



## Social determinants of early weaning in a rural community of a Pomeranian population: a cross-sectional study

### *Determinantes sociais do desmame precoce em comunidade rural de uma população pomerana: estudo transversal*

### *Determinantes sociales del destete precoz en comunidad rural de una población pomerana: estudio transversal*

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#### ABSTRACT

**Objectives:** To assess the association between social determinants of health and early weaning in children in a rural community. **Methods:** A quantitative cross-sectional study was carried out in 2021 to analyze 143 medical records of children up to five years of age attending joint child care consultations in the District of Melgaço, Domingos Martins, Espírito Santo, between 2016 and 2019. The dependent variable was early weaning and the independent variables were grouped into: socioeconomic and demographic characteristics, maternal obstetric data and children's habits. Fisher's exact test was used for each independent variable and early weaning. **Results:** There was a prevalence of early weaning of 66.4%, with a predominance of mothers aged between 25 and 34 years (44.8%), white race/skin color (76.9%), multiparous women (58.0%), incomplete primary education (49%), agricultural workers (61.5%), and women covered by the Bolsa Família cash transfer program (35.9%). The use of a pacifier ( $p=0.001$ ) and bottle ( $p=0.000$ ) correlated positively with early weaning. Prenatal care began in the first trimester in most cases (82.1%) and lasted six or more consultations (85.0%). The most common mode of delivery was through c-section (59.4%) and births were at term (88.8%) without the need for hospitalization of the baby (96.5%) resulting from a planned pregnancy (61.5%). The other variables studied had no significant association. **Conclusion:** The prevalence of early weaning in this rural community was high and influenced by deleterious oral habits.

**Descriptors:** Breastfeeding; Early Weaning; Rural Population.

#### RESUMO

**Objetivos:** Avaliar a associação entre determinantes sociais de saúde e o desmame precoce de crianças de uma comunidade rural. **Métodos:** Trata-se de estudo quantitativo e transversal, realizado em 2021 por meio da análise de 143 prontuários de crianças de até cinco anos de idade atendidas nas consultas conjugadas de puericultura no Distrito de Melgaço, Domingos Martins, Espírito Santo, entre 2016 e 2019. A variável dependente apresentou-se por desmame precoce e as independentes agruparam-se em: características socioeconômicas e demográficas, dados obstétricos maternos e hábitos das crianças. Utilizou-se o teste exato de Fisher para cada variável independente e o desmame precoce. **Resultados:** Encontrou-se a prevalência de desmame precoce de 66,4%, com predomínio de mães na faixa etária entre 25 e 34 anos (44,8%), raça/cor predominante branca (76,9%), múltiplas (58,0%), com ensino fundamental incompleto (49%), trabalhadoras da agropecuária (61,5%), beneficiadas pelo programa Bolsa Família (35,9%). Correlacionaram positivamente com o desmame precoce o uso de chupeta ( $p=0,001$ ) e mamadeira ( $p=0,000$ ). O pré-natal iniciou-se no primeiro trimestre, na maioria dos casos (82,1%), e contou com seis ou mais consultas (85,0%). A via de parto mais comum aconteceu por meio de cesariana (59,4%) e a termo (88,8%), sem necessidade de internação do bebê (96,5%), frutos de gestação planejada (61,5%). As demais variáveis estudadas não tiveram associação significativa. **Conclusão:** A prevalência de desmame precoce nessa comunidade rural apresentou-se enquanto alta, sendo influenciada por hábitos bucais deletérios.

**Descritores:** Aleitamento Materno; Desmame Precoce; População Rural.



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## RESUMEN

**Objetivos:** Evaluar la asociación entre determinantes sociales de salud y el destete precoz de niños de una comunidad rural. **Métodos:** Se trata de estudio cualitativo y transversal, realizado en 2021 por medio del análisis de 143 registros de niños con hasta cinco años de edad atendidos en las consultas conjugadas de puericultura en el Distrito de Melgaço, Domingos Martins, Espírito Santo, entre 2016 y 2019. La variable dependiente se presentó por destete precoz y las independientes se juntaron en: características socioeconómicas y demográficas, datos obstétricos maternos y hábitos de los niños. Fue utilizado el test exacto de Fisher para cada variable independiente y el destete precoz. **Resultados:** Se encontró la prevalencia de destete precoz de 66,4%, con predominio de madres con edades entre 25 y 34 años (44,8%), raza/color predominante blanca (76,9%, multíparas (58%), con enseñanza primaria incompleta (49%), trabajadoras de la agropecuaria (61,5%), beneficiadas por el programa Bolsa Família (35,9%). Correlacionaron positivamente con el destete precoz el uso de chupete ( $p=0,001$ ) y biberón ( $p=0,000$ ). El prenatal se inició en el primer trimestre, en la mayoría de los casos (82,1%), y contó con seis o más consultas (85%). La vía de parto más común sucedió por medio de cesariana (59,4%) y a término (88,8%), sin necesidad de internación del bebé (96,5%), frutos de gestación planeada (61,5%). Las demás variables estudiadas no tuvieron asociación significativa. **Conclusión:** La prevalencia de destete precoz en esta comunidad rural se presentó mientras alta, bajo influencia de hábitos bucales deletéreos.

**Descriptores:** Lactancia materna; Destete precoz; Población rural.

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## INTRODUCTION

Breastfeeding is the natural outcome of pregnancy and childbirth as part of the reproductive cycle; it brings benefits not only to the baby but also to the lactating woman in the short and long term. It is a public health strategy for lactating women as it: reduces the risk of breast and cervical cancer; stimulates the development of the baby's stomatognathic system; decreases the risk of chronic diseases such as hypertension, diabetes and obesity; and promotes hygienic, immunological, psychosocial and cognitive benefits<sup>(1)</sup>.

Better child development and reduced health costs as a result of breastfeeding generate economic benefits for families and for countries<sup>(2)</sup>. Breastfeeding is a public health issue as it is closely related to population mortality and health patterns. Estimates show that it could prevent 13% of deaths from preventable causes of children under the age of five worldwide<sup>(3)</sup>.

The World Health Organization (WHO), the United Nations Children's Fund (Unicef) and the Ministry of Health of Brazil (MoH) recommend that breastfeeding be exclusive in the first six months of the child's life and complemented until the age of two or over<sup>(4)</sup>. Despite being on the rise, exclusive breastfeeding (EB) rates remain below expectations despite all its benefits<sup>(2)</sup>. A study of data from 127 low- and middle-income countries and 39 high-income countries concluded that more than 80% of newborns are breastfed in almost all countries, but in most countries exclusive breastfeeding rates are way below 50%<sup>(5)</sup>.

Early weaning is characterized by the introduction of food (liquids or solids) before six months of age, and there is a concern that it results in gastrointestinal infections, diarrhea and hospitalization due to respiratory diseases<sup>(6)</sup>. It implies a lower intake of breast milk, with the possibility of the child not receiving the nutrients necessary for their development if the foods introduced do not have adequate nutritional value, which may result in obesity or malnutrition, thereby impacting morbidity and mortality rates<sup>(7)</sup>.

To promote breastfeeding, one must first identify the reasons why exclusive and continued breastfeeding is interrupted. Breastfeeding is a phenomenon that goes beyond the mother's desire and autonomous decision, as it exhibits strong sociocultural and historical determination, which can be proven by different breastfeeding patterns across populations and over time<sup>(6)</sup>. These individual life conditions, such as work, social, economic, cultural, ethnic/racial, psychological and behavioral factors, which influence the occurrence of health problems and help to identify risk factors for the population, are called Social Determinants of Health (SDH)<sup>(8)</sup>. Understanding the hierarchical relationships between social determinants of health allows the identification of difficulties and failures in public policies and enables the formulation of more precise policies in relation to the needs of specific populations considering their particularities.

An example of populations with socioeconomic and cultural peculiarities are rural communities. According to the last census held in Brazil<sup>(9)</sup>, 15.6% of Brazilians live in rural areas. Most rural Brazilian populations have lower

levels of education, a low average monthly income and poor access to health services<sup>(10)</sup>. Characteristics such as geographic isolation, difficult access, lack of resources and poor communication can impact the health of these individuals. Thus, this study seeks to assess the association between social determinants of health and early weaning of children in a rural community.

## METHODS

An analytical cross-sectional study was carried out in 2021 with data from medical records of children aged up to five years old living in Melgaço, a district in the municipality of Domingos Martins, in Espírito Santo.

The municipality of Domingos Martins is located in the mountainous region of Espírito Santo, 53 km away from the capital Vitória. According to data from the last Census held by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE, 2010*)<sup>(9)</sup>, the city has a total of 31,847 inhabitants, 24,106 of whom live in rural areas. According to the 2010 Census, the population of children up to five years old is 3,292 children. The district of Melgaço is located 24 km away from the municipality and has approximately 3,600 inhabitants<sup>(9)</sup>.

The present study selected children from the age range of up to five years old in order to minimize memory bias – since the period of time elapsed since breastfeeding was not so long.

Data collection was carried out by consulting secondary sources, including all the medical records of children assisted in Child Care Joint Consultations between 2016 and 2019. This was a recent project in the district, which is why it did not have a large number of medical records available. Additional information was retrieved from the E-SUS system and the data were tabulated in a specific form.

Early weaning was the dependent variable. It was characterized by the introduction of any other type of food, solid or liquid, before six months of age. The socioeconomic and demographic variables assessed were: age, skin color/race and maternal education, marital status, maternal occupation, monthly household income, receipt of cash transfer (*Bolsa Família* cash transfer program), number of people in the household, and source of the water consumed.

The following obstetric variables were analyzed: parity, number of children, number of prenatal consultations, type of delivery, gestational age, birth weight, hospitalization in a neonatal unit, and gestational planning status.

As for maternal habits, smoking, drinking and drug use during pregnancy were investigated. With regard to the baby, the use of a pacifier and the use of a bottle were assessed.

There was a review of the medical records to analyze the completeness and consistency of data, which were analyzed using descriptive statistics through absolute and relative frequencies presented in tables.

Fisher's Exact Test was used for each independent variable and early weaning. A significance level of 5% ( $p < 0.05$ ) was adopted and the statistical package IBM SPSS 20 was used for this analysis.

The project was approved by the Research Ethics Committee of the Federal University of Espírito Santo, under Approval No. 3.952.910.

## RESULTS

All 143 available medical records dated between 2016 and 2019 were analyzed. Mothers aged between 25 and 34 years were the majority, 44.8% ( $n=64$ ), and there was a predominance of white race/skin color, 76.9% ( $n=110$ ).

In all, 90.2% ( $n=129$ ) of the records did not contain information about the mother's marital status, and the remaining 9.8% ( $n=14$ ) of women were married.

As for education, 49.0% ( $n=70$ ) of the 143 mothers did not complete primary school, representing the largest share of this variable. As expected, considering the characteristic of rural dwelling in the sample, most women were agricultural workers, 61.5% ( $n=88$ ). A total of 32.9% ( $n=47$ ) of the sample were covered by the *Bolsa Família* cash transfer program, with a prevalence of families earning one minimum wage, 29.4% ( $n=42$ ). Most households were inhabited by four people, 36.4% ( $n=52$ ), and water was supplied from an artesian well, 77.6% ( $n=111$ ). The socioeconomic and demographic characteristics are shown in Table I.

Table I - Socioeconomic and demographic characteristics of the mothers analyzed. Domingos Martins, Espírito Santo, 2021.

Characteristics	n	%
<b>Age range</b>		
16 – 24 years	55	38.5
25 – 34 years	64	44.8
35 years or older	24	16.7
<b>Race</b>		
White	110	76.9
<i>Parda</i> (Mixed-race Brazilians)	23	16.1
Other	10	7.0
<b>Marital status</b>		
Married	14	9.8
Not informed	129	90.2
<b>Education</b>		
Incomplete primary education	70	49.0
Complete primary education	25	17.4
Secondary education	36	25.2
Higher education	12	8.4
<b>Occupation</b>		
Agricultural worker	88	61.5
Other	15	10.5
Not informed	40	28.0
<b>Income (minimum wages)</b>		
Below 1	25	17.5
1 minimum wage	42	29.4
1 - 2 minimum wages	41	28.7
Above 2 minimum wages	19	13.3
Not informed	16	11.1
<b>Covered by <i>Bolsa Família</i> cash transfer</b>		
Yes	47	32.9
No	96	67.1
<b>People in the household</b>		
Three	47	32.9
Four	52	36.4
Five	21	14.6
Six or more	23	16.1
<b>Type of water consumed</b>		
Cesan	23	16.1
Artesian well	111	77.6
Not informed	9	6.3
<b>Total</b>	<b>143</b>	<b>100.0</b>

Table II depicts the obstetric data of the research participants. Of the 143 women analyzed, 58.0% (n=83) were multiparous, with 39.9% (n=57) having two children and 18.1% (n=26) having three or more children. Sixty women (42%) were experiencing motherhood for the first time. Prenatal care started in the first trimester in 81.1% (n=116) of the pregnancies and six or more consultations were attended in 85.5% (n=123) of the cases.

The majority of births were given via c-section, 59.4% (n=59.4). Births occurred at term (between 37 and 41 weeks) for 88.8% (n=127) of the sample. A total of 3.5% (n=5) of the children analyzed needed admission to a neonatal unit. Pregnancy was planned in 61.5% (n=88) of the cases.

It should be noted that only the variables related to the social determinants of health were checked for associations; therefore, there was no analysis of the obstetric data, with only their descriptive data being presented.

Table II - Obstetric data of the analyzed mothers. Domingos Martins, Espírito Santo, 2021.

Characteristics	n	%
<b>Type of parity</b>		
Primiparous	60	42.0
Multiparous	83	58.0
<b>Number of children</b>		
One	60	42.0
Two	57	39.9
Three or more	26	18.1
<b>Start of prenatal care</b>		
First trimester	116	81.1
Second trimester	26	18.2
Third trimester	1	0.7
<b>Number of prenatal consultations</b>		
Less than 6	13	9.6
Six or more	123	85.5
Not informed	7	4.9
<b>Type of delivery</b>		
Vaginal	58	40.6
C-section	85	59.4
<b>Gestational age at birth</b>		
Up to 36 weeks (pre-term)	6	4.2
37 to 41 weeks (at term)	127	88.8
Over 42 weeks (post-term)	2	1.4
Ignored	8	5.6
<b>NB needed to be admitted to a neonatal unit</b>		
Yes	5	3.5
No	138	95.5
<b>NB needed hospitalization due to jaundice</b>		
Yes	1	0.7
No	142	99.3
<b>Planned pregnancy</b>		
Yes	88	61.5
No	55	38.5

NB: newborn

In all, 50.3% (n=72) of the children analyzed used pacifiers and 46.9% (n=67) used bottles. 66.4% (n=95) of the medical records indicated early weaning – that is, weaning before six months of age (Table III).

Table III - Habits of analyzed children. Domingos Martins, Espírito Santo, 2021.

Characteristics	n	%
<b>Use of pacifier</b>		
Yes	72	50.3
No	71	49.7
<b>Use of bottle</b>		
Yes	67	46.9
No	76	53.1
<b>Early weaning</b>		
Yes	95	66.4
No	48	33.6

After applying Fisher's Exact Test with a significance threshold of 5%, the variables bottle use ( $p=0.000$ ) and pacifier use ( $p=0.001$ ) were found to be associated with early weaning. The other studied variables had no significant association with the abandonment of exclusive breastfeeding before six months of age (Tables IV and V). Only variables related to social determinants of health were checked for associations; therefore, there was no analysis of obstetric data.

Table IV - Association between early weaning and socioeconomic factors in the children and mothers analyzed. Domingos Martins, Espírito Santo, 2021.

Characteristics	Early weaning		No early weaning		p-value
	n	%	n	%	
<b>Age range</b>					
Up to 24 years	37	67.3	18	32.7	0.507
25 years or older	58	65.9	30	34.1	
<b>Race</b>					
White	71	64.5	39	35.5	0.249
Other	22	73.3	8	26.7	
<b>Education</b>					
Primary education	66	69.5	29	30.5	0.185
Secondary education or further	29	60.4	19	39.6	
<b>Income</b>					
Up to 1 MW	46	68.7	21	31.3	0.153
Above 1 MW	35	58.3	25	41.7	
<b>Working</b>					
Yes	70	68.0	33	32.0	0.333
No	25	62.5	15	37.5	

Fisher's exact test, adopted significance level of 5%; MW: minimum wage

Table V - Association between early weaning and obstetric data of the children and mothers analyzed. Domingos Martins, Espírito Santo, 2021.

Characteristics	Early weaning		No early weaning		p-value
	n	%	n	%	
<b>Parity</b>					
Primiparous	37	61.7	23	38.3	0.198
Multiparous	58	69.9	25	30.1	
<b>Number of prenatal consultations</b>					
Less than 6	11	84.6	2	15.4	0.097
6 or more	77	62.6	46	37.4	
<b>Planned pregnancy</b>					
Yes	62	70.5	26	29.5	0.135
No	33	60.0	22	40.0	
<b>Use of pacifier</b>					
Yes	57	79.2	15	20.8	0.001
No	38	53.5	33	46.5	
<b>Use of bottle</b>					
Yes	58	86.6	9	13.4	0.001
No	37	48.7	39	51.3	

Fisher's exact test, adopted significance level of 5%

## DISCUSSION

This study addresses a population group that is little considered in epidemiological studies and that deserves attention due to its different socioeconomic, geographic and cultural characteristics. Rural populations must be assisted in their peculiarities, ensuring that the health promotion strategies adopted are effective. Cross-sectional studies are more likely to show recall bias. However, the introduction of foods and other types of milk and the cessation of breastfeeding are important milestones in child development and are often remembered by mothers. The recall bias is more evident for children of more advanced ages, which is why we chose to include only children up to five years of age in the sample.

The rate of early weaning in the population studied in this research was high (66.4%). Preliminary data from the last National Study of Child Food and Nutrition<sup>(11)</sup> agree with the findings of this study and point to a figure of 53.1% of prevalence of exclusive breastfeeding in children up to six months. Such a situation requires investment and planning in order to change this scenario.

It is important to observe the variables with a high percentage of incomplete records in the present study. There was no reference to marital status in 90.2% of the records in the sample. Data on the occupation of the mother was also missing in 28% of the medical records. Data on monthly household income was not informed in 11.1% of the cases and, finally, information on the type of water consumed was missing in 6.3% of the records in the sample. Additionally, 4.9% of the records did not have information on the number of prenatal consultations and 5.5% of the medical records did not inform the gestational age. Certainly, the mother's option of not answering the question due to embarrassment, memory and other individual factors should be considered. However, it is worth remembering the assisting professional's responsibility for the correct recording of information in the medical records, both for individual assessment and treatment and for knowledge of the situation of their population and possible interventions when necessary.

Pacifier use was strongly associated with early weaning ( $p=0.001$ ) in the current study, a finding that is in line with results from other studies<sup>(12,13,14)</sup>. In a literature review<sup>(15)</sup> that sought to identify the multiple factors associated with the practice and duration of breastfeeding in Brazil, the use of a pacifier was the risk factor for interrupting breastfeeding most frequently cited by studies. The use of pacifiers can impair the suction of milk from the mother's breast as it reduces the baby's sucking time at the breast and changes the sucking pattern, causing complications in the baby's oral capacity<sup>(14)</sup>.

Bottle use ( $p=0.000$ ) was another variable that remained associated with early weaning in the present study, a finding that is in agreement with the findings in the literature<sup>(16)</sup>. The use of a bottle leads to a deficit in the appropriate aspects for the practice of ideal breastfeeding, such as sucking, mother/baby position, received milk flow, affectivity and the baby's responses to the breast<sup>(17)</sup>.

In the current scenario where the role of women in society has expanded, exclusive dedication to the demands of the child and conciliation with their interests can bring difficulties to the mother. In the analyzed sample, there was no significant association between maternal occupation and early weaning ( $p=0.333$ ), different from what is found in the literature<sup>(18,19)</sup>. Agricultural workers are entitled to Rural Maternity Leave for a period of up to 120 days of leave from their work activities. However, data on access to Rural Maternity Leave were not available in the medical records used in this study, but future research should draw attention to and include this variable. Considering the particularities of the women in this research and their way of life and work, a qualitative study could be very useful to understand the relationship between maternal work and early weaning.

There was no statistical difference between primiparous and multiparous women in relation to early weaning of their children ( $p=0.198$ ) in the present, unlike published studies where primiparous women tend to interrupt exclusive breastfeeding before the child is six months old<sup>(20,21)</sup>. However, in a longitudinal study, both primiparous and multiparous women offered food early, even before four months of age<sup>(22)</sup>. Given the great family proximity in the region investigated in the current research, where different generations of a family tend to inhabit the same land, it is possible that knowledge about breastfeeding is transmitted between women who are close to each other; therefore, even those who have their first child benefit from the experience of others. Furthermore, early weaning and pregnancy planning were not associated in the present study ( $p=0.135$ ).

Prenatal care is important for creating a bond between the family and health professionals, thus providing conditions for promoting the health of the pregnant woman, encouraging self-care, improving the quality of life and clarifying doubts<sup>(23)</sup>. In the present study, most of the sample (116 women or 81.1%) started prenatal care in the first trimester and 123 (85.5%) pregnant women had six appointments or more, as recommended by the Ministry of Health<sup>(24)</sup>. The number of prenatal consultations did not influence early weaning of babies ( $p=0.097$ ), which is in line with other studies<sup>(25,26)</sup>. These findings may show that there is a flaw in prenatal education, with difficulty in

understanding, provision of insufficient or outdated information or even lack of interest from users, which calls for observations of the quality of the service provided. Guidance on breastfeeding during prenatal care should not be discarded given its experience-based importance for promoting breastfeeding.

In a systematic review<sup>(27)</sup>, maternal education was the most widely investigated factor, and the findings were unanimous: low education levels were associated with early weaning. Similar findings can be found in publications<sup>(18,20)</sup> where mothers with higher education levels exhibited higher frequencies of exclusive breastfeeding. It is possible that more educated women receive more information about it and thus value breastfeeding. The population studied in the current research consisted mostly (49.0%) of women with incomplete primary education, and the level of education and early weaning were not associated ( $p=0.185$ ).

Although they are the most favored by the benefits of breastfeeding, such as reduced mortality and morbidity<sup>(5)</sup>, children from low-income families are the most impacted by the early interruption of breastfeeding<sup>(6)</sup>. In the current study, most families lived on a minimum wage (29.4%), and there was no association between household income and early weaning ( $p=0.153$ ), unlike existing publications<sup>(28)</sup>, including research conducted in rural areas<sup>(29)</sup>.

Maternal race/skin color has been associated with early weaning with inconclusive results. Studies<sup>(24,30)</sup> associate non-white skin color to a higher prevalence of breastfeeding. These findings may be associated with the observed social inequalities, where it is possible that black children have lower socioeconomic status and less access to breast milk substitutes, thus making breastfeeding the most accessible alternative. However, there is also evidence in the literature of a higher prevalence of early weaning among black mothers<sup>(28)</sup>, a factor that, combined with greater socioeconomic vulnerability, exposes children to greater risk. In the sample analyzed in the present study, there was no significant association between maternal race/skin color and early weaning ( $p=0.249$ ). This factor, therefore, seems to be contradictory, or very specific in certain populations, suggesting a need for further studies.

There was no association between maternal age and the introduction of foods before six months of age ( $p=0.507$ ), a result that is in line with previous work<sup>(20)</sup> in which there was no relationship between early weaning and the woman's age in both urban and rural populations. These results disagree with a published study, where younger women are more likely to wean their babies early<sup>(18)</sup>. The conflicting findings in the existing literature point to the need for further research on the subject. In the region studied, for example, it is common for very young people to marry, with this being a cultural trait of the population. Marriage, then, is an important rite of passage, and is greatly celebrated. Thus, families are constituted of young and often inexperienced parents.

The use of devices that make breastfeeding difficult should be discouraged. It is important that individual and collective actions to promote natural breastfeeding are designed considering the social constitution of the population that will be assisted, leveraging resources and results. To ignore the surroundings and consider breastfeeding as a purely biological act is to close one's eyes to the great obstacles that deprive families of the benefits of breastfeeding.

## CONCLUSION

It is concluded that there was a high prevalence of early weaning in the analyzed population, with a significant association with the use of pacifiers and bottles.

## CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest in the present study.

## CONTRIBUTIONS

**Camila Lampier Lutzke** contributed to the acquisition, analysis and interpretation of data and to the writing of the manuscript. **Maria Helena Monteiro de Barros Miotto** contributed to the conception and design of the study and the revision of the manuscript. Both authors approved the final version to be published and are responsible for its content and integrity.

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