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ORIGINAL ARTICLE

Evaluation of dentists' knowledge and attitudes regarding ankyloglossia in children

Evaluación del nivel de conocimiento y de las actitudes de los dentistas sobre la anquiloglosia en niños

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Abstract

Objective: *Ankyloglossia, known as tongue-tie, is a common congenital malformation that restricts the movement of the tongue. It is seen in 4.8% of newborns and is more prevalent in males compared to females. This study aims to evaluate the knowledge and attitudes of dentists in Turkey regarding ankyloglossia.* **Methods:** *Our survey was conducted online with dentists in Turkey who examine and treat patients. The data were analyzed using IBM Statistical Package for the Social Sciences V.21 software. Frequency distributions and percentages were examined, and relationships between nominal variables were assessed using the χ^2 test. A significance level of $p < 0.05$ was accepted.* **Results:** *The results showed that 76.14% of the participants could recognize ankyloglossia in children, and 87.14% believed it to be a congenital anomaly. In addition, 91.49% of the participants thought that ankyloglossia negatively affects breastfeeding, and 98.34% believed that it could cause speech disorders.* **Conclusions:** *Our study emphasizes the importance of increasing awareness of ankyloglossia and the significance of early diagnosis and treatment.*

Keywords: *Ankyloglossia. Online survey study. Dentists' knowledge and attitudes. Congenital malformation.*

Resumen

Objetivo: *La anquiloglosia, conocida como frenillo lingual, es una malformación congénita común que restringe el movimiento de la lengua. Se observa en el 4.8% de los recién nacidos y es más frecuente en los hombres que en las mujeres. El objetivo de este estudio es evaluar el conocimiento y las actitudes de los dentistas en Turquía con respecto a la anquiloglosia.* **Métodos:** *Se realizó una encuesta en línea a dentistas de Turquía que examinan y tratan a pacientes. Los datos se analizaron utilizando el software IBM SPSS V.21. Se examinaron las distribuciones de frecuencia y los porcentajes, y las relaciones entre variables nominales se evaluaron utilizando la prueba χ^2. Se consideró como nivel de significancia $p < 0.05$.* **Resultados:** *El 76.14% de los participantes podían reconocer la anquiloglosia en los niños y el 87.14% creían que era una anomalía congénita. Además, el 91.49% de los participantes pensaba que la anquiloglosia afecta negativamente la lactancia materna y el 98.34% que podría causar trastornos del habla.* **Conclusiones:** *Este estudio enfatiza la importancia de aumentar la concienciа sobre la anquiloglosia y la importancia del diagnóstico y el tratamiento tempranos.*

Palabras clave: *Anquiloglosia. Estudio de encuesta en línea. Conocimientos y actitudes de los dentistas. Malformación congénita.*

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Introduction

Ankyloglossia, also known as tongue-tie, is one of the most common congenital developmental malformations that restricts the mobility of the tongue.[1,2] Ankyloglossia has a prevalence of 4.8% in the newborn population and is three times more common in males than females (3:1). In the general population, its prevalence ranges from 4% to 10.7%, based on studies using different diagnostic criteria. The severity of ankyloglossia varies from mild cases, where tongue movement is minimally affected, to complete ankyloglossia, where the tongue is fully attached to the floor of the mouth.[3-5]

Ankyloglossia can occur sporadically or be familial and can be part of rare syndromes such as Moebius syndrome, Beckwith-Wiedemann syndrome, orofaciodigital syndrome, and X-linked cleft palate. Both isolated and syndrome-associated cases of ankyloglossia are thought to have a genetic component.[3,6]

Classifications for ankyloglossia are based on various anatomical and functional criteria; however, there is no universally accepted classification yet. Key criteria for classification include the amount of tongue elevation and protrusion, breastfeeding, feeding, speech, and the development of dental arches.[7]

In the literature, views on the importance of ankyloglossia vary significantly.[8] Some experts argue that it is symptomatic and usually does not require intervention, while others believe that it can lead to various issues such as breastfeeding difficulties, speech disorders, and oral health problems.[9,10]

Based on these studies, ankyloglossia can cause a range of problems, including breastfeeding difficulties and associated poor weight gain, breast pain or mastitis in the mother, speech and feeding disorders, poor oral hygiene, localized gingival recession on the lingual surfaces of mandibular anterior teeth, sleep apnea, and peer bullying during childhood and adolescence.[4,5,7,11]

Therefore, early diagnosis of ankyloglossia forms the basis for surgical or psychological interventions aimed at improving the child's quality of life.[5]

Dentists play a vital role in the early detection and treatment of ankyloglossia, as they frequently encounter this condition during routine patient examinations. The knowledge level of dentists regarding ankyloglossia allows them to accurately assess patients, make correct diagnoses, and develop appropriate treatment plans. In addition, having current and comprehensive knowledge and skills related to ankyloglossia enables dentists to treat patients with this condition through a multidisciplinary approach and helps patients achieve the best outcomes. This study aims to evaluate the knowledge levels and approaches of dentists regarding ankyloglossia through a survey, raise awareness, and contribute to the literature. The primary objective of the study is to assess dentists' knowledge and attitudes regarding the diagnosis and treatment methods of ankyloglossia, thereby evaluating current education and practice standards. This survey aims to identify knowledge gaps in the diagnosis and treatment processes of ankyloglossia among dentists and develop strategies to improve education and practice standards in this field.

Methods

Study design and population

Ethical approval was obtained from the Institutional Ethics Committee and Scientific Review Board of Iğdır University with the decision made at the meeting dated February 28, 2024. Informed consent was obtained online from all participants before the study. In this study, a cross-sectional survey titled "Evaluation Of Dentists' Knowledge And Attitudes Regarding Ankyloglossia In Children" consisting of questions proven to be reliable and valid in similar literature studies, was administered to dentists in Turkey who examine and treat patients.[3,5]

Inclusion and exclusion criteria

Inclusion criteria of the study encompass randomly selected dentists who examine and treat patients in clinics. Exclusion criteria include dentists who do not actively treat patients and those who do not wish to participate in the study.

Sample size calculation

This study is a cross-sectional survey conducted among 44,000 registered dentists nationwide. The online survey prepared on the Google Forms platform was sent to participants via Instagram, email, and WhatsApp at the beginning of 2024. Sample size calculation was performed using OpenEpi's sample size calculator (https://www.openepi.com/SampleSize/SSPropor.htm). Using a 95% confidence interval and

a 5% margin of error, the minimum sample size was calculated as 381. To compensate for potential participant dropouts, the sample size was increased by 20%, resulting in a final sample size of 457, which was reached using a simple random sampling method.

Data collection

The questionnaire was developed by the authors by reviewing relevant published literature and international guidelines. The survey was designed to cover key aspects of dentists' knowledge and practices regarding ankyloglossia. The survey consists of three sections:

1. The first section, following informed consent, includes basic characteristics of the participants such as age, gender, and years of professional experience
2. The second section aims to measure dentists' knowledge about ankyloglossia and their awareness of its effects on patients
3. The third section includes questions evaluating dentists' attitudes and practices regarding clinical examination and treatment measures. The participation rate of dentists in the study was recorded as 100%.

Statistical analysis

The data obtained in this study were analyzed using the licensed IBM Statistical Package for the Social Sciences V. 21 package program. Frequency distribution tables with counts and percentage values were examined for variables. The χ^2 test was applied to examine the relationships between groups of nominal variables. Fisher's Exact Test was used in 2×2 tables when the expected values in the cells did not have sufficient volume, and the Pearson χ^2 analysis was applied with the help of Monte Carlo Simulation in RxC tables (*χ^2 analysis was performed with the help of Monte Carlo Simulation because 20% of the expected values in the cells were < 5). A significance level of 0.05 was used when interpreting the results; a significant relationship was indicated if $p < 0.05$, while no significant relationship was indicated if $p > 0.05$.

Results

Among the participants, 70.75% were female, and 29.25% were male. The age distribution of the participants was as follows: 49.59% were aged 23-30, 37.55% were aged 31-40, 10.37% were aged 41-50, and 2.49% were aged 51 and above. Regarding professional experience, 42.32% had 1-5 years, 30.08% had 6-10 years, 14.11% had 11-15 years, and 13.49% had 15 years or more in the profession.

About 76.14% (n = 367) of the participants stated that they could recognize ankyloglossia in a child patient who visits their clinic. 87.14% (n = 420) believed that ankyloglossia is a congenital anomaly, and 91.49% (n = 441) believed that it could negatively affect breastfeeding. 98.34% (n = 474) thought that ankyloglossia could cause speech disorders, and 52.7% (n = 254) were aware of the treatment options. The proportion of those who had previously encountered a patient with ankyloglossia was 51.87% (n = 250), and 25.93% (n = 125) routinely checked for ankyloglossia during examinations. 82.16% (n = 396) thought that ankyloglossia should be treated at an early age, 88.17% (n = 425) believed that untreated patients might experience psychological problems, and 87.76% (n = 423) believed that it could cause feeding difficulties. 63.28% (n = 305) strongly agreed that anomalies should be routinely checked during clinical oral examinations (Table 1).

A statistically significant relationship was found between gender and encountering a patient with ankyloglossia during a clinical examination ($p < 0.05$). 53.37% of women and 48.23% of men had previously encountered a patient with ankyloglossia during a clinical examination, while 44.57% of women and 45.39% of men had not.

A statistically significant relationship was also found between gender and routinely checking for anomalies during clinical oral examinations ($p < 0.05$). 67.16% of women and 53.9% of men routinely checked for anomalies during clinical oral examinations, while 1.42% of men did not.

There was no statistically significant relationship between gender and other questions related to knowledge about ankyloglossia and its effects on patients ($p > 0.05$).

A statistically significant relationship was found between age group and the belief that ankyloglossia negatively affects breastfeeding ($p < 0.05$). 91.63% of those aged 23-30, 93.92% of those aged 31-40, 86% of those aged 41-50, and 75% of those aged 51 and above believed that ankyloglossia negatively affects breastfeeding, while 4.6% of those aged 23-30, 3.31% of those aged 31-40, 4% of those aged 41-50, and 16.67% of those aged 51 and above did not.

Table 1. Frequency distribution of questions regarding knowledge of ankyloglossia and its effects on patients

Question	Yes	%	No	%	Undecided	%	Total	%
1. Do you recognize if a child patient has ankyloglossia when they visit your clinic?	367	76.14	43	8.92	72	14.94	482	100
2. Do you think ankyloglossia is a congenital anomaly?	420	87.14	16	3.32	46	9.54	482	100
3. Do you think ankyloglossia can negatively affect breastfeeding?	441	91.49	19	3.94	22	4.56	482	100
4. Do you think ankyloglossia can cause speech disorders?	474	98.34	0	0	8	1.66	482	100
5. Are you aware of the treatment options for ankyloglossia?	254	52.7	115	23.86	113	23.44	482	100
6. Have you ever encountered a patient with ankyloglossia during a clinical examination?	250	51.87	216	44.81	16	3.32	482	100
7. Do you routinely check for ankyloglossia during clinical oral examinations?	125	25.93	308	63.9	49	10.17	482	100
8. Do you think ankyloglossia should be treated at an early age?	396	82.16	16	3.32	70	14.52	482	100
9. Do you think untreated ankyloglossia patients might experience psychological problems?	425	88.17	10	2.07	47	9.75	482	100
10. Do you think ankyloglossia can cause feeding difficulties?	423	87.76	14	2.9	45	9.34	482	100
11. Anomalies should be routinely checked during clinical oral examinations.								
Strongly agree			305	63.28				
Agree			161	33.4				
Undecided			14	2.9				
Disagree			2	0.41				
Total			482	100				

A statistically significant relationship was found between age group and knowledge of treatment options for ankyloglossia ($p < 0.05$). 41% of those aged 23-30, 62.98% of those aged 31-40, 68% of those aged 41-50, and 66.67% of those aged 51 and above were aware of the treatment options, while 28.87% of those aged 23-30, 20.99% of those aged 31-40, 14% of those aged 41-50, and 8.33% of those aged 51 and above were not.

A statistically significant relationship was found between age group and encountering a patient with ankyloglossia during a clinical examination ($p < 0.05$). 40.59% of those aged 23-30, 61.33% of those aged 31-40, 66% of those aged 41-50, and 75% of those aged 51 and above had encountered a patient with ankyloglossia during a clinical examination, while 54.39% of those aged 23-30, 37.57% of those aged 31-40, 32% of those aged 41-50, and 16.67% of those aged 51 and above had not.

A statistically significant relationship was found between age group and routinely checking for ankyloglossia during clinical oral examinations ($p < 0.05$). 15.9% of those aged 23-30, 33.7% of those aged 31-40, 40% of those aged 41-50, and 50% of those aged 51 and above routinely checked for ankyloglossia during clinical oral examinations, while 71.97% of those aged 23-30, 56.91% of those aged 31-40, 56% of those aged 41-50, and 41.67% of those aged 51 and above did not.

A statistically significant relationship was found between age group and the belief that ankyloglossia causes feeding difficulties ($p < 0.05$). 90.79% of those aged 23-30, 87.85% of those aged 31-40, 74% of those aged 41-50, and 83.33% of those aged 51 and above believed that ankyloglossia causes feeding difficulties, while 2.09% of those aged 23-30, 2.21% of those aged 31-40, 8% of those aged 41-50, and 8.33% of those aged 51 and above did not.

There was no statistically significant relationship between age group and other questions related to knowledge about ankyloglossia and its effects on patients ($p > 0.05$).

A statistically significant relationship was found between years of professional experience and the ability to recognize ankyloglossia in a child patient visiting the clinic ($p < 0.05$). 69.61% of those with

1-5 years, 75.17% of those with 6-10 years, 92.65% of those with 11-15 years, and 81.54% of those with 15 years or more professional experience could recognize ankyloglossia in a child patient, while 10.29% of those with 1-5 years, 8.97% of those with 6-10 years, 2.94% of those with 11-15 years, and 10.77% of those with 15 years or more professional experience could not.

A statistically significant relationship was found between years of professional experience and knowledge of treatment options for ankyloglossia ($p < 0.05$). 38.24% of those with 1-5 years, 55.17% of those with 6-10 years, 77.94% of those with 11-15 years, and 66.15% of those with 15 years or more professional experience knew the treatment options, while 31.37% of those with 1-5 years, 24.83% of those with 6-10 years, 13.24% of those with 11-15 years, and 9.23% of those with 15 years or more professional experience did not.

A statistically significant relationship was found between years of professional experience and encountering a patient with ankyloglossia during a clinical examination ($p < 0.05$). 37.25% of those with 1-5 years, 51.72% of those with 6-10 years, 75% of those with 11-15 years, and 73.85% of those with 15 years or more professional experience had encountered a patient with ankyloglossia during a clinical examination, while 58.33% of those with 1-5 years, 44.83% of those with 6-10 years, 25% of those with 11-15 years, and 23.08% of those with 15 years or more professional experience had not.

A statistically significant relationship was found between years of professional experience and routinely checking for ankyloglossia during clinical oral examinations ($p < 0.05$). 15.2% of those with 1-5 years, 26.21% of those with 6-10 years, 38.24% of those with 11-15 years, and 46.15% of those with 15 years or more professional experience routinely checked for ankyloglossia during clinical oral examinations, while 71.08% of those with 1-5 years, 64.83% of those with 6-10 years, 54.41% of those with 11-15 years, and 49.23% of those with 15 years or more professional experience did not.

There was no statistically significant relationship between years of professional experience and other questions related to knowledge about ankyloglossia and its effects on patients ($p > 0.05$).

Discussion

In the literature, tongue-tie is a controversial issue due to its potential effects on children. Dentists, pediatricians, otolaryngologists, and lactation consultants play a crucial role in the diagnosis and clinical management of tongue-tie. Dentists should have high knowledge and awareness of this condition as they frequently encounter anatomical disorders such as ankyloglossia. Ankyloglossia is often associated with congenital syndromes such as orofaciodigital syndrome, Simpson-Golabi-Behmel syndrome, Opitz syndrome, Beckwith-Wiedemann syndrome, and X-linked cleft palate syndrome. In a study by Oviya et al., 96% of participants stated that they had knowledge of ankyloglossia, and 85% were aware that ankyloglossia is a congenital condition.[1,5] In our study, 76.14% of participants reported knowing ankyloglossia, and 87.14% were aware that it is a congenital anomaly.

Ankyloglossia can cause nipple pain due to the baby's inability to latch properly, leading to poor milk flow and nipple sores, which can result in the termination of breastfeeding, the baby rejecting the breast, and a switch to bottle feeding.[12] In a study by Oviya et al., 87% of participants reported that ankyloglossia negatively affects breastfeeding.[5] Conversely, another study asked participants (excluding speech pathologists) about the relationship between tongue-tie and sucking or feeding dysfunction in infants. While 90% of pediatricians and 70% of ENT specialists indicated that ankyloglossia rarely causes feeding difficulties, 69% of lactation consultants reported that tongue-tie often or always leads to feeding difficulties, and 30% said it sometimes causes these issues.[9] In our study, 91.49% of dentists reported knowing that ankyloglossia negatively affects breastfeeding.

Research by Messner and Lalakea evaluated the effects of ankyloglossia on speech problems among physicians and speech pathologists. While 60% of ENT specialists reported that tongue-tie sometimes causes speech disorders, only 23% of pediatricians shared this view. The same study indicated that speech pathologists had varying opinions on the impact of tongue-tie on speech.[9] In a study by Oviya et al., 85% of participants stated that ankyloglossia negatively affects children's speech.[5] In our study, 98.34% of dentists reported that ankyloglossia negatively affects children's speech.

A study by Jin et al. indicated variability in ankyloglossia treatment among healthcare professionals, attributed to uncertain treatment outcomes and increased complications, particularly damage to anatomical structures. Untreated children may face breastfeeding, speech difficulties, and dental development issues, necessitating orthodontic intervention.[13]

In the study by Oviya et al., 80% of participants reported knowing the treatment methods for ankyloglossia.[5] In our study, 52.7% of dentists reported knowing the treatment options.

Research by Messner and Lalakea found that over 80% of physicians surveyed considered ankyloglossia rare, with fewer than 10 cases seen annually in their practices. 77% of lactation consultants indicated that ankyloglossia rarely occurs and significantly contributes to breastfeeding problems in only 1-5% of cases. Similarly, 70% of speech pathologists reported rarely seeing symptomatic ankyloglossia in their practices.[9] In the study by Oviya et al., 57% of participants had encountered patients with ankyloglossia.[5] Previous studies reported an incidence of encountering patients with ankyloglossia ranging from 0.02% to 5%.[7] In our study, 51.87% of dentists reported having encountered a patient with ankyloglossia during clinical examinations.

In the study by Oviya et al., 70% of participants reported routinely checking for ankyloglossia in every patient, and 85% acknowledged that all anomalies should be routinely checked during examinations.[5] In our study, only 25.93% of dentists reported routinely checking for ankyloglossia during clinical oral examinations.

Research by Messner and Lalakea indicated significant improvement in breastfeeding among children who underwent surgical intervention for ankyloglossia[9]. A study by Walls et al.,[14] reported improvements in speech outcomes and oral motor activities in children who underwent frenectomy as newborns compared to those who did not.[14] In the study by Oviya et al., 85% of participants stated that ankyloglossia should be treated at an early age.[5] In our study, 82.16% of dentists believed that ankyloglossia should be treated at an early age.

In a case study by Baxter et al.,[15] a child with ankyloglossia was reported to be shy and insecure in communication, selectively preferred foods, and gagged when eating certain foods. In the study by Oviya et al., 79% of participants reported that this anomaly causes psychological problems in children.[5] In our study, 88.17% of dentists believed that untreated ankyloglossia could cause psychological problems.

In the study by Oviya et al., 82% of participants indicated that children with ankyloglossia experience feeding difficulties.[5] In our study, 87.76% of dentists believed that ankyloglossia could cause feeding difficulties.

Given the limited data in the literature on ankyloglossia and related problems, access to some sources in the discussion section was limited. In addition, since the survey method used in our study relied on participants' self-reports, the results may be subjective. The selection of participants from a specific geographical region also limits the generalizability of the results. These limitations underscore the importance of future studies with larger sample groups and more comprehensive data collection methods on ankyloglossia.

Conclusions

This study evaluated dentists' knowledge and attitudes towards ankyloglossia. Our findings indicate that the majority of dentists have knowledge of ankyloglossia and believe that this anomaly should be treated at an early age. In addition, there is a widespread view in our study that untreated ankyloglossia can lead to breastfeeding, feeding, and speech problems. These findings highlight the importance of increasing awareness of ankyloglossia and considering it during routine examinations. Future studies should support these findings with larger sample groups.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols. The authors have obtained approval from the Ethics Committee for the analysis

of routinely obtained and anonymized clinical data, so informed consent was not necessary.

Declaration on the use of artificial intelligence. The authors declare that artificial intelligence was used in the writing of this manuscript specifically "Chatgpt" in the writing of this manuscript and/or in the creation of images, graphics, tables, or their corresponding captions. "ChatGPT has been utilized to enhance the language of the copyright transfer letter.

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