

Is the Occurrence of Ankyloglossia in Newborns Associated with Breastfeeding Difficulties?

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Abstract

Background: Ankyloglossia is characterized by abnormal tongue movements that can possibly interfere with breastfeeding due to incorrect latching, pain, nipple fissure, and ineffective suction.

Objective: To determine the prevalence of ankyloglossia in newborns and its association with exclusive breastfeeding and early breastfeeding difficulties.

Materials and Methods: This is an analytical cross-sectional study conducted in seven public maternity hospitals in the city of Recife, PE, Brazil. The study sample consisted of 822 mothers/newborns of both genders. The diagnosis of ankyloglossia was confirmed by comparing two previously standardized and validated lingual frenulum assessment tools. Information on the mother's socioeconomic profile and breastfeeding difficulties were also collected. The data were analyzed using bivariate and multivariate logistic regression models.

Results: The prevalence of ankyloglossia was 2.6% when using the Bristol Tool and 11.7% with the Assessment Tool for Lingual Frenulum Function (Neonatal Tongue Screening Test—NTST). The agreement between the two assessment tools was 2.2%, with a significant difference between them ($p < 0.001$). There was an association between the occurrence of ankyloglossia and breastfeeding difficulties (odds ratio = 1.99), but no association with exclusive breastfeeding practice was found.

Conclusions: The diagnostic tools used herein revealed different prevalence rates of ankyloglossia in newborns. This condition was associated with breastfeeding difficulties, and the NTST was more effective in determining such an association.

Keywords: prevalence, ankyloglossia, newborn, breastfeeding

Introduction

ANKYLOGLOSSIA IS CHARACTERIZED by abnormal tongue movements that can possibly interfere with breastfeeding due to incorrect latching, pain, nipple fissure, and ineffective suction, which may predispose to early weaning.¹ Although ankyloglossia is a congenital disorder, it has not been routinely diagnosed in neonatal screenings.

The prevalence rate of ankyloglossia is variable and possibly underestimated, since most often the diagnosis of this condition is only made if symptoms are present. Hence, health professionals may fail to diagnose ankyloglossia in patients with limited symptomatology. The lack of a standardized protocol and the genetic characteristics of the studied populations may explain the different prevalence

rates of ankyloglossia in newborns reported in the literature: 3.15–21% in Brazil^{2,3} and 4–11% worldwide.^{4–7}

Considering the importance of the early diagnosis of ankyloglossia in maternity hospitals, the federal law 13.002/2014 was approved in Brazil to protect and support breastfeeding practice. As of 2014, the assessment of the lingual frenulum became mandatory in Brazil for all newborns before hospital discharge, to follow up and/or treat the cases where breastfeeding could be potentially affected, as well as to prevent weaning after hospital discharge and favor the continuation of exclusive breastfeeding.^{1,8,9}

Although there are reports of a possible relationship between the occurrence of ankyloglossia and breastfeeding difficulties, this association remains inconclusive due to methodological limitations of published studies.^{10–12} Thus,

this study aimed to determine the prevalence of ankyloglossia in newborns, based on two assessment tools, and to investigate its association with exclusive breastfeeding and early breastfeeding difficulties.

Materials and Methods

Study participants

This was an analytical cross-sectional study conducted in seven public maternity hospitals in the city of Recife, PE, Brazil, between November 2018 and April 2019.

The study sample was composed of 822 mothers of newborns of both genders, aged 1–30 days. The sample size was determined based on a universe of 12,498 individuals, which corresponds to a 6-month average number of monthly births in each maternity hospital. For sample calculation, we also considered a prevalence rate of ankyloglossia (8.8%) from a previous study, 95% confidence interval (CI), 2% maximum error, 1.2 estimated effect and 20% sample dropout. The minimum sample size to be considered was 804 mothers/newborns, who were proportionally allocated from each maternity hospital based on the average number of births. The final sample size was greater than the estimates because some mothers were asked to participate in the study for assessment of their newborn's lingual frenulum.

The data were collected by three examiners previously calibrated in a pilot study. An intraexaminer agreement rate of 0.99 was obtained for the first and second examiners as compared with 1.0 of the gold-standard examiner. Inter-examiner agreement rates of 0.9 and 0.81 were obtained for the first and second examiners, respectively, as compared with the gold-standard examiner.

The following inclusion criteria were considered: term birth, newborns admitted to the same unit, aged 1–30 days, and under exclusive or nonexclusive breastfeeding. Newborns/mothers who met the following exclusion criteria were excluded from the analysis: (1) craniofacial malformations such as microcephaly, cleft lip, and/or palate; (2) diagnosis of mental or motor disorders and/or syndromes; and (3) parturients with postpartum complications that interfered with the mother–child bond or those with systemic issues that prevented them from breastfeeding.

Study measures

The data were collected using three assessments tools, as follows: The Lingual Frenulum Diagnostic tool, the Bristol Tongue Assessment Tool (BTAT),¹³ and the Assessment Tool for Lingual Frenulum Function (Neonatal Tongue Screening Test—NTST).^{14,15} The first was addressed to participating mothers and consisted of a socioeconomic questionnaire with questions such as type of delivery, number of children, previous breastfeeding experience, and complaints of breastfeeding difficulties. The breastfeeding difficulties reported by mothers included nipple pain and fissure; frequent newborn gagging and crackling during breastfeeding associated with inadequate movement of perioral muscles; excessive tiredness when breastfeeding; difficulties in latching the breast; irritability and restlessness of the newborn during breastfeeding associated or not with short feedings and frequent crying; low milk flow associated with difficulty in latching the breast; low glycemic index of the newborn related

to ineffective breastfeeding due to incorrect latching of the breast. The latter was confirmed from the newborn's care chart.

The other two assessment tools were used for oral examination and inspection of the lingual frenulum. For assessment of the lingual frenulum, the mother was asked to place the newborn's neck onto her arm and forearm, as if positioning for breastfeeding, and then to firmly hold the newborn's hands. A specific maneuver was used to elevate the newborn's tongue for proper examination of the lingual frenulum. In brief, gloved index fingers were introduced under the tongue along its lateral margins, and the tongue was elevated for inspection. Newborns were examined for the severity of ankyloglossia and breastfeeding difficulties, and the data were recorded.

Newborns who scored 0–3 on the BTAT and >7 on the NTST were diagnosed with ankyloglossia. Newborns who scored >3 on the BTAT and <7 on the NTST were classified as normal.

The BTAT is based on four analytical criteria, namely appearance of the tip of the tongue, insertion of the frenulum in the mouth floor, elevation of the tongue during crying, and tongue protrusion. Each item has a score ranging from 0 to 2, and the result is obtained by the sum of the scores, which can vary from 0 to 8.

The NTST scores are obtained by summing up the scores of two assessment phases. First, the scores are obtained by examining the lip at rest, tongue positioning during crying, and the shape of the tip of the tongue when it is elevated during crying. The scores range from 0 to 6, with scores from 4 to 6 indicating that the lingual frenulum interferes with tongue movements. The second phase consists of examining the thickness of the lingual frenulum, its attachment to the ventral region of the tongue and the mouth floor. The scores range from 0 to 6, with scores from 3 to 6 indicating that the lingual frenulum interferes with tongue movements. The total sum of scores in both assessments can range from 0 to 12, with scores from 7 to 12 indicating altered lingual frenulum.

While the BTAT classification is “presence of ankyloglossia” or “normality,” the NTST also considers inconclusive cases requiring a second inspection (scores 5 and 6). However, for statistical purposes, this study considered only normality or abnormality, and inconclusive cases were considered as normal.

Statistical analysis

The data were tabulated into Microsoft Office Excel spreadsheets and analyzed in SPSS program, version 23.0. The categorical variables and study measures were analyzed descriptively as absolute and percentage frequencies (mean, standard deviation, and median of age). The association between two categorical variables was tested using Pearson's chi-squared test or Fisher's exact test. The assessment tools for the diagnosis of ankyloglossia were compared by McNemar chi-squared test. Kappa agreement values, and their corresponding CIs, were obtained. Odds ratio (OR) and CIs were obtained from the association between variables in the bivariate study.

A logistic regression model was adjusted for each variable to determine whether the independent variables influence the response (dependent) variables “exclusive breastfeeding” and “breastfeeding difficulties.” Only variables that showed

a significant association up to 20% ($p < 0.20$) in the bivariate study were considered. The variables with $p < 0.20$ were maintained in the model through backward selection. The model allowed to estimate OR values, significant values (p values) of the variables, adjustment of data to the model through the Lemeshow test, and the percentage of correct classification of cases. A 5% margin of error and 95% CI were considered in all statistical tests.

Ethical issues

This study was previously approved by the Research Ethics Committee of the University of Pernambuco (protocol no. 2.414.893/2017, Certificate of Submission for Ethical Appreciation (CAFE): 73673117.6.0000.5207), Research Ethics Committee of the Federal University of Pernambuco (protocol no. 2.506.470/2018, CAEE: 73673117.6.3001.5208), and by the Research Ethics Committee of the Professor Fernando Figueira Integral Medicine Institute (IMIP) (protocol no. 3.196.159/2019, CAEE: 73673117.6.3002.5201). This study is in accordance with all ethical principles disclosed in the Declaration of Helsinki. Volunteer mothers signed an informed consent term to participate in the study.

All cases diagnosed with ankyloglossia were referred to a referral center for diagnosis, follow-up, and treatment of ankyloglossia in the city of Recife, PE, Brazil, regardless of the presence or absence of breastfeeding difficulties.

Results

Of the 822 study participants, 54.9%, 32.2%, and 10.9% were born in state, municipal, and federal public maternity hospitals, respectively, in the city of Recife, Brazil. The most frequent type of delivery was vaginal (53.2%), followed by Cesarean section (46.8%); 63.6% of the newborns had gestational age between 37 and 39 weeks.

The parturients' age ranged from 13 to 44 years, with an average of 25.64 years and a median of 24 years. As for schooling, 51.8% of them had completed high school, 43.2% elementary school, and 5% higher education. Most parturients (74.1%) had a monthly family income of up to one minimum wage (998.00 BRL/250.00 USD), 37.1% of them reported that pregnancy was planned, 77.6% lived with the child's father in the same household, and 69.3% reported that the pregnancy was desired by the father. The parturients' were also inquired about their number of children—42.5% of them had only one child, 43.8% had two or three children, and 13.7% had more than four children. In our study, 54.1% of the mothers had previous breastfeeding experience, 7.5% reported to be embarrassed about breastfeeding in public places, and 19.2% of them took a breastfeeding training course during pregnancy. Most mothers (72.3%) had protruding nipples, followed by semi-flat (18%), flat (8%), and inverted nipples (1.7%).

Demographic and clinical information about the newborns were collected and the following results were obtained: 52.2% were males, 79.8% were aged up to 4 days at the time of examination, and 87.8% were under exclusive breastfeeding, although 17.9% of the mothers reported the occurrence of breastfeeding difficulties.

The prevalence of ankyloglossia was 2.6% when using the BTAT and 11.7% with the NTST. The agreement between the two tools regarding the diagnosis of ankyloglossia was

2.2%, with a significant difference between them ($p < 0.001$). The prevalence of ankyloglossia when using the NTST was higher among males than females (14.2% versus 8.9%) and significantly associated with gender ($p < 0.05$, OR = 1.70 [1.09–2.63], Pearson's chi-squared test). In contrast, no association between the diagnosis of ankyloglossia and gender was observed when the BTAT tool was used.

There was a significant association between exclusive breastfeeding and the maternity hospital public administration (municipal, state, or federal), type of delivery, and variables related to the mother. Nevertheless, there was no significant association between the occurrence of ankyloglossia in the newborns and exclusive breastfeeding in either assessment tools (Table 1).

There was a higher frequency of exclusive breastfeeding among newborns born by vaginal delivery (92.5%) and admitted to municipal maternity hospitals (94.7%), as well as among younger mothers (92.5%) and mothers with more children (92.9%). In addition, the frequency of exclusive breastfeeding was higher among mothers with previous breastfeeding experience (90.6%) who reported no difficulty in breastfeeding (94.4%), and among those with protruding nipples (90.9%).

Breastfeeding difficulties were significantly associated with some mothers' characteristics such as number of children, previous breastfeeding experience, and nipple shape ($p < 0.05$). Furthermore, the newborn's age at the time of the examination was significantly associated with the presence of ankyloglossia diagnosed by the NTST ($p < 0.05$). Of note, breastfeeding difficulties were not related to the occurrence of ankyloglossia diagnosed by the BTAT ($p > 0.05$), but they were associated with the maternity hospital administration (municipal, state, or federal) and type of delivery ($p < 0.05$) (Table 2).

There was a higher frequency of breastfeeding difficulties reported by mothers who underwent Cesarean section (20.8%) in a federal maternity hospital (24.4%). Breastfeeding difficulties were mostly reported by mothers who had their first child (23.2%), with no previous breastfeeding experience (23.9% versus 12.8%) and with nonprotruding nipples (semi-flat, flat, or inverted) (27.1%) as compared with those with protruding nipples (13.8%). In addition, breastfeeding difficulties were most commonly found among newborns aged up to 4 days at the time of the examination (19.5% versus 11.4%) and among those diagnosed with ankyloglossia through the NTST (27.1%).

After a bivariate analysis, a multivariate logistic regression model was used with the five variables that indicated $p < 20$ in the bivariate study at 5% significance. It was possible to infer that the chances of experiencing breastfeeding difficulties are higher among newborns born by Cesarean section in federal public maternity hospitals, in their first 4 days of life, diagnosed with ankyloglossia, and whose mothers have no previous breastfeeding experience and have nonprotruding nipples (Table 3). The model was accepted ($p < 0.001$) and adjusted well according to the Lemeshow test ($p = 0.124$).

Discussion

The decision that supports breastfeeding practices involves a complicated process related not only to the mother's desires but also heavily influenced by beliefs, awareness of the

TABLE 1. ASSESSMENT OF EXCLUSIVE BREASTFEEDING IN RELATION TO THE MATERNITY HOSPITAL PUBLIC ADMINISTRATION, TYPE OF DELIVERY, MOTHER'S CHARACTERISTICS, AND THE OCCURRENCE OF ANKYLOGLOSSIA

Variable	Exclusive breastfeeding			p	OR (95% CI)
	Yes, n (%)	No, n (%)	Total, n (%)		
Maternity hospital public administration				$p^* < 0.001^\dagger$	
Municipal	266 (94.7)	15 (5.3)	281 (100.0)		4.13 (1.97–8.66)
State	383 (84.9)	68 (15.1)	451 (100.0)		1.31 (0.73–2.36)
Federal	73 (81.1)	17 (18.9)	90 (100.0)		1.00
Type of delivery				$p^* < 0.001^\dagger$	
Cesarean section	319 (82.9)	66 (17.1)	385 (100.0)		1.00
Vaginal	403 (92.2)	34 (7.8)	437 (100.0)		2.45 (1.58–3.80)
Mother's age range (in years)				$p^* = 0.046^\dagger$	
13–19	160 (92.5)	13 (7.5)	173 (100.0)		2.28 (1.17–4.43)
20–29	362 (87.9)	50 (12.1)	412 (100.0)		1.34 (0.85–2.12)
30–44	200 (84.4)	37 (15.6)	237 (100.0)		1.00
Number of children				$p^* = 0.017^\dagger$	
1	294 (84.2)	55 (15.8)	349 (100.0)		1.00
2–3	323 (89.7)	37 (10.3)	360 (100.0)		1.63 (1.05–2.55)
≥4	105 (92.9)	8 (7.1)	113 (100.0)		2.46 (1.13–5.33)
Nipple shape				$p^* < 0.001^\dagger$	
Protruding	540 (90.9)	54 (9.1)	594 (100.0)		2.53 (1.65–3.88)
Nonprotruding	182 (78.8)	46 (20.2)	228 (100.0)		1.00
Previous breastfeeding experience				$p^* = 0.009^\dagger$	
Yes	403 (90.6)	42 (9.4)	445 (100.0)		1.74 (1.14–2.66)
No	319 (84.6)	58 (15.4)	377 (100.0)		1.00
Breastfeeding difficulties				$p^* < 0.001^\dagger$	
Yes	85 (57.8)	62 (42.2)	147 (100.0)		1.00
No	637 (94.4)	38 (5.6)	675 (100.0)		12.23 (7.70–19.43)
Bristol classification				$p^\ddagger = 0.498$	
Severe	20 (95.2)	1 (4.8)	21 (100.0)		**
Normal	702 (87.6)	99 (12.4)	801 (100.0)		
Martinelli's classification				$p^* = 0.441$	
Severe	82 (85.4)	14 (14.6)	96 (100.0)		1.00
Normal	640 (88.2)	86 (11.8)	726 (100.0)		1.27 (0.69–2.34)
Total group	722 (87.8)	100 (12.2)	822 (100.0)		

*Pearson's chi-squared test.

**OR could not be calculated due to low frequency.

†Significant association at 5%.

‡Fisher's exact test.

CI, confidence interval; OR, odds ratio.

importance of breastfeeding, and support of friends, relatives, and health professionals. The (dis)continuation of exclusive breastfeeding depends on biological, social, cultural, economic, and political factors. Therefore, the health care team should be prepared to encourage breastfeeding practices as well as to detect potential issues that may cause discontinuation.¹ The hypothesis of our study was that the occurrence of ankyloglossia in newborns may interfere with exclusive breastfeeding or contribute to early breastfeeding difficulties.

It is critical to conduct a systematic and standardized inspection of the lingual frenulum during neonatal screening for the diagnosis of ankyloglossia. Nevertheless, there is no evidence available of a gold-standard assessment tool for the diagnosis of ankyloglossia, which opens research opportunities for comparative analytical studies on different diagnostic resources. It is also worth noting that the prevalence rates of ankyloglossia might be underestimated due to diagnostic inaccuracy, particularly in cases with mild symptomatology.⁵

Studies conducted in Canada¹⁶ and Spain⁴ revealed that when the lingual frenulum examination was performed in maternity hospitals using standardized diagnostic instruments, the prevalence of ankyloglossia was higher than the estimates, which is a strong indication of under-reporting.

Consistent with literature reports, the diagnostic tools used herein showed different prevalence rates of ankyloglossia. Even though the BTAT is usually considered a practical, objective, and easy-to-use assessment tool,¹³ it detected a lower prevalence rate of ankyloglossia as compared with the NTST.^{14,15}

The BTAT was found to be inaccurate when tongue protrusion was scored. When this aspect is considered, the score tends to be >3, inaccurately indicating normality. Therefore, tongue protrusion may be a misleading criterium to consider, as newborns may not protrude their tongue during inspection, or otherwise—newborns with ankyloglossia may protrude their tongues up to the lip or gingiva and even so have limited movement amplitude. The BTAT should be used carefully

TABLE 2. ASSESSMENT OF BREASTFEEDING DIFFICULTIES IN RELATION TO THE MATERNITY HOSPITAL PUBLIC ADMINISTRATION, MOTHER'S AND NEWBORN'S CHARACTERISTICS, AND THE OCCURRENCE OF ANKYLOGLOSSIA

Variable	Breastfeeding difficulties			p	OR (95% CI)
	Yes, n (%)	No, n (%)	Total, n (%)		
Maternity hospital public administration				$p^* < 0.001^\dagger$	
Municipal	30 (10.7)	251 (89.3)	281 (100.0)		1.00
State	95 (21.1)	356 (78.9)	451 (100.0)		2.23 (1.44–3.47)
Federal	22 (24.4)	68 (75.6)	90 (100.0)		2.71 (1.47–4.99)
Type of delivery				$p^* = 0.042^*$	
Cesarean section	80 (20.8)	305 (79.2)	385 (100.0)		1.45 (1.01–2.07)
Vaginal	67 (15.3)	370 (84.7)	437 (100.0)		1.00
Number of children				$p^* < 0.001^\dagger$	
1	81 (23.2)	268 (76.8)	349 (100.0)		3.97 (1.85–8.49)
2–3	58 (16.1)	302 (83.9)	360 (100.0)		2.52 (1.16–5.45)
4 or more	8 (7.1)	105 (92.9)	113 (100.0)		1.00
Nipple shape				$p^* < 0.001^\dagger$	
Protruding	82 (13.8)	512 (86.2)	594 (100.0)		1.00
Nonprotruding	65 (28.5)	163 (71.5)	228 (100.0)		2.49 (1.72–3.61)
Previous breastfeeding experience				$p^* < 0.001^\dagger$	
Yes	57 (12.8)	388 (87.2)	445 (100.0)		1.00
No	90 (23.9)	287 (76.1)	377 (100.0)		2.13 (1.48–3.08)
Newborn's age (in days)				$p^* = 0.015^\dagger$	
Up to 4	128 (19.5)	528 (80.5)	656 (100.0)		1.88 (1.12–3.14)
≥5	19 (11.4)	147 (88.6)	166 (100.0)		1.00
Exclusive breastfeeding				$p^* < 0.001^\dagger$	
Yes	85 (11.8)	637 (88.2)	722 (100.0)		1.00
No	62 (62.0)	38 (38.0)	100 (100.0)		12.23 (7.70–19.43)
Bristol classification				$p^\ddagger = 0.779$	
Severe	4 (19.0)	17 (81.0)	21 (100.0)		1.08 (0.36–3.27)
Normal	143 (17.9)	658 (82.1)	801 (100.0)		1.00
Martinelli's classification				$p^* = 0.012^\dagger$	
Severe	26 (27.1)	70 (72.9)	96 (100.0)		1.86 (1.14–3.03)
Normal	121 (16.7)	605 (83.3)	726 (100.0)		1.00
Total group	147 (17.9)	675 (82.1)	822 (100.0)		

*Pearson's chi-squared test.

†Significant association at 5%.

‡Fisher's exact test.

CI, confidence interval; OR, odds ratio.

TABLE 3. BIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION ANALYSIS OF BREASTFEEDING DIFFICULTIES

Variable	Bivariate analysis		Adjusted model	
	OR (95% CI)	p	OR (95% CI)	p
Newborn's age (in days)		0.015*		0.005*
Up to 4	1.88 (1.12–3.14)		2.17 (1.27–3.71)	
≥5	1.00		1.00	
Maternity hospital public administration		<0.001*		<0.001*
Municipal	1.00		1.00	
State	2.23 (1.44–3.47)		2.46 (1.56–3.88)	
Federal	2.71 (1.47–4.99)		2.65 (1.41–4.98)	
Previous breastfeeding experience		<0.001*		0.001*
Yes	1.00		1.00	
No	2.13 (1.48–3.08)		1.92 (1.13–2.84)	
Nipple shape		<0.001*		<0.001*
Protruding	1.00		1.00	
Nonprotruding	2.49 (1.72–3.61)		2.09 (1.41–3.11)	
Ankyloglossia (NTST)		0.012*		0.009*
Severe	1.86 (1.14–3.03)		1.99 (1.19–3.35)	
Normal	1.00		1.00	

*Significant at 5%.

CI, confidence interval; NTST, Neonatal Tongue Screening Test; OR, odds ratio.

and, ideally, the tongue protrusion item should be disregarded for greater diagnostic accuracy.

The prevalence of ankyloglossia found in our study using the NTST is consistent with that reported in a systematic review of different diagnostic tools.⁷ A significantly greater frequency of ankyloglossia was observed among males when the NTST was used, which is in line with other literature reports^{4,10,17–19} and may be explained by genetic factors.^{18,19} In contrast, the occurrence of ankyloglossia was not significantly associated with the newborn's gender when the BTAT was used.

Our findings revealed that exclusive breastfeeding was more frequent among younger mothers, with greater number of children, previous breastfeeding experience, experiencing no breastfeeding difficulties, and with protruding nipples. In addition, exclusive breastfeeding was also more prevalent among newborns born by vaginal delivery in municipal maternity hospitals. Although maternal characteristics have a strong influence on breastfeeding practice, they should not guide health promotion and protection strategies due to their immutable nature. Instead, public policies should be directed toward the choice for vaginal delivery as a protective measure for both the mother and the newborn.

Our findings also revealed that the maternity hospital administration (municipal, state, or federal) contributed to breastfeeding practice. Health care teams in municipal maternity hospitals were found to be positively encouraging compliance with exclusive breastfeeding as compared with those of state or federal hospitals.

The occurrence of ankyloglossia was not associated with exclusive breastfeeding, but instead with breastfeeding difficulties. In our study, participating newborns were screened very early—in their first days of life—using a cross-sectional approach and no follow-up on a possible early weaning. Thus, the lack of association between the diagnosis of ankyloglossia and exclusive breastfeeding practice should be interpreted with caution.

A previous review showed prevalence rates of ankyloglossia ranging from 2% to 5% and further reported that 50% of the newborns presented some issue related to breastfeeding.²⁰ Another study carried out in England confirmed that ankyloglossia may pose significant difficulties in exclusive breastfeeding in the long term. The frequency of exclusive breastfeeding at 3 months of age is very low in England, which reinforces the need for early diagnosis and treatment of ankyloglossia to prolong breastfeeding practice.²¹ In Ireland, the frequency of exclusive breastfeeding at hospital discharge (46%) is also alarmingly low. Some authors point out that although there is controversy regarding the clinical impact of ankyloglossia on breastfeeding, it is important to encourage this practice before hospital discharge.¹¹

Mothers with no previous breastfeeding history and at early stages of breastfeeding experienced more difficulty. To some extent, these findings can be considered normal because there is an adaptation gap in the mother–newborn relationship, which tends to improve over time. However, the presence of ankyloglossia was indeed a contributing factor to breastfeeding difficulties. The lingual frenulum does not change in terms of elasticity and fixation upon movement and/or over time²²; therefore, ankyloglossia should be treated early, since, if difficulties persist, it may lead to early weaning. Of note, the difficulties reported in our study were

encountered by mothers who were still breastfeeding. Mothers who had difficulties and were not breastfeeding were excluded from the study. It is assumed that there is a considerable percentage of mothers who discontinue breastfeeding, even before hospital discharge, due to the difficulties associated with ankyloglossia.

The major limitation of this study corresponds to its cross-sectional design. Although potential contributors of early weaning have been speculated, there was no follow-up assessment to confirm that. Another limitation lies in the fact that interviews were carried out during the newborns' first days of life, which corresponds to the mother–newborn adaptation gap. Therefore, the occurrence of some breastfeeding difficulties may be biased in this regard.

Conclusions

The BTAT and the NTST showed different prevalence rates of ankyloglossia in newborns, with the former revealing a lower prevalence. Our findings suggested that although the occurrence of ankyloglossia in newborns did not affect exclusive breastfeeding in their first days of life, it significantly contributed to breastfeeding difficulties. The NTST was found to be more effective in determining such an association. The difficulties encountered by mothers may cause discontinuation of exclusive breastfeeding and, eventually, lead to early weaning.

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