






# Prevalence of breastfeeding among indigenous peoples of the Triple Frontier: Brazil, Argentina and Paraguay

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## Abstract

*Objectives: to verify the prevalence of breastfeeding and the children's nutritional status of indigenous origin up to two years of age in the triple frontier region: Brazil, Argentina and Paraguay.*

*Methods: data from the Sistema de Vigilância Nutricional e Alimentar Indígena (Indigenous Food and Nutrition Surveillance System) were analyzed, being a cross-sectional and descriptive study. The survey was carried out in 2018, with data referring to 2017. Registrations of indigenous children of both sexes, aged zero to two years old were included. Data were extracted from the indigenous children's follow-up map. The prevalence of breastfeeding and complementary feeding was evaluated.*

*Results: the prevalence of exclusive breastfeeding in children under six months of age was 93.4% and complementary breastfeeding was 6.5%. The prevalence of complementary breastfeeding after six months was 71.6% and exclusive breastfeeding after six months was 28.3%. Regarding social benefits, 30.3% of the families accumulated two types of social benefits.*

*Conclusions: the prevalence of exclusive breastfeeding was high and surpassed the national prevalence in the first semester of life, there was no early weaning.*

**Key words** Breastfeeding, Indigenous health services, Weaning, Public health



## Introduction

Breastmilk is an appropriate food for infants to develop and have a healthy growth. The recommendation is that the mother should breastfeed for two years or more, and exclusively in the first six months of life.<sup>1</sup> There are no benefits in introducing food before six months of age; on the contrary, there are significant losses to the child's health, such as increased diarrhea, dehydration, and susceptibility to respiratory diseases.<sup>1</sup>

The promotion, protection, and support of breastfeeding (BF) is a global concern and strategies have been created for the success of this practice; however, there are still significant variations in the prevalence of BF around the world.<sup>2</sup> The recommendation for the practice of breastfeeding is worldwide, regardless of ethnic or social origin, and is unique in children's health in developing countries.<sup>2</sup>

Like other children around the world, indigenous children are affected by diseases resulting from early weaning.<sup>3</sup> Specifically in Brazil, due to unfavorable social health determinants, the indigenous population has been exposed to health risks.

The accelerated process of sociocultural, economical changes and contact with urban society have direct repercussions on the indigenous ethnic group's eating habits and nutritional status.<sup>4</sup> Due to the abandonment of subsistence activities, reduced food variability, and dependence on industrialized products, this population is highly vulnerable to protein-energy malnutrition and other nutritional deficiencies, especially in children, with the aggravating prevalence of infectious and parasitic diseases.<sup>5</sup>

BF, as a social practice, has undergone changes over time. Due to its complexity and importance for maternal and child health, it constantly requires new approaches on the subject in order to understand the impacts of different social and educational contexts on the practice.<sup>4</sup>

They draw attention to the lack of studies and official data regarding Brazilian indigenous populations, giving them "[...] a harmful demographic and epidemiological invisibility".<sup>6</sup> In 2018, the Ministry of Health defined the Agenda Nacional de Prioridades de Pesquisa (National Research Priorities Agenda), present in two editions of the agenda, consecutively. The indigenous peoples' health is the first topic addressed in the health research sub-agenda. Within this theme the first topic addressed were nutritional and food surveys: identifying eating habits, malnutrition, obesity, anemia, and hypovitaminosis A. In addition to the fact that the theme regarding breastfeeding is little known, the subject is a priority defined by the Ministry of Health, cited in both editions in the document.<sup>7</sup>

The "*I Inquérito Nacional de Saúde e Nutrição dos Povos Indígenas*" (1<sup>st</sup> National Survey on Health and Nutrition of Indigenous Peoples) highlighted the poor

sanitation conditions in the villages, the high prevalence of chronic malnutrition, anemia, diarrhea, and acute respiratory infections in children, and the emergence of chronic non-communicable diseases in women.<sup>8</sup> Compared to other children, indigenous children are more likely to be below the poverty line, and that just belonging to indigenous people puts them in a situation of greater vulnerability.<sup>9-10</sup>

Considering the diverse health realities reflected in the health indicators, this research was designed to contribute to the generation of evidence and consequently to public policies and strategies to reduce child's malnutrition among indigenous people.<sup>11</sup>

In this direction, it is essential to know the practices of breastfeeding and complementary feeding in the population of indigenous children. The present study aimed to verify the prevalence of breastfeeding and nutritional status of indigenous children up to two years of age in the triple frontier region: Brazil, Argentina, and Paraguay.

## Methods

Cross-sectional, descriptive study with a quantitative approach, conducted with secondary data from the database of the *Sistema de Vigilância Alimentar e Nutricional Indígena* (SISVAN-I) (Indigenous Food and Nutrition Surveillance System) of the *Distrito Sanitário de Saúde Especial Indígena* (South Coast Indigenous Special Health District). The study was conducted in 2018, with data from 2017.

The scenario of the study contemplates six cities in the state of Paraná, Brazil that has a frontier with Paraguay and Argentina, namely are: São Miguel do Iguaçu, Itaipulândia, Guaíra, Terra Roxa, Santa Helena, and Diamante do Oeste. There are a total of 17 villages located in these cities: Ocoy, TekoháAñetete, Vy'a Renda, Aty-Miri, TekohaItamara, Marangatu, Jehy, Y'hovy, Araguajy, Porã, Miri, Yvyraty Porã, Guarani, Taturi, Poha Renda, Karumbei and Nhamboete. This region is an intersection in the geographic space known as the triple frontier, with a large flow of people and goods. Approximately 120,000 inhabitants transit the region, which causes some cities to have fluctuating populations. The region is characterized by migration of population, according to the economic advantages of the cities, such as education and better living conditions, but mainly access to Brazilian health system.

The study population was composed of records of indigenous children of both sexes aged zero to two years old, registered in SISVAN-I in 2017 in the cities included in the study. Data were extracted from the indigenous children's follow-up map, collected in 2018 directly from SISVAN-I.

Inclusion criteria were records of children aged zero to two years old, who were registered in SISVAN-I in 2017 and who lived in indigenous villages. A total of 435 children participated in the study. Data were obtained from

the children's records at the following times: at 15 days of life, at two, four, six, nine, 12, 18, and 24 months, making a total of 1,766 records.

The variables of the study were divided into four groups, (i) variables related to the child's care: date of care; type of care (first visit or return), child's sex, date of birth and age; (ii) variables related to nutritional status: weight (body mass measurement) and height (height measurement); P/I classification (weight-for-age ratio defined by the World Health Organization (WHO) as appropriate weight, low weight, low weight and high weight), (iii) variables related to feeding: breastfeeding status (exclusive breastfeeding (EBF), predominant breastfeeding, complementary feeding; and no breast milk) and (iv) associated variables: government social benefits (*Bolsa Família* (receive money from the government) - currently *Auxílio Brasil*, *Programa Leite* (Milk program) and *Cesta Básica* (Food basket).

The analyses used descriptive statistics, by means of relative, absolute, and percentage frequencies of the descriptive independent variables: weight classification and social benefits. For the response of the variable of the study - exclusive breastfeeding - a binomial distribution was assumed. In all adjustments and tests, the coefficient of determination test  $R^2$  was performed, and the level of significance or variance of 5% ( $\alpha=0.05$ ) was adopted and the program used was R (R Core Team, 2018) version 3.5.3.

The project was authorized by the *Secretaria Especial de Saúde Indígena e Distrito Sanitário Interior Sul* and approved by the Ethics and Research Committee of the *Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo* and by the National Human Research Ethics Committee, CAAE number:91104918.6.0000.5393.

## Results

The present study evaluated 1,766 registrations from the nutritional attendance of 435 indigenous children from zero to two years of age, belonging to the Guaraní ethnic group. Of the total, 224 (51.49%), children were female and 211 (48.51%) were male. The Ocoí Reserve had the highest number of children ( $n=87$ ; 20.0%), followed by the Marangatu ( $n=46$ ; 10.5%) and Jehy ( $n=40$ ; 9.2%) villages.

In relation to social benefits, 30.3% of the families accumulated two types of social benefits - *Bolsa Família* and *Cesta Básica*.

Regarding weight-for-age classification according to the WHO, 1,423 (80.5%) records show children with appropriate weight for age, 38 (2.1%) with low weight, eight (0.4%) with very low weight, and nine (0.5%) with high weight. Still, 41 (2.3%) records showed that the children's families had moved or were absent at the time of weighing and 247 (13.9%) records of children who

were not weighed or were unattended, the reasons for not performing the weight measurement are unknown.

Regarding breastfeeding in the first six months of life, the prevalence of EBF was 93.4% and of complemented breastfeeding was 6.5%. Between six months and two years of life, the prevalence of EBF was 28.3% and of complemented breastfeeding was 71.6%. It is important to note that the continuity of EBF after six months of life was verified. In the seventh month of life there were 25 (53.2%) records of children on EBF, in the eighth month 12 records (27.3%), in the ninth month of life 9 records (16.1%), in the tenth month of life 9 (15.8%), eleventh month 6 (12.5%), in the twelfth 3 (5.6%), in the thirteenth 2 (3.4%), in the fourteenth 1 (1.9%), fifteenth 1 (1, 6%), sixteenth 3 (4.9%), seventeenth 1 (1.5%), eighteenth 2 (3.0%), nineteenth 1 (1.5%), twentieth there were no children in EBF, but in the twenty-first month again occurs registration in the amount of 1 (1.7%) and twelfth 1 (1.4%), finally in the last two months of analysis the EBF is totally absent.

## Discussion

A 93.4% prevalence of EBF in the first six months of life and 6.5% of complementary breastfeeding was detected, in agreement with the EBF profile practiced by certain indigenous peoples such as the Nam Qom in Argentina.<sup>12</sup> However, lower prevalence of EBF up to six months is reported in the indigenous population of Ecuador (54.4-78.2%),<sup>11,13</sup> Canada (57.9%),<sup>14</sup> and in the Brazilian Western Amazon (35.0%).

The recognition of breast milk as the best food for the child was identified in 98% of indigenous Mayan mothers in Mexico.<sup>15</sup> Although breastfeeding is considered part of the culture of indigenous peoples, it is known that colonialism negatively influenced the transmission of women's ancestral knowledge about breastfeeding.<sup>16</sup> An increasing trend in the use of formula in indigenous children's feeding has been detected over the years.<sup>15</sup> In indigenous children under six months of age, mixed breastfeeding is observed in 32.7% and the use of formula in 12.9%,<sup>13</sup> with water consumption in 42.1%, 15.8% salt food, and 11.1% typical preparations.<sup>17</sup>

There are reports in the literature that indigenous women with higher education,<sup>14</sup> older<sup>15</sup> and better economic conditions have a tendency to maintain EBF.<sup>11</sup> Regarding the route of childbirth, there is divergence among studies, with the identification of late initiation of EB in women who underwent a cesarean section compared to women who had vaginal delivery; and greater use of milk formulas,<sup>15</sup> while in other studies it is reported that cesarean section does not influence EB in indigenous women.<sup>12,15</sup> It is also reported that ethnicity can influence early weaning.<sup>17</sup>

Despite their singularities and specificities, the indigenous population of Latin America, in general, has higher rates of BF compared to the general reference population.<sup>18</sup>

According to WHO guidelines, a very good EBF indicator is considered in the range of 90 to 100%, good from 50 to 89%, fair from 12 to 49%, and poor from 0 to 11%.<sup>19</sup> This confirms the relevance and importance of recording a mean EBF prevalence above 90% and divergent from the reality in the rest of Brazil.

Regarding the main objective of this study, the prevalence of EBF was high and exceeded the national research by more than 40% in the first semester of life, in the second semester of life the prolonged or complemented EBF dominated statistically, there were no infants weaned early. Complemented breastfeeding lasted for twenty four months as recommended by the WHO, which impacted on the expression of a small number of low birth weight children, even though it was continued in an age group that is not indicated.

In our study the prevalence of EBF was higher than the prevalences observed in three nationwide surveys on the same topic. These surveys found a prevalence of 36.0% in 2006, 41.0% in 2009, and 37.1% in 2013.<sup>20</sup>

The duration of breastfeeding in indigenous women ranges from 1 to 72 months; the prevalence of complementary breastfeeding is 71.6% in the period from the sixth to the twenty-fourth month of life.<sup>15</sup> In Brazil, complementary breastfeeding in indigenous people was 53.7% in the period from 6 to 12 months and 41.8% from 12-24 months.<sup>21</sup>

It is detected that complementary feeding begins at an average of 23 weeks,<sup>12</sup> and the continuity of breastfeeding in children 6-12 months can reach 99.3%.<sup>11</sup> Weaning in certain indigenous populations can occur in a period of less than two years, with an average of 11.4 months,<sup>17</sup> while in others, it occurs around 30 months of age.<sup>12</sup>

The deficit in complementary feeding in childhood was detected in the present study, with the continuity of EBF after the sixth month of life until the twenty-fourth month in about one-third of children (28.3%). It is denoted that complementary feeding in most of these populations is compromised, with low food diversity and a significant portion of indigenous children do not receive the minimum acceptable daily food intake.<sup>18</sup> A study in Ecuador showed that only about one third (32.5%) of indigenous children received a diet with adequate food diversity.<sup>11</sup> In the Brazilian Western Amazon region it was observed that 79.2% of children aged 6 to 12 months received breast milk; however, the percentage of complementary food consumption was low.<sup>17</sup>

Complementary feeding practices in indigenous children are influenced by socioeconomic conditions, observing less diversity in the diet of children living in urban areas and in poverty and a higher probability of statutory

deficit (SD) among those who do not receive the minimum amount of daily meals.<sup>11</sup> In addition, indigenous children of widowed or divorced mothers had lower prevalence of minimum daily meals compared to children of mothers who had a partner. The lower intake of iron in children's diets was associated with worse socioeconomic conditions, adolescent mothers, and lower education levels.<sup>11</sup>

In the present study, most records pointed out that indigenous children have the appropriate weight for age, but 13.9% of the records pointed out the lack of weight of the children or lack of follow-up of the children and 2.3% had moved or were absent at the time of weighing. The identification of problems related to the growth and development of indigenous children leads to discontinuity of actions, and the impossibility of planning, implementing, and evaluating intervention measures, considering the aggravating scenario of high prevalence of nutritional deficits in the child segment.<sup>22</sup>

Low weight for age ranges from 5.9 to 57.5% of Brazilian indigenous children,<sup>10,22</sup> higher than the findings of this study. Possibly, the high prevalence of EBF was associated with appropriate weight for age in this indigenous population belonging to the Triple Frontier region. Breastfeeding has a protective effect against low weight in indigenous children under 12 months of age.<sup>10</sup>

Currently, a nutritional transition process is observed in indigenous peoples, with evidence of malnutrition, anemia, and overweight concomitantly,<sup>23,24</sup> with the insertion of ultra-processed food in the diet of indigenous children aged 6 to 12 months in 52.6%.<sup>17</sup> In Brazilian indigenous communities, the prevalence of overweight in children ranges from 7.7-15.1%,<sup>24,25</sup> higher than that detected in the present study (0.5%).

Stature deficit in indigenous children ranges from 12.4 to 80.5% in Brazil,<sup>11,18,22,24</sup> in 26.8% in Ecuador,<sup>11</sup> 12.1% in Suriname<sup>18</sup> and 61.4% in Guatemala.<sup>18</sup> When considering the Brazilian territory, higher SD and low weight for age was observed in children of the indigenous population in the North region.<sup>11,22</sup>

Low birth weight and SD indicators are strongly associated with social inequities,<sup>18,22</sup> extreme poverty, precarious housing, lack of basic sanitation, residence in rural areas, maternal anemia, low birth weight, and the presence of four or more children in the household.<sup>10,11</sup>

In this direction, when considering the conditions of vulnerability and food insecurity of indigenous children, the relevance of income transfer programs stands out. In Brazil, the *Bolsa Família* Program, established in 2004, was presented as an alternative to promote the breaking of the cycle of poverty and nutritional problems that directly and indirectly affect more vulnerable population segments,<sup>26</sup> such as indigenous children. According to the guidelines of this Program monitoring the growth and

development of children is essential to receive/maintain the benefit.<sup>22</sup>

Thus, inadequate monitoring of the nutritional status of indigenous children, as identified in this study, may lead to the suspension of this fundamental benefit for overcoming situations of vulnerability in segments of the Brazilian population that are in poverty or extreme poverty.<sup>22</sup>

Despite the relevance of the incentive and income improvement through social benefits, these were not sufficient to have an impact on the diet of indigenous children. It should be emphasized the importance of land for indigenous people as a means of subsistence and a source of adequate nutritional intake that ensures food variability and the protection of habits and traditions belonging to that culture.

This study has limitations because it was conducted based on secondary data from SISVAN-I. However, it contributes to the advancement of knowledge about the indigenous children's food profile, the breastfeeding practices, and complementary feeding carried out in the Triple Frontier region, with the identification of vulnerabilities such as the continuity of EBF even after the child is six months old, which possibly reflects the difficulties in the nutritional transition and the adequate supply of food for children, as well as the discontinuity of indigenous children's nutritional monitoring. It is pertinent the promotion and protection of BF and complementary feeding of indigenous children and the effective implementation of public policies and breaking the historical line of the harmful invisibility of indigenous health, whether in the Triple Frontier region or in any other area of Brazil, considering the vulnerabilities of this population. New studies are needed to understand the nutritional situation of indigenous children.

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## Authors' contribution

Pereira BSA and Gomes-Sponholz FA: drafting of the article, data analysis and interpretation, writing, critical review of the content and preparation of the final version of the manuscript. Zilly A, Monteiro JCS and Barbosa NG: writing, critical review of the content and preparation of the final version of the manuscript. All authors approved the final version of the article and declare no conflict of interest.

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