Perinatal health and malocclusions in preschool children: Findings from a cohort of adolescent mothers in Southern Brazil

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Introduction: Pregnancy in adolescence has long-term consequences that can negatively influence oral conditions. In this study, we aimed to assess malocclusion in deciduous dentition and its association with prolonged breastfeeding, pacifier use, and perinatal health indicators pertaining to the periods immediately before and after birth. **Methods:** This cross-sectional study was nested in a cohort of adolescent mothers who became pregnant from 13 to 19 years of age (mean age, 17.3 ± 1.6 years). A total of 509 mother-child dyads were included. Information on perinatal indicators, including Apgar score (0-10), which is a standardized assessment of the condition of the infant at birth (heart rate, breath rate, muscle tone, reflex irritability, and skin color), head circumference, birth weight, and need for intensive care unit admission were collected after delivery through interviews with the mothers. By the time the children were 24 to 36 months of age, malocclusion was assessed, and information on the use of pacifiers and breastfeeding was collected. Multivariate Poisson regression was used to assess the effect of independent variables on the outcome (malocclusion). **Results:** The prevalence of malocclusion was 62.33%, and open bite was the most frequent one (47.45%). After adjustments, children with no need for intensive care unit admission had a lower risk of malocclusion (prevalence ratio [PR] = 0.75; 95% CI, 0.56-0.99), whereas those with an Apgar score less than 7 had a higher risk (PR = 1.32; 95% CI, 1.06-1.64). Children who had used a pacifier (PR = 1.82; 95% CI, 1.02-3.24) or were still using it (PR = 3.88; 95% CI, 2.65-5.68) had a higher chance of malocclusion compared with children who never used a pacifier. Children breastfeeding for 24 months or longer were less likely to have malocclusion (PR = 0.46; 95% CI, 0.34-0.73). **Conclusions:** Poor perinatal health and pacifier use may be risk factors for malocclusion development in deciduous teeth. Long duration of breastfeeding is associated with better occlusal conditions in children of adolescent mothers. Further studies are needed with other age groups. (Am J Orthod Dentofacial Orthop 2017;152:613-21)

Mothers are usually the main caregivers during early childhood, and they are responsible for the transmission of behaviors and habits, including those related to oral health.[1] Pregnancy in adolescence has long-term medical, emotional, and economic consequences for both the mother and the child.[2] Generally, adolescent mothers lack experience in dealing with children, and because of the higher prevalence of psychological problems, such as depression and anxiety during adolescent motherhood, they may be less attached to their offspring, reducing the required care.[3,4] As a consequence, a previous study showed that psychological characteristics of adolescent mothers can negatively influence oral health outcomes.[5]

Adolescent mothers also have a lower breastfeeding rate than adult mothers, tend to breastfeed less often, and stop breastfeeding earlier.[6-8] In addition to the nutritional benefits and the protection against diseases, breastfeeding may play an important role in

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the prevention of malocclusion in the deciduous dentition, promoting growth and development of muscles and bones.[9] There is an inverse relationship between the duration of breastfeeding and the use of pacifiers.[10] Thus, it is possible that children of adolescent mothers have higher frequencies of pacifier use and bottle feeding, which are among the main causes of disturbed occlusal development.[11,12]

Adolescent pregnancy is also associated with negative perinatal indicators, which are important determinants of child health during and after birth. Higher rates of adverse obstetric outcomes, such as prematurity, low birth weight, small for gestational age, and low Apgar score, were found in children of adolescent mothers.[13-15] Problems in the early neonatal period may impair the development of children, including the stomatognathic system.[16] It has been shown that premature infants have twice the probability of malocclusion compared with healthy children born at term.[16] Premature children often require hospitalization and even admission to the intensive care unit (ICU), where intubation is performed. This could contribute to malocclusion, since it may cause consequences such as deepening of the palate.[16] Thus, a low Apgar score and ICU admission could indicate that these children may be exposed to risk factors for malocclusion development.

The prevalence of malocclusion is high among children,[11,17] and it is recognized that children with severe malocclusion may have limitations regarding esthetic appearance, phonation, and masticatory efficacy, thereby affecting their social relationships and oral health-related quality of life.[18,19] Although self-correction of some types of malocclusion in the deciduous dentition is possible,[20] studies have shown that malocclusion in the deciduous dentition can be predictive for malocclusion in the mixed[21] and permanent dentitions.[22]

Since young mothers tend to have a higher risk of negative perinatal outcomes and a lower frequency and duration of breastfeeding, it is possible that children from adolescent mothers are more often exposed to risk factors for malocclusion development. The aim of this study was to determine the prevalence of malocclusion and associated factors in children aged 24 to 36 months from a cohort of adolescent mothers in southern Brazil. The null hypotheses were that the prevalence of malocclusion would not be influenced by perinatal health indicators, prolonged breastfeeding, and pacifier use.

MATERIAL AND METHODS

This cross-sectional study was performed in Pelotas, southern Brazil, between July 2012 and February 2014, in a cohort of pregnant adolescents (13-19 years of age) who received prenatal care at the National Brazilian Unified Health System. Mean age was 17.3 years (SD, ±1.6), and mean gestational age was 23.1 weeks (SD, ±6.0). The sample was selected from 47 basic health units and 3 outpatient centers, totaling about 95% of the prenatal care provided by the Unified Health System in the city. This study was carried out when the children were 24 to 36 months old (n = 538).

Pregnant adolescents was recruited between October 2009 and March 2011. The main focus of the research was on mental problems during pregnancy and in the perinatal period. A total of 871 adolescent mothers were invited to participate. The sample size was calculated based on the aim of the major study: to detect the prevalence of mood disorders in this population, with the STATCALC tool of the Epi Info software (Centers for Disease Control and Prevention, Atlanta, Ga). Considering a confidence level of 95% and power of 80%, and given an estimated prevalence of suicidal behavior of 15% with an estimated risk of 1.55 in the exposed group, the sample size was determined to be 758. By adding 10% to offset eventual losses and refusals, a sample of 833 participants was needed. More details about the cohort methodology are provided elsewhere.[3]

When the children were 24 to 36 months of age, a clinical dental examination was conducted. For this evaluation, the minimum sample size was estimated considering the malocclusion prevalence reported by Emmerich et al,[23] found to be 59.1%. Considering an acceptable error of 5% and a 95% confidence level, 306 participants were recommended; adding 10% to cover losses and refusals and 15% for stratified analysis, 387 would be required.

We used data collected during pregnancy (socioeconomic characteristics), 30 to 60 days postpartum (perinatal variables), and when the children were between 24 and 36 months of age (information on breastfeeding and pacifier use and clinical oral examination). Pretested questionnaires were used to collect data.

The fieldwork team consisted of 5 graduate dental students, who acted as examiners, and 5 undergraduate students, who served as interviewers. All examiners were trained and calibrated according to the methodology previously described.[24] The examiner reliabilities were calculated by kappa (dichotomous categorical variables) and weighted kappa (ordinal polytomous categorical variables). The lowest kappa accepted for this study was 0.6. Values ranged from 0.62 to 1.00 for all occlusal traits.

The socioeconomic data used were family income and maternal education at birth. Information about family income was collected in a continuous way and then dichotomized (≤1000 or ≥1001 Brazilian reals), and maternal education was grouped into 2 categories (<8 years of study and ≥8 years of study).

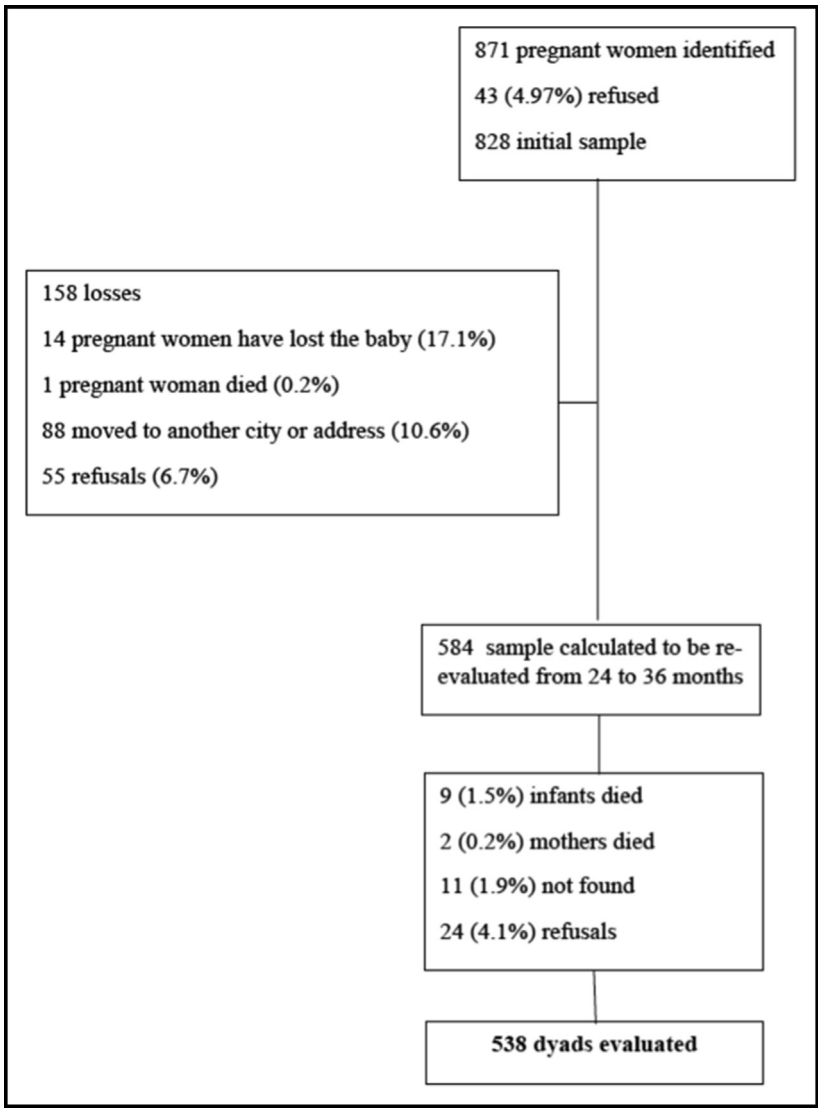

Fig. Flow diagram with reasons for nonparticipation at each stage.

At 30 to 60 days postpartum, the mothers were interviewed to obtain perinatal variables, related to the periods immediately before and after birth. Data collection included the 5-minute Apgar score, which is a standardized assessment of the condition of an infant at birth (heart rate, breath rate, muscle tone, reflex irritability, and skin color). The Apgar score is based on a total score of 1 to 10. A score of 7 to 10 is considered normal and is a sign that the newborn is in good health. Information was dichotomized as 0-6 or 7-10.[12,25] The World Health Organization definitions of prematurity were used to classify birth weight (normal, $\geq$2.5 kg; low, $<$2.5 kg) and gestational age (preterm, $<$37 weeks; term, $\geq$37 weeks). The head circumference at birth, which reflects intrauterine brain and fetal growth, was classified for the population in this study as lower than or equal to the tenth percentile or higher (normal). Information about the type of delivery (normal or cesarean section) and the need for ICU care (yes/no) were also collected.

The use of pacifiers and breastfeeding duration were collected in the last follow-up (24-36 months). Pacifier use was classified as never used, used for less than 24 months, or used for 24 months or more. Breastfeeding was categorized as no breastfeeding or breastfeeding for less than 24 months vs breastfeeding for 24 months or longer.[26] In addition, information was collected about the main caregiver (mother or other person).

Clinical oral examinations of the children were carried out with a mirror and Community Periodontal Index-probe, gauze, and headlamp lights. The child's position for the examination could be sitting on the mother's lap or the knee-to-knee position. Diagnosis of malocclusion was based on the classification by Foster and Hamilton[27] and included (1) anterior open bite (classified as present when there was no contact between the mandibular and maxillary central incisors in centric occlusion), (2) posterior crossbite (classified as present when the maxillary teeth bite lingually with the mandibular teeth), (3) left/right canine relationships (classified as Class I, Class II, or Class III), and (4) overjet, measured at the most protruding maxillary incisor and classified as normal (0–2 mm) or increased (>2 mm). In this study, the outcome (malocclusion) was defined when the child had at least 1 type of these changes.[11]

Statistical analysis

Data were double typed using Epi Info 6.04 and analyzed with Stata software (version 14.0; StataCorp, College Station, Tex). The frequency distribution of each variable was evaluated, thereby allowing the characterization of the population. Bivariate analyses were used to test the associations between independent variables and different types of malocclusion by a chi-squared test, Fisher exact test, and chi-square test for linear trends. Crude and adjusted analyses were performed using Poisson regression with robust variance for estimating the prevalence ratios and their respective 95% confidence intervals. For multivariable analysis, a hierarchical model was used.[28] On the first level, we included demographic and socioeconomic characteristics of mothers (family income at birth and maternal education at birth). On the second level, the perinatal characteristics and child characteristics were included (type of delivery, gestational age, sex, birth weight, Apgar score, and head circumference); on the third level, the variables regarding the person responsible for the child's care were included; on the fourth level, breastfeeding was included; and on the fifth level, pacifier use was included.

This study was approved by the human ethics research committee (#194/2011) of Federal University of Pelotas, and all mothers signed an informed consent form. Mothers received information regarding their children's oral health conditions, and oral hygiene kits were provided to the mothers and children. Children and mothers needing dental treatment were referred to the School of Dentistry.

RESULTS

Of the 828 mothers evaluated during pregnancy, a total of 538 and their offspring (dyads) were included in this evaluation, resulting in a response rate of 62%. We were able to contact 584 mothers, but there were 46 losses due to death of the mother (2), death of the baby (9), refusal to participate (24), and failure to appear for 3 consecutive scheduled examinations (11) (Fig).

Occlusal assessments of 509 children were available and included in this study. The mothers' mean age was 20.1 years. A total of 14 (2.81%) children needed ICU admission, and 48 (12.06%) had a low Apgar score. Mean head circumference was 33.9 cm (±1.93), and mean birth weight was 3.1 kg (±0.54). Table I provides a summary of the sociodemographic characteristics and perinatal variables of the subjects. Frequencies of breastfeeding and pacifier use for 24 months or beyond were,

Table I. Sample distribution according socioeconomic, perinatal, and clinical characteristics

Variable/category	*%*	*n*
Family income at birth*†		
≥1001 Brazilian reals	49.89	234
≤1000 Brazilian reals	50.11	235
Maternal education		
>8 years	53.83	274
≤8 years	46.17	235
Type of delivery		
Normal	51.47	262
Cesarean section	48.53	247
Need for ICU*		
Yes	2.81	14
No	97.19	485
Birth weight*		
Normal (≥2.5 kg)	90.70	429
Low (<2.5 kg)	9.30	44
Gestational age*		
Term	84.36	383
Premature	15.64	71
Sex		
Male	49.90	254
Female	50.10	255
Apgar score*		
Normal (7-10)	87.94	350
Low (0-6)	12.06	48
Head circumference* (percentile)		
>10	87.33	317
≤10	12.67	46
Main caregiver		
Mother	79.57	405
Other	20.43	104
Breastfeeding*		
Never/<24 months	83.86	426
24 months or beyond	16.14	82
Pacifier use*		
Never	31.25	155
Less than 24 months	10.89	54
24 months or beyond	57.86	287

*Some information missing; †1 US dollar = 3.96 Brazilian reals at time of data collection.

Table II. Association of the variables and types of malocclusions

Variable	Open bite n (%)	Crossbite n (%)	Left canine relationship n (%)	Right canine relationship n (%)	Overjet n (%)	Any type of malocclusion n (%)	All types of malocclusion n (%)
Type of delivery							
Normal	122 (46.56)	26 (10.00)	29 (11.11)	32 (12.26)	94 (36.15)	159 (61.15)	3 (1.15)‡
Cesarean section	119 (48.18)	16 (6.50)	38 (15.38)	39 (15.79)	104 (42.28)	156 (63.41)	6 (2.44)
ICU							
Yes	8 (57.14)	3 (21.43)‡	1 (7.14)‡	3 (21.43)	9 (64.29)*	11 (78.57)	0 (0)‡
No	227 (46.8)	39 (8.09)	63 (13.02)	66 (13.64)	185 (38.38)	298 (61.83)	9 (1.87)
Birth weight							
Low (<2.5 kg)	17 (38.64)	0 (0)*‡	4 (9.09)	5 (11.36)	12 (27.27)	22 (50)	0 (-)‡
Normal (≥2.5 kg)	204 (47.55)	41 (9.62)	60 (14.02)	64 (14.95)	173 (40.61)	217 (63.62)	9 (2.11)
Gestational age							
Term	180 (47.0)	32 (8.40)	47 (12.30)	52 (13.61)	154 (40.42)	240 (62.99)	6 (1.57)
Premature	33 (46.48)	4 (5.71)	14 (19.72)	15 (21.13)	21 (30.0)	41 (58.57)	2 (2.86)
Apgar score							
Normal (7-10)	157 (44.86)*	30 (8.62)	45 (12.89)	50 (14.33)	137 (39.37)	216 (62.07)	4 (1.15)*‡
Low (0-6)	30 (62.50)	5 (10.64)	8 (16.67)	5 (10.42)	24 (51.06)	35 (74.47)	3 (6.38)‡
Head circumference (percentile)							
>10	144 (45.43)	28 (8.92)*	44 (13.92)	47 (14.87)	122 (38.85)	194 (61.78)	5 (1.59)
≤10	20 (43.48)	0 (0.00)	2 (4.35)‡	4 (8.70)	17 (36.96)	27 (58.70)	0 (0.00)
Breastfeeding							
Never/<24 months	229 (53.72)	39 (9.22)	64 (15.06)	68 (16)	178 (42.08)	288 (68.09)	9 (2.13)
24 months or beyond	11 (13.41)*	3 (3.66)	3 (3.66)*‡	3 (3.66)*	20 (24.39)*	26 (31.71)*	0 (-)‡
Pacifier use†							
Never	7 (4.52)*	4 (2.58)*	5 (3.23)*	7 (4.52)*	33 (21.29)*	39 (25.16)*	1 (0.65)‡
Less than 24 months	5 (9.26)	3 (5.56)	3 (5.56)‡	5 (9.26)	12 (22.22)	15 (27.78)	1 (1.85)‡
24 months or beyond	221 (77)	35 (12.32)	58 (20.28)	58 (20.28)	150 (52.82)	252 (88.73)	7 (2.46)
Total	242 (47.45)	43 (8.48)	68 (13.36)	72 (14.15)	198 (39.05)	316 (62.33)	9 (1.78)

*$P \leq 0.05$; †chi-square test; ‡Fisher exact test.

respectively, 16.14% and 57.86%. Table II shows that the prevalence of any malocclusion was 62.33%, with 47.45% having open bite; 8.48%, crossbite; 13.36%, wrong left canine relationship; 14.15%, wrong right canine relationship; and 39.05%, overjet. Nearly 2% of the sample had all types of malocclusion combined.

Table II shows the association of the different types of malocclusion with the independent variables. Children who never used pacifiers, those who had stopped before 24 months, and children who were breastfed for 24 months or longer had lower occurrences of occlusal alterations. In addition, children for whom the main caregiver was the mother had lower prevalences of open bite, wrong left canine relationship, and any malocclusion. The use of a pacifier was associated with a high prevalence of all types of malocclusion (open bite, crossbite, overjet, and wrong right and left canine relationships). The Apgar score was related to open bite and all malocclusions; lower birth weight was associated only with crossbite, and breastfeeding for less than 24 months was related to open bite, left and right canine relationships, overjet, and any malocclusion.

Table III shows the investigation of the outcome (any malocclusion) and the variables of interest on crude and adjusted multivariate analyses. The null hypotheses were rejected, since the presence of any type of malocclusion had a significant relationship with Apgar score, main caregiver, pacifier use, and breastfeeding. After adjustments, the effects of breastfeeding, pacifier use, ICU admission, and Apgar score on malocclusion were confirmed. Children with lower Apgar scores had a prevalence ratio (PR) of 1.32 (95% CI, 1.06-1.64) to exhibit malocclusion compared with those with higher scores. Children who received intensive care were more likely to exhibit malocclusion compared with those who did not (PR = 0.75; 95% CI, 0.56-0.99). Children who never used pacifiers were protected against malocclusion, compared with those who had stopped their use (PR = 1.82; 95% CI, 1.02-3.24) and those who were still using them (PR = 3.88; 95% CI, 2.65-5.68). The children who were still being breastfed for 24 months or longer had fewer malocclusions than those who had already stopped being breastfed by this age or were never breastfed (PR = 0.46; 95% CI, 0.34-0.73).

Table III. Association between the independent variables and malocclusion (Poisson regression analysis)

	Crude			Adjusted		
Variable	*PR*	*95% CI*	P *value*	*PR*	*95% CI*	P *value*
Level 1						
Familial income at birth*			0.36			0.39
≥1001 Brazilian reals	1.00			1.00		
≤1000 Brazilian reals	1.07	0.93-1.23		1.07	0.92-1.23	
Maternal education			0.97			0.91
>8 years	1.00			1.00		
≤8 years	0.99	0.87-1.15		1.01	0.87-1.17	
Level 2						
Type of delivery			0.60			0.66
Normal	1.00			1.00		
Cesarean section	1.04	0.91-1.19		1.04	0.87-1.24	
Need for ICU			0.09			0.05
Yes	1.00			1.00		
No	0.79	0.59-1.04		0.75	0.56-0.99	
Birth weight			0.12			0.12
Normal (≥2.5 kg)	1.00			1.00		
Low (<2.5 kg)	0.79	0.58-1.06		0.65	0.37-1.12	
Gestational age			0.50			0.83
Term	1.00			1.00		
Premature	0.93	0.75-1.15		1.03	0.77-1.39	
Sex			0.37			0.78
Male	1.00			1.00		
Female	0.94	0.82-1.08		1.02	0.86-1.22	
Apgar score			0.05			0.01
Normal (7-10)	1.00			1.00		
Low (0-6)	1.20	1.00-1.45		1.32	1.06-1.64	
Head circumference (percentile)			0.69			0.76
>10	1.00			1.00		
≤10	0.95	0.73-1.23		1.05	0.77-1.42	
Level 3						
Main caregiver			0.01			0.57
Mother	1.00			1.00		
Other	1.22	1.06-1.41		1.06	0.86-1.32	
Level 4						
Breastfeeding			<0.01			<0.01
Never/<24 months	1.00			1.00		
24 months or beyond	0.46	0.34-0.73		0.59	0.42-0.84	
Level 5						
Pacifier use			<0.01			<0.01
Never	1.00			1.00		
Less than 24 months	1.10	0.66-1.84		1.82	1.02-3.24	
24 months or beyond	3.53	2.68-4.64		3.88	2.65-5.68	

PR, Prevalence ratio.
*1 US dollar = 3.96 Brazilian reals at time of data collection.

DISCUSSION

We investigated a sample of children from adolescent mothers enrolled in a cohort study in southern Brazil. Occlusal characteristics were evaluated, aiming to investigate the association of perinatal factors and nutritive and nonnutritive sucking habits with malocclusion occurrence. A total of 62.33% of the evaluated children had at least 1 type of malocclusion, and 1.78% had all possible malocclusions. Compared with the results of other studies investigating similar age groups, the prevalence of malocclusion was high in this sample. De Sousa et al[17] found that 21% of the surveyed children had open bite and 11.6% had posterior crossbite; Wagner and Heinrich-Weltzien[11] found that 54% of the children had malocclusion. A possible explanation for the higher prevalence observed in our study could be the influence of maternal age on feeding and nonnutritive sucking habits.

A birth cohort study in Porto Alegre, southern Brazil, showed that the frequency of long-duration breastfeeding (to 24 months or more) was 29.1%.[26] In our cohort of

adolescent mothers, the frequency of long-duration breastfeeding was lower. Studies have reported that adolescent mothers have a higher chance of interrupting exclusive breastfeeding before 6 months, independent of other risk factors.[7,8] Thus, it is plausible that children from adolescent mothers may be more exposed to risk factors for malocclusion, since prolonged breastfeeding prevents nonnutritional habits[10] and bottle feeding.[29] It is noteworthy, even in the absence of nonnutritional sucking habits, that failure to breastfeed for a sufficient period can negatively affect growth and development of proper muscle tone, leading to malocclusion.[7] However, there is no scientific evidence confirming an adequate length of breastfeeding to benefit the children against malocclusion.[12] Our findings showed the benefits of prolonged breastfeeding for occlusal development of children, corroborating the World Health Organization's recommendations of breastfeeding to at least 12 to 24 months of age.[30]

No relationship was found between prematurity and low birth weight with malocclusion. This is similar to the findings of Guedes et al,[31] who evaluated preschool children. However, another study found that 3 or more malocclusions were almost twice as common among premature infants compared with controls.[16] Rosa[32] conducted a study in a birth cohort and also found that moderate or severe malocclusion was more prevalent in preterm infants. Different mechanisms could explain this association, which includes alterations in growth and development, although specific factors remain unclear.

In our study, ICU admission and Apgar scores were associated with malocclusion. The procedures performed in the neonatal ICU can result in structural changes, such as a narrow, persistent groove in the middle of the hard palate, which can be observed in up to 87.5% of infants with tracheal intubation for at least 2 weeks. This is usually asymptomatic but may be associated with subsequent changes in palate architecture, contributing to malocclusion development.[33] Alves and Luiz[34] studied the association of orotracheal intubation with oral alterations in preterm infants, comparing the intubated infant group and the nonintubated infant group, and suggested that mechanical trauma has an influence on the development of oral structures. This study demonstrated the effect of the 5-minute Apgar scores on occlusal characteristics. Apgar scores below 7 indicate the need for special treatment; if there is no improvement, the newborn will be admitted to the ICU. Thus, it is possible that the association observed is because children with lower Apgar scores may require interventions such as orotracheal intubation, which might, in turn, cause occlusal development alterations. Clinicians should be aware that children with poor perinatal health (low Apgar scores and ICU need) are at increased risk of developing malocclusion. Thus, caregivers may be able to better prepare for possible orthodontic treatment,[22] and dentists may adopt timely interventions.

The children included in this study were 24 to 36 months old. It is known that self-correction of some types of malocclusion in the deciduous dentition (anterior open bite, sagittal malocclusions, and unilateral posterior crossbite) is common.[20] However, the late discontinuing of deleterious habits is associated with maintenance of malocclusion in the deciduous dentition[35] and with morphologic malocclusion severity in the mixed and permanent dentitions.[21,36] Children with anterior open bite, increased overjet, and crossbite in the deciduous dentition had a higher risk of having the same characteristics in the mixed dentition. Additionally, a birth cohort study showed that the occurrence of open bite, crossbite, and canine malocclusion in the deciduous dentition is predictive for malocclusion in the permanent dentition.[22] Whereas there is evidence that anterior open bite tends to disappear with the early discontinuation of sucking habits, the same is not true for posterior crossbite and overjet.[37,38] Thus, dentists should provide anticipatory guidance for parents to support extended breastfeeding and to help children stop sucking habits,[39] and regularly monitor children with malocclusion at a young age[22] to assess self-correction or the maintenance of occlusal alterations.

Since pregnancy is a period when women are open to receiving new information, prenatal clinics could also include pediatric oral health education especially for adolescent mothers.[40] The complexity of this life cycle phase demonstrates that adolescence implies challenges. Therefore, health professionals' approaches to breastfeeding-related aspects in adolescent mothers need to include adequate measures for breastfeeding support during the puerperium and early childhood.

These data were obtained from children of adolescent mothers attending public health services, and the results may not be extrapolated to all preschool children of mothers of other ages. Thus, further studies are needed including other age groups of mothers who delivered after the age of 20. Also, all adolescents were recruited from, the National Public Health System in Brazil. Therefore, our sample group shared a common low socioeconomic profile, which might be considered a limitation of our study. This could explain why socioeconomic characteristics were not associated with occlusion traits. Nevertheless, these results agree with those obtained in a previous study in Brazil.[41,42] Although our cohort did not represent the population, the longitudinal design makes the data less subject to

memory bias. However, lack of information about some characteristics of the child-mother dyads was detected and resulted in lower sample sizes in the multivariate analyses. Despite the limitations, our results contribute to the understanding of risk factors for malocclusion development and in gathering information for effective planning related to orthodontic treatment.

CONCLUSIONS

Within the limitations of this study, the following conclusions can be made.

1. The presence of some type of malocclusion in children aged 24 to 36 months of young mothers was 62.33%. The most common type of malocclusion in this age group was open bite, affecting 47.45% of the children.
2. Children who required ICU admission and had Apgar scores less than 7 had a higher risk of developing some type of malocclusion.
3. Children who used pacifiers had more malocclusions, whereas children who received prolonged breastfeeding had a lower prevalence of malocclusion.

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