# 36 - ANTHROPOMETRIC MEASURES OF PRE-ADOLESCENTS INDIAN AND NON-INDIAN

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## INTRODUCTION

The bodily composition is linked to personal and ethical questions and distinguishes an individual from his/her group, as well as an entire group from others. The personalization of the body, according to Ribeiro (1987), follows the Indian child in its whole life cycle.

Gomes (1991) notices that the process of politics-cultural compulsion which led Indian people to transform their cultures and lives, as means of adaptation and survival , is what has been agreed to be called acculturation; therefore, a reality different from that they lived previously.

Regarding to the following of students' growth and development, it is a relevant matter to know whether there is or not significant difference between Indians pre-adolescents and non-Indians, as to the variables weight, stature, diameter, circumferences and skin folds.

**Problem**: The cultural adaptation of Indians students from Elementary/Primary School, at Dourados Indian villages, is supposed to cause overweight on these pre-adolescents, comparing with non-Indians from others schools of the Municipal Education Network of Dourados/MS.

**Objective**: Verifying if there is significant difference amid pre-adolescents Indians and non-Indians, concerning the variables: weight, height, diameter, circumferences and skin folds.

**Justification**: Researches on obesity show up an increasingly spread of overweight victims, what is influenced by the lack of concern with lifestyles based on nutritional education and fitness. The obesity reaches people of the most varied ages; once the fat cells number increases, in the youth ages, remaining constant during the matureness of the individual.

Considering that the Indian Reservation of Dourados is situated on the vicinity of the city, and the cultural interactions resulting from this proximity as well, including the Indians attendance at universities, the concern and interest in investigating whether their customs resemble or not the non-Indians pre-adolescents habits' have arisen, once Brazilian child, according to Matsudo (1996), spend today more time in front of a TV set than an American child, routine of which result muscle flaccidness, due to the inactivity.

Amongst the variables of growth, the distinguishing characteristics between the genders and ages are significant to the substantiation of the influence of genetic, environmental, behavioral and socio-economic determiners. Man and woman Indians from the forest neither diet nor do standardized physical exercises. Yet, they present body mass constitution incomparably better than the civilized persons, as Paciornick (1985), in Guedes (1998).

In addition to the individual differences which play important roles, as for the mechanisms of consumption and energy demand , the information associated to the corporal constitution become fundamentally important to the orientation, in programs of body weight control and reliable assistance, regarding the nutritional advising and the prescription of physical exercises.

## LITERATURE REVIEW

The man's curiosity in measuring his body is ancient; however, its systematization is modern. The ratios between some part of and the entire body have been registered by the Egyptians the upper limbs would be equivalent to 'eight middle fingers'. Even in the Classical Antiquity, it was used to nominee an athlete's physical profile with greater probability of winning the Olympics. Presently, they are countless standards of anthropometric points and their uses in measure (CARNIVAL, 2002).

Hence, it is necessary to settle on the main anthropometric points at performing anthropometric measures in Physical Education area. The measurement of weight, height, circumferences and diameters are expected to be in correlation with the measures of skin folds, in order to get consistent subsidies in terms of corporal composition assessment. The thicknesses of skin folds as indicators of approximately 50% out of the total body fat amount are made up of subcutaneous tissues, indicating the fat located in that part of the body.

The number of adipose cells increases in the younger ages, remaining constant during the maturity. Guedes (1997) mentions longitudinal studies which were carried out with animals, by Hirsch & Han (1969), and confirmed by Oscai *et als*. (1974) and Stiles *et als*. (1975). It seems to be possible to conclude that, in adults, the reduction of the corporal fat amount is resulted from the depletion of the fatty-cells lipid content, without changing the cells quantity.

Once a determined number of adipose cells is reached it is no more possible to diminish them. Similar transversal and longitudinal studies, involving children and adolescents, from the ages of 4 months to 19 years, have shown different quantities of corporal fat. The endocrine system is one of which "*is closely related to the growth, bodily composition and motor performance of children and adolescents*".

Eckert (1993) cites a more comprehensive method, of Sheldon and Cobs (1940), for establishing types of bodies that are sorted out by the somatic characteristics of adult male individuals: the first, endomorphic, is featured by the prevalence of the viscera; in the second type, mesomorphic, there is prominence of bone, muscular and connective tissues that characterize sturdy and firm body-build and rectangular profile; and the third type, ectomorphic, is the kind remarked by the central nervous system, the linear and frail body, and presents relatively great areas.

Concerning the frightening increase of people that present overweight, as well as obesity, it became also an illness in Brazil, from the clinical point of view. Prefacing Halpern and Mancini's book (2002), Lotufo quotes a study done with Americans on risks of general mortality. These risks were directly associated to values of the body mass index, with greater impact on the youths.

In fact, when it is evaluated, the body fat is defined through the finding of 20% or more of fat excess, above the total corporal weight in men and 30%, in women. The variation of body fat for men and women within the range of 17 to 50 years-old is nearly 5%. When the fat surpasses the average value of 5%, then, the values will be considered exceeding.

**History of Food in Brazil**

Writing about the feeding in Brazil, Cascudo (1983) mention the Ecclesiastes: all man's work is for his mouth [...] the stomach is dominator, imperious, not deferrable. It must not have been difficult to the Portuguese, newcomer in Brazil, to get used to the cassava flour, maize, pods and fishes, and also to the great variety of tropical fruits, chestnut, nut-like seeds and heart of palm, besides the salt, sugar cane, cattle, coconut palms, sweet banana trees, citric fruits, mango trees and spices. Ornellas (2003) refers to Manoel Botelho de Oliveira, who recited in verse the fecundity of Brazilian land: I have explained about the fruits and vegetables that go Portugal pretty much jealousy.

In Ornellas (2003), the Jesuit Fernão Cardim reports the victuals wealth: Bahia is a land plentiful of provisions, beef, hog, poultry, sheep and other breeding. With pineapples, pacobas (banana) and many other fruits, it did not lack nor even eggplant, lettuces, borecoles and kales, pumpkins. The Portuguese have brought to Brazil over ten thousand slaves from Guinea and Angola, and vegetables, as well, that could be cultivated in tropical region, like the palm tree, okra, onion and garlic.

The learning with the Arabs about the organized agriculture: basic food of the Natives, the cultivation of cassava has delighted the Portuguese and Africans. The legumes were also appreciated by Spanish and Portuguese. On shortage of meat, the common bean is a food of elevated satiety rate, what made it being included into Brazilian daily meals. The Africans used to eat pap of millet and seeds pounded in pestle, in addition to milled rice, mentioned in the shopping lists of 1622 to 1653. The coconut rice up to then exclusive of the Negro cook has already been mentioned.

During the Brazil Empire, D. João VI, when fleeing from Portugal, brought specialized cooks with him. Later, he ordered to hire a French chef, so as to meet his demands, such as always having deboned chickens in his pouch to eat wherever he went to. At his banquets, with great abundance of repast, around 120 people by feast, it was used to serve fowl, turkey hens, poult, rabbit, heifer, pork, loin of cow, larded partridges, Moorish doves, hares, young skinned hares, tongue of sheep, sausages, ham, fricassee, patties and diverse quiches, sweets and many species of fruit.

Comprised of three different ethnic and cultural origins, after three centuries, the nourishment of Brazilian people were based on simple preparations of cassava flour, farofa (*dried mix of manioc or maize flour prepared with butter, smoked meat and spices*), tutu (*consistent mixture of bean, flour and seasoning*), pirão (*meat, poultry or fish broth with cassava flour*), fubá (*fine corn meal*) and angu (*corn meal boiled in water with some meat*), beans, rice.

In the Independent Brazil, despite of the September, 7, shipments of European delicacies as cheeses, pickles, candies, and French wines continued to arrive. It had started, then, the cultivation of European fruits: apple, plum, peach, grape and pear, for example, on the Itajaí Valley, where it was cultivated citric varieties, like tangerine, and later, greenery and legumes (potato, turnip, beet, cabbage, cauliflower etc.).

The contribution of Brazil Republic, according to Cascudo (1983), were the official banquets, with menu and French service, in which Presidency and vice-presidency candidates were chosen in conventions. One of the major celebrations of our feeding is the lack of greens in the diets (Magalhães in Ornellas, 2003).

In Santa Catarina and Rio Grande do Sul States, the gastronomy is remarked by the cassava flour and charque (*sun-dried salty beef*), inward the State; pirão and fish, along the seashore; pinhão, beans and rice; southward, the prevalence are beef (barbecue, T-bone, rib) grilled and fried chicken, meat of wild animals, farofa and yerba mate (*chimarrão*). From North to South, it is necessary to rehab the national culinary and teach people how to taste their dishes.

Staden (1998) says that God is a redeemer in the misfortunes. In his prays, begging for His mercies, the sea-storms, winds, thunders and lightning evanesced. The Tupinambá had set fire to Bertioga, taking the other Natives as prisoners, or else, cutting them in pieces and distributing their flesh for food. “The Guiana were enemies of every others and used to eat everyone whom they imprisoned”.

The other tribes used to behave the same way. In their perambulations through the forest, the Guiana were skillful hunters with bow and arrow, and spears and traps too. These populations used to eat honey, since there was a great deal of this food on the hills, and were able in imitating birds, in order to ambush and hunt them more easily. To make fire, they got lops and parched twigs for baking the meat they were going to eat. These tribes, hatred-full, in contrast to others, often slashed still living enemies' arms and legs, for eating them later.

With acute eyes to distinguish fish at any point of a river surface, they threw an arrow at its direction, and reaching the target they jumped into the water and dived deep up to 6 fathoms to catch it. Who got lots of fish were expected to give one part to others. The fish were roasted on fire, smashed and kneaded. This way, it would be preserved for longer time and could be eaten with cassava meal.

Instead of bread, the cassava roots were grinded and dried in pottery. After bolting it, the Indians produced flour from the cassava for baking flat cakes, named *beiju*. Meat and fish were also cooked in similar way, resulting in durable flour. According to Staden (1998), they used to eat meat and fish meals with cassava flour. Amongst Indian peoples, even today, many tribes do not use salt. But some of them knew the salt by trading with Frenchmen.

The Carajá tribe, whose territory is far from the sea, drew out salt from palm tree. However, they stated that who got used to eat much salt would not have long life. Seeing the manner they 'made' salt, Staden, himself, helped them. He reported Indians chopped palm trees into logs, which they burnt together with desiccated wood, until everything was reduced to a gray powder. This residue was boiled, then, being transformed in barrela (kind of lixivium), from which it was separated something similar to salt.

By cooking meat or fish, they took the food off of the bouillon and the pot, when it was almost ready, and prepared a watery pap with it. Some put in it green pepper, and used to drink the pap in calabash pots. Fish and other meats were smoke-cured about four spans above the intense fire, until the meat was dried out. When they wanted to eat it, they cooked it again a dish called moquém.

The enchanted beverages were made by the women in great ceramic pans, filled with cassava roots. Over-boiled, the cassava was drawn out of the pans and placed in pots, for cooling a little. The young women seated and masticated the manioc, returning it to special pots. This very cassava were put back into a pan full of water and heated once again. The special pots which had the same use of the barrels for aging wine and beer were then entrenched well-closed in the ground to the half.

With the fermentation, this brew became strong-tasting and, two days afterward, the Indians drank it, going drunk. It was a thick and nutritive drink. Each hut prepared its own beverage, once a month. Everyone met up with themselves and walked to stop at the first hut, drinking until the beverage was finished. Some Indians used to sing and dance at the same place they drank, getting rid of their waters. While drinking, they danced around the campfire, screaming and blowing their instruments.

Drunk, they yelled in such a way Staden classified as dreadful, notwithstanding, quarrels was rare. Helpful, when someone had additional food, they handed a little to whom had less. In the low Amazon, about 200.000 Indians that survived until the Cabanagem, and bestowed their workforce to collect forest goods, as cacao seeds, sarsaparilla, cinnamon, turtle eggs etc, living in a relatively steady way with the hardly any Luso-Brazilians, in the existing few villages.

In Mato Grosso do Sul, before the white colonization, the lands that belong to Dourados City today were inhabited by Terena and Kaiwá tribes. Yet, their descendants can be found in the Indian reservation, on the verges of the city. The Kaiwá worked at yerba mate crops. In the parties, it was used beverages of low alcoholic grade, made of maize. Today, it is made up with sugar cane fermented juice, blended with maize or potato (GRESSLER, 1995)

**Methodology: Characterization of the locality**

On December, 20, 1935, Dourados City was promoted to the administrative division of municipal district, with an area of 4.096,9 square kilometers, through the State Decree NO. 30. Nowadays, its population is estimated in 173.872 inhabitants (IBGE, 2003). The city attracted plenty of Brazilian migrants and foreigner immigrants, mainly, Japanese, who have remarkably dedicated to the cultivation of coffee.

Along with the economic activities, mostly agribusinesses derived from agriculture and cattle breeding, which enhance the commerce and industry, Dourados is also a service supplier center, noticeably, on public utilities under responsibility of the State and Federal Agencies public healthcare and education , as well as civil engineering, agricultural planning, finance (bank), trading of cereals and agriculture machinery (GRESSLER, 1995).

The present study has been started under the official license of the National Indian Foundation (FUNAI), and the directors of the schools and officials, in order to know the number of children that would be drawn. Besides, it has been made verbal invitations to the parents of the students, aged between 8 and 11 years old, during the pedagogical meetings that happened in the schools. The approach in these reunions was the importance of knowing about the health concerns, especially, on what is consumed in the meals, and also the habit of practicing physical activities.

After the explanation, it was distributed an acceptance letter, authorizing the research to start, considering that the children are underage. The letter, signed by one of the parents, emphasizes the question of the secrecy, as for the publication of data without subject's name identification.

**Sample definition**

The study was composed of 50 pre-adolescents Indians and 50 non-Indians, from the villages and Dourados City, with ages between 8 and 12 years. The scheme of data collection was done in the following way:

Amid the Native population, it has been drafted one student per genre, age and school. Concerning the population of non-Indians, five schools were firstly drafted, from which the researches also chose through drawings one student by genre and age, summoning 50 pre-adolescents Indians and 50 non-Indians.

The analytical study designs are comprised of the interfering variables: race, genre and age; and dependent variables: weight, height, diameter, circumference and skin folds. The data of the variables have been tabulated and analyzed through descriptive or exploratory techniques of statistical analysis.

The hypothesis was detached-tested within the problems and objective, through the test *t* of Student, with bilateral significance for average differences and chi-square for categorical variables.

**Measure Protocols and Assessment**

For achievement of the measures, it was used one assessment form that contains data related to age, genre, race, body weight, height, circumference, diameter, of Tanner(1985) and corporal constitution of Boileau *et al.*, cited by Petroski (1999),.

Body weight: material a100-gram-precision scale. Protocol the person in evaluation should stand with the back turned to the grades of the scale, with his/her feet on the center of the scale platform, upright and looking at fixed point ahead. He / She must wear the minimum clothes possible. It is carried out a single measurement.

Height: material centimeter and tenth-centimeter-graduated measuring tape fixed on the wall, and a square ruler.

Arm, abdominal, gluteus and leg circumferences: Material a flexible measuring tape with the precision of 0.1 cm. Diameters: humeral bi-epicondyle, femoral bi-condyle, radius-cubital bi-styloid (fist). The results are depicted in centimeters, at the precision of 0.1 cm. Material caliper rule, of several sizes, depending on the segment to be measured.

Corporal composition: tricipital and subscapular. Material: short-shaft caliper for skin folds (Luger). It was utilized specific equations, for predicting values of corporal density of tricipital and subscapular, in accordance with the equations of Boileau *et al.*, cited by Petroski (1999), which determines the percentage of fat for children, Boys % G= 1.35(TR + SE) 0.012 (TR + SE)$^2$ -4.4 and, Girls % G= 1.35(TR + SE) 0.012 (TR + SE)$^2$ -2.4.

To defining the weight excess and obesity, it was used the classifications of the body mass index (BMI). Above of 25 kg/m², it is considered excess of weight, and above of 30 kg/m², obesity. The overweight can be also defined by another index: between 110% and 120%, and obesity, for more than 120%.

**Analysis and Interpretation of the Results**

The data of the variables have been tabulated and analyzed by means of descriptive or exploratory techniques of statistic analysis, being the hypotheses tested through test *t* of Student, with bilateral significance for differences of averages and ?$^2$ for the categorical variables (qualitative). The statistical treatment makes it possible to verify the data that are demonstrated in the illustrations, as following:

**Table 01: Frequency by Ethnos and Genre of the partakers and percentage.**

| Ethnic group | Frequency | | | % |
|---|---|---|---|---|
| | Male | Female | Total | |
| **non-Indian** | 28 | 22 | 50 | 50.0 |
| **Indian** | 22 | 28 | 50 | 50.0 |
| Total | 50 | 50 | 100 | 100.0 |

The data of Table 01 are related to the sampling composition, which is equivalent to 50 pre-adolescents in each category; that is, 50% for both ethnos of the study.

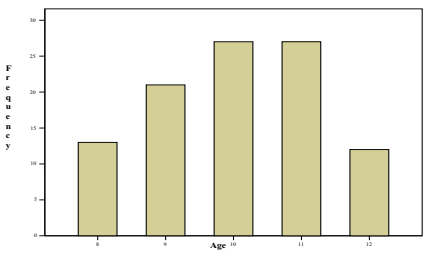


**Figure 01: Age frequency of the Indians and non-Indians pre-adolescents of Dourados-MS.**

In the age group of 8 years old, 13 pre-adolescents have taken part of the study, corresponding to 13% out of the sample; at the age of 9, 21 students participated, or 21% out of the sample; referring the of 10 years, the study had 27 pre-adolescents, or 27%; the same percentage of the 11-year-old participants, 27 students; and representing 12% of the sample, there were 12 students at the age of 12, as shown in the Figure 01.

**Table 2. Measures of weight, height and circumferences by Ethnos and significance statistic.**

| Measures | Ethnos | | Average | Standard Deviation | t (p) | Sig |
|---|---|---|---|---|---|---|
| Weight [kg] | Non-Indian | 0 | 34.75 | 7.850 | 1.262 (0.210) | Ns |
| | Indian | 0 | 33.05 | 5.402 | | |
| Height [m] | Non-Indian | 0 | 1.41 | 0.089 | 1.45 (0.149) | Ns |
| | Indian | 0 | 1.39 | 0.073 | | |
| Arm Circumference [cm] | Non-Indian | 0 | 21.84 | 2.660 | 0.92 (0.360) | Ns |
| | Indian | 0 | 21.42 | 1.804 | | |
| Gluteus Circumference [cm] | Non-Indian | 0 | 71.66 | 8.353 | 0.66 (0.510) | Ns |
| | Indian | 0 | 70.31 | 11.764 | | |
| Abdominal Circumference [cm] | Non-Indian | 0 | 63.87 | 12.126 | -0.85 (0.400) | Ns |
| | Indian | 0 | 65.57 | 7.394 | | |
| Leg Circumference [cm] | Non-Indian | 0 | 39.80 | 8.706 | -0.07 (0.943) | Ns |
| | Indian | 0 | 39.91 | 6.863 | | |

The average weight for non-Indians is 34.37 kg; for Indians, 33.05 kg. This difference did not present statistical significance through the test *t* of Student, ($t_{(98)} = 1.26$; $p = 0.21$). The height average of the non-Indians is 1.41m, and the Indians', 1.39m. In the differences of height measures the test ($t_{(98)} = 1.45$; $p = 0.149$) has demonstrated not-significant.

As to the circumferences of the pre-adolescents, the arms' average is 21.84 cm, among the non-Indian, and 21.42 cm, among Indian; about the abdomen, the non-Indian's average is 63.87cm, and 65.57 cm, among Indians; the median circumferences of the gluteus are 71.66 cm, measured from non-Indians, and 70.31 cm, from Indians; and the legs' circumferences are 39.80 cm, non-Indians, and 39.91 cm, for Indians. The result of the Test *t* of Student did not present statistical significance in any of these measures, as it may be seen through the data on the two columns at right of Table 2.

**Table 3. Diameter Measures by Ethnos and statistical significance.**

| Measures | Ethnic Group | | Average | Standard Deviation | t (p) | Sig. |
|---|---|---|---|---|---|---|
| DiaBiEUm [cm] | Non-Indian | 0 | 6.64 | 6.679 | 0.14 (0.887) | N s |
| | Indian | 0 | 6.48 | 3.923 | | |
| DiBiRcPun [cm] | Non-Indian | 0 | 4.64 | 2.030 | -1.23 (0.222) | N s |
| | Indian | 0 | 5.27 | 2.988 | | |
| DiBCFem [cm] | Non-Indian | 0 | 9.00 | 5.674 | -0.39 (0.695) | N s |
| | Indian | 0 | 9.49 | 6.695 | | |

Regarding the measures of the diameters, it was verified that the average diameters between Indians and non-Indians did not differ considerably, as it is shown through the data presented on Table 3.

The sum of the tricipital and sub-scapular skin folds, in accordance with Boileau *et al*. Equation, cited by Petroski (1999), determines the fat percentage in children, Boys % G = 1.35(TR + SE) 0.012 $(TR + SE)^2$ -4.4 and, Girls % G = 1.35(TR + SE) 0.012 $(TR + SE)^2$ -2.4.

**Table 4. Fat percentage of tricipital and subescapular skin folds.**

| | **Ethnic Group (n)** | **Non-Indian (49)** | **Indian (50)** | **Significance** |
|---|---|---|---|---|
| ***Measures*** | ***Gender*** | ***Average (dp)(n)*** | ***Average (dp)(n)*** | ***t (p)*** |
| Percent of Fat | Masculine(49) | 16.56(6.52)(27) | 12.21 (3.51)(22) | 2.977 (0.005)[1] |
| | Feminine(50) | 19.83(6.86)(22) | 18.01 (4.90)(28) | 1.094 (0.280) |
| | Total | 18.02(6.80)(49) | 15.45 (5.19)(50) | 2.109 (0.038)[1] |

**[1] Do not consider equal variances**

It may be concluded that the fat percentage of the tricipital and sub-scapular skin folds is significantly higher ($t_{(90)} = 2.109$; $p = 0.038$), in non-Indians, when compared with the ones of individuals from the Indian ethnos. To the masculine gender it was significant ($t_{(41)} = 2.977$; $p = 0.005$). However, this difference was not significant ($t_{(48)} = 1.094$; $p = 0.280$), in respect of the feminine gender.

**Table 5. Values obtained to the fat percentage sorting, by gender and ethnos of the students surveyed.**

| Fat Classification | Gender | | | | | |
|---|---|---|---|---|---|---|
| | Masculine | | Feminine | | | |
| | Ethnic Group | | Ethnic Group | | **Total** | |
| | non-Indian | Indian | non-Indian | Indian | non-Indian | Indian |
| Very low | 0 | 0 | 2 | 2 | **2** | **2** |
| Low | 3 | 7 | 4 | 8 | **7** | **15** |
| Optimum | 18 | 14 | 11 | 16 | **29** | **30** |
| Moderate High | 3 | 0 | 3 | 1 | **6** | **1** |
| High | 3 | 0 | 2 | 1 | **5** | **1** |
| Very High | 1 | 0 | 0 | 0 | **1** | **0** |
| **Total** | **28** | **21** | **22** | **28** | **50** | **49** |

*** Adaptation from Lohman, cited by Lopes (1999, p. 57)**

Concerning the classification of the fat percentage of the students partakers in the study, which is represented on Table 15, the values signalize a greater number, that is, 29 non-Indians and 30 Indians match up the class Optimum; 9 non-Indians and 17 Indians, the classes Low and Very Low; and 12 pre-adolescents non-Indian and 2 Indians' data are consistent with the classes Moderate, High and Very High of fat classification.

The option for the probabilistic sampling has, to some extent, hindered the identification of pre-adolescents with overweight on both ethnic groups, considering that it was observed, during the visits at the schools chosen, a significant number of students clearly over-weighted.

A broader study should be undertaken by the teachers themselves, in the schools, what is believed to be done at the beginning and at the end of the school-year, as means of monitoring the children's growth.

**CONCLUSION**

If the problematic arisen in this study questioned whether the cultural adaptation that surrounds the Indians of Dourados Villages could cause or not overweight in their pre-adolescents, comparing to non-Indians, we may conclude that the finds disclosed similarities between the two groups, differing in some variables investigated. The statistical tests revealed no discrepant data, considering the ethnic groups, given that it can be acknowledged as being true the hypothesis which supposed the weights of Indians and non-Indians pre-adolescents to be similar. Therefore, this hypothesis is ratified through the study.

It has been verified that 74% out of the adolescents, the great majority, presented little weight, and merely 26% presented normal weight. Thus, the politic-cultural compulsion process that lead the Indian peoples to transform their cultures and lives, as a way of adaptation and survival, is a reality different from that they lived before, adapting their lifestyle to the non-Indians pre-adolescents.

**Key words:** Anthropometric Measures, Pre-adolescents. Indians and non-Indians.

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**ANTHROPOMETRIC MEASURES OF PRE-ADOLESCENTS INDIAN AND NON-INDIAN**

**ABSTRACT**

The cultural adjustment of the Indians of Dourados Villages causes overweight in their pre-adolescents, when compared to the non-Indians, is the question that created the problematic which has been stipulated to run this study, guided by the general objective of verifying whether there is significant difference between Indians and non-Indian pre-adolescents, in relation to the variables weight, height, diameter, circumference and skin folds, in a sample comprised of 50 pre-adolescents Indians from municipal schools, in the Indian villages of Dourados, Mato Grosso do Sul, and 50 non-Indians also from municipal schools of Dourados City, aged between 6 and 12 years old, respectively. The sort of sampling utilized is the probabilistic, and the data of the variables were tabulated and analyzed by descriptive or exploratory techniques of statistic analysis. The hypothesis was tested through the Test *t* of Student, and $?^2$ for the variables of category. The average weight of non-Indians is 75.77lbs (34.37 Kg) and for Indians is 72.86lbs (33.05 Kg). This difference did not present statistical significance by the Test t of student, ($t_{(98)}$= 1,26; p = 0,21). The height average of non-Indians is 1.41m and the Indians' is 1.39 m. Concerning the differences of height measures, the test ($t_{(98)}$ = 1.45; p = 0.149) has demonstrated not significant. As for the circumferences of the pre-adolescents, the average of the arms measures is 21.84 cm, took from non-Indians, and 21.42 cm, from Indians; the values for abdomen are 63.87 cm (non-Indians) and 65.57 cm (Indians); gluteus, 71.66 cm, of non-Indians, and 70.31 cm, of Indians; legs, 39.80 cm, non-Indians, and 39.91, Indians. The result of the Test *t* of Student did not show statistical significance to any of these measures. It may be asserted that the fat percentage of the tricipital and sub-scapular skin folds is significantly higher ($t_{(90)}$ = 2, 109; p = 0,038) in non-Indians, by comparing with the Indian ethnos and concerning the masculine genre it was significant ($t_{(41)}$ = 2, 977; p = 0,005), but in relation to the feminine genre, it was not significant ($t_{(48)}$ = 1,094; p = 0,280). The option for the probabilistic sampling has somewhat hindered the identification of over-weighted pre-adolescents in both ethnic groups, once it was observed at the schools drafted, during the visits, a noticeable number of students clearly over-weighted. That is why a broader study should be done in the schools, by the very teachers of Physical Education, at the beginning and at the end of the school year, as suggestion of monitoring the students' growth.

Key words: Anthropometric Measures, Pre-adolescents. Indians and non-Indians.

**RÉSUMÉ**

L'adaptation culturelle des indigènes des villages Dourados provoque du poids excessif dans leurs pré-adolescentes, en se comparant avec les non-indigènes, c'est la question qu'il a produit la problématique stipulée pour la réalisation de cette étude, guidée par l'objectif général se vérifier s'existe différence significative entre pré-adolescentes Indiens et non-Indiens, concernant le

changeants poids, hauteur, diamètre, circonférence et pli cutanés, dans un échantillon composé par 50 pré-adolescentes Indiens des villages Dourados/MS et de 50 non-Indiens des écoles municipales de la ville Dourados, avec des âges entre 8 et 12 ans, respectivement. Le type d'échantillonnage utilisé est le probabiliste. Les données des variables ont été présentées sous forme de tableaux et analysés par des techniques descriptives ou des exploratórias d'analyse statistique. L'hypothèse a été expérimentée à travers l'essai t de Student, et $?^2$ pour variables catégoriques. Le poids moyen pour non-Indiens est de 34.37 kg et pour d'Indiens de 33.05 kg. Cette différence n'a pas présenté importance statistique par l'essai t de Student, ($t_{(98)}$ = 1.26 ; p = 0.21). La moyenne de la hauteur de non-Indiens est 1,41m et d'Indiens 1.39 m. Dans les différences de mesures de hauteur, l'essai ($t_{(98)}$ = 1.45 ; p = 0.149) a démontré non significatif. Combien aux circonférences de pré-adolescentes, la moyenne pour bras est de 21.84 cm, pour des non-Indiens et 21.42 cm pour Indiens; pour abdome 63.87 cm, nous non-Indiens, et 65.57 cm pour Indiens; glúteos, 71.66 cm, pour des non-Indiens, et 70.31 cm pour Indiens; jambes, 39.80 cm, pour des não-índios, et 39.91 cm pour Indiens. Le résultat de l'essai t de Student n'a pas présenté importance statistique dans aucune de ces mesures. Les diâmetros moyennes entre des Indiens et des non-Indiens n'a pas différé significativement. Il se peut conclure que le pourcentage de graisse des pli tricipital et de la subescapular est significativement plus grand (t (90) = 2, 109 ; p = 0.038), dans non des Indiens quand comparé à ce de l'ethnie indigène, pour le type masculin est significatif (t (41) = 2, 977 ; p = 0.005) Néanmoins, cette différence dans le type féminin, n'a pas été significatif (t (48) = 1.094 ; p = 0.280).

Motsclés: Mesures Anthropométriques. Pré-adolescentes. Indiens et non-Indiens.

**RESUMEN**

La adaptación cultural de los indios de las aldeas de Dourados provoca exceso de peso en sus preadolescentes, comparándose con los no-indios, es la pregunta que generó el problemático estipulado para la realización de este estudio, dirigida para el objetivo general de si para verificar si existe la diferencia significativa entre los indios preadolescentes y los no-indios, en lo referente a los as variables altura, peso, al diámetro, a la circunferencia cutánea y a los dobleces, en una muestra compuesta para 50 indios preadolescentes de las aldeas del Dourados/MS y de 50 no-indios de las escuelas municipales de la ciudad de Dourados, con edades entre 8 y 12 años, respectivamente. El tipo usado de muestreo es el probabilístico. Los datos de las variables habían sido tabulados y analizados para las técnicas descriptivas o exploratorias de estadística del análisis. La hipótesis fue probada a través de la prueba t del Student, y del $?^2$ para las variables categórica. El peso medio para los no-indios está de 34.37 kilogramos y para indios de 33.05 kilogramos. Esta diferencia no presentó la estadística de la significación para la prueba t del Student, ($t_{(98)}$ = 1.26; p = 0.21). El promedio de la altura de no-indios es el 1,41m y de los indios 1.39m. En las diferencias de medidas de altura, prueba ($t_{(98)}$ = 1.45; p = 0.149) no significativos demostrada. Cuánto a las circunferencias de los preadolescentes, el promedio para los brazos es de 21.84 centímetros, para los no-indios y 21.42 centímetros para los indios; para el abdome 63.87 centímetros, en los no-indios, y 65.57 centímetros para los indios; glúteos, 71.66 centímetros, para los no-indios, y 70.31 centímetros para los indios; piernas, 39.80 centímetros, para los no-indios, y 39.91 centímetros para los indios. El resultado de la prueba t del Student no presentó estadística de la significación en ningunas de estas medidas. Los diametros medios entre los indios y los no-indios no diferenciaron perceptiblemente. Puede ser concluido que el porcentaje de la grasa de los dobleces tricipital y sea subescapular es perceptiblemente más grande ($t_{(90)}$ = 2,109; p = 0.038), en no indios en comparación con el que está del etnia aborigen, porque la clase masculina eran significativos ($t_{(41)}$ = 2, 977; p = 0.005). Sin embargo, esta diferencia en la clase femenina, no era significativo ($t_{(48)}$ = 1.094; p = 0.280).

Palabra-llave: Medidas de Antropométricas. Preadolescentes. Indios y no-indios.

**RESUMO**

A adaptação cultural dos indígenas das aldeias de Dourados provoca sobrepeso em seus pré-adolescentes, comparando-se com os não-indígenas, é a pergunta que gerou a problemática estipulada para a realização deste estudo, norteado pelo objetivo geral de se verificar se existe diferença significativa entre pré-adolescentes índios e não-índios, em relação às variáveis peso, altura, diâmetro, circunferência e dobras cutâneas, em uma amostra composta por 50 pré-adolescentes índios das aldeias de Dourados MSe 50 não-índios das escolas municipais da cidade de Dourados, com idades entre 8 e 12 anos, respectivamente. O tipo de amostragem utilizado é o probabilístico. Os dados das variáveis foram tabulados e analisados por técnicas descritivas ou exploratórias de análise estatística. A hipótese foi testada através do teste *t* de Student, e $?^2$ para variáveis categóricas. O peso médio para não-índios é de 34,37 kg e para índios de 33,05 kg. Essa diferença não apresentou significância estatística pelo teste *t* de Student, ($t_{(98)}$ = 1,26; p = 0,21). A média da altura de não-índios é 1,41m e de índios 1,39 m. Nas diferenças de medidas de altura, o teste ($t_{(98)}$ = 1,45; p = 0,149) demonstrou não significativo. Quanto às circunferências dos pré-adolescentes, a média para braços é de 21,84 cm, para não-índios e 21,42 cm para índios; para abdome 63,87 cm, nos não-índios, e 65,57 cm para índios; glúteos, 71,66 cm, para não-índios, e 70,31 cm para índios; pernas, 39,80 cm, para não-índios, e 39,91 cm para índios. O resultado do teste *t* de Student não apresentou significância estatística em nenhuma dessas medidas. Os diâmetros médios entre índios e não-índios não diferiu significativamente. Pode-se concluir que o percentual de gordura das dobras tricipital e subescapular é significativamente maior ($t_{(90)}$ = 2, 109; p = 0,038), em não índios quando comparado ao da etnia indígena, para o gênero masculino foi significativa ($t_{(41)}$ = 2, 977; p = 0,005). No entanto, essa diferença no gênero feminino não foi significativa ($t_{(48)}$ = 1,094; p = 0,280).

Palavras-chave: Medidas Antropométricas. Pré-adolescentes. Índios e não-índios.