variables that suggest an effect of exposure to the urban area, such as time of residence in the city and proportion of life time in the city, calculated by the ratio between years of residence in the city and current age.

It is worth noting the difficulty that a survey that seeks to identify the indigenous population in large cities in Brazil may encounter, given that less than 0.5% of the Brazilian population considers

itself indigenous, according to data from the 2010 Demographic Census. Contact networks between the indigenous people of the Sateré-Mawé ethnic group are strong in the city of Parintins and facilitated the identification of the participants, so that it was possible to reach the census universe initially proposed. It should also be considered that in large cities there may be discontinuity between indigenous social networks, as well as the disinterest and/or distrust of an indigenous participant in self-identifying to an unknown surveyor. The city of Parintins is a regional center of attraction for the Sateré-Mawé population coming from the Andirá-Marau Indigenous Territory (which is approximately 80 kilometers in a straight line from the city). The ties between the indigenous land and the city of Parintins are strong, so that the city has the headquarters of a political representation of the Sateré-Mawé people, which we also used as an initial contact to reach the other indigenous participants of the survey.

The study is part of the effort to generate and disseminate health information in an indigenous population residing in urban areas, which is still incipient in Brazil. Developed countries such as Australia and Canada already have functional and publicly accessible information systems for their native populations. As a result of the availability of data, these countries also have public policies aimed at indigenous people, including the portion of these people who live in urban areas.

Nevertheless, the growing regional studies that focus on the health of indigenous populations in urban situations in Brazil are considered extremely important, considering the populations that are still invisible in this connection. Making the health information of these populations visible is a first step towards thinking about a differentiated paradigm of indigenous health in the structure of the Government Unified Health System in cities (and not only in indigenous territories), which considers the complex context where ethnic identity interacts with the health conditions experienced in the socioeconomic context of the process of participation in the market economy and residence in the city. It is about the utopia of a paradigm that overcomes the assimilationist ideal of loss of indigenous identity in those who inhabit the city; that does not implement the massification of health practices, especially in those populations, and that, as a two-way avenue in the process of acculturation, be open to new learning of the indigenous knowledge and culture.

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