



## Prevalence of Dental Caries in Intercountry Adopted Children

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**Abstract: Background:** Dental caries is one of the most prevalent pathologies worldwide. All children from international adoption have a history of exposure to potential risk factors for dental health and the development of dental caries, both before and during institutionalization before adoption. The objective of this study was to determine the prevalence of dental caries in primary teeth in a cohort of intercountry adopted children upon arrival in the Autonomous Community of Aragon, Spain. **Material & Methods:** Epidemiological, descriptive, observational, and cross-sectional study from January 2000 to December 2018. A total of 264 children, aged between 1 and 6 years, were examined by a pediatrician and dentist in the first 15 days after arrival. For oral evaluation, the WHO standardized protocols and forms and the FDI notation were used. **Results:** The mean age at the time of the examination was 32 months. The prevalence of active dental caries in all intercountry adopted children was found to be 9.1% and dft index was 0.18 (95% CI: 0.11-0.25). The majorities were from Eastern European countries, mainly Russia. Dental caries was not detected in children from China, the Indian subcontinent, and Southeast Asia. No child had fissure sealant. No child had filled or missing tooth, due to caries. Of the 24 children with active dental caries, all had carious crown and only two had carious root. **Conclusion:** Intercountry adopted children in Aragon do not present a high prevalence of active dental caries in the examination upon arrival. Anyway, it is necessary to reinforce pediatricians and dentists to promote dental health to prevent tooth decay once they have adapted and integrated into the host community.

**Keywords:** Dental Caries, Prevalence, Children, Intercountry Adoption.

### INTRODUCTION

Dental caries is one of the most prevalent pathologies worldwide. It is of special relevance in pediatric patients since a carious lesion can compromise the integrity of the affected tooth, being necessary in the most extreme cases extraction. This aspect can lead to harmful changes in swallowing or in the patient's occlusion ([www.fdiworlddental.org](http://www.fdiworlddental.org), 2015).

All children from international adoption have a history of exposure to potential risk factors for dental health and the development of dental caries, such as poverty, abuse and chronic neglect, malnutrition, rickets, inadequate nutrition and excess sugar in the diet, lack of hygiene and tooth brushing, lack of fluoridation of drinking water or fluoridated supplements in orphanages, endemic diseases and poor preventive and health care, both before and during the previous institutionalization upon adoption (Oliván Gonzalvo, G., & de la Parte Serna, A. C. 2021; Alberola López, S. *et al.*, 2008; Jones, V. F., & Schulte, E. E. 2019; Salerno, G. *et al.*, 2018).

For this reason, in these children, the integrity of the primary dentition should be evaluated after the arrival in the host country, and subsequent damage to the secondary dentition should be prevented (Alberola López, S. *et al.*, 2008; & Jones, V. F., & Schulte, E. E. 2019).

### OBJECTIVE OF THE STUDY

The objective of this study was to determine the prevalence of dental caries in primary teeth in a cohort of intercountry adopted children upon arrival in the Autonomous Community of Aragon, Spain.

### MATERIAL AND METHODS

#### Study Design:

Descriptive, observational, and cross-sectional epidemiological study.

### **Data Source and Sample:**

This study was conducted on 264 intercountry adopted children in Aragon, Spain, assessed in the Pediatrics and International Adoption Center of Zaragoza (Aragon, Spain) from January 2000 to December 2018.

### **Inclusion Criteria:**

Children aged between 1 and 6 years, both male and female, explored in the first 15 days after their arrival.

### **Exclusion Criteria:**

Children aged between 1 and 6 years explored beyond 15 days after their arrival. Children below 1 year and above 6 years.

### **Study Procedure:**

A trained and international adoption expert pediatrician performed the initial examination and diagnosis of possible dental caries. Children diagnosed with possible dental caries were referred to public or private pediatric dentistry centres for diagnosis confirmation and, where appropriate, for their treatment.

### **Diagnosing Method:**

For oral evaluation, the WHO standardized protocols and forms (World Health Organization. 2013) and the FDI notation ([www.fdiworlddental.org](http://www.fdiworlddental.org). 2015) were used. For primary dentition, the dft index (decayed, filled teeth; missing teeth is not recommended to be part of dft index because of the confusion with exfoliated teeth) were used. According to FDI two-digit tooth numbering system, in deciduous teeth, the 1st digit refers to the quadrants of the mouth (5, upper right; 6, upper left; 7, lower left; 8, lower right) and the 2nd digit refers to the teeth (1, central incisors; 2, lateral incisors; 3, canines; 4, 1st molar; 5, 2nd molar) ([www.fdiworlddental.org](http://www.fdiworlddental.org). 2015). To perform the oral examination, among other instruments, plane mouth mirror Cone Socket#5 and metallic periodontal probes with ball tip conforming to WHO specifications (World Health Organization. 2013) were used. A tooth was considered present in the mouth when any part of it was visible. The criteria for diagnosing a tooth decayed and the coding in deciduous teeth were as follows. Carious crown (B): when a lesion in a pit or fissure, or on a smooth tooth surface, has an unmistakable cavity, undermined enamel, or a detectably softened floor or wall. Carious root (1): when a lesion feels soft or leathery on probing with the

examination. Filled crown, with caries (C): when it has one or more permanent restorations and one or more areas that are decayed. Filled root, with caries (2): when it has one or more permanent restorations and one or more areas that are decayed. Filled crown, with no caries (D): when one or more permanent restorations are present and there is no caries anywhere on the crown. Filled root, with no caries (3): when one or more permanent restorations are present and there is no caries anywhere on the root. Missing tooth, due to caries (E): when that have been extracted because of caries and are recorded under coronal status. Fissure sealant (F): for teeth in which a fissure sealant has been placed on the occlusal surface, in pits or for teeth in which the occlusal fissure has been enlarged with a rounded or “flame-shaped” bur, and a composite material placed (World Health Organization. 2013).

### **Data Collection:**

The following epidemiological variables were collected: country of origin; sex; age at the examination; diagnosing and coding of dental caries in the deciduous tooth. An Excel® sheet was used to calculate the arithmetic mean of the age and the absolute frequencies and percentages of the qualitative data. Informed consent was not required due to the retrospective design. The data was used in accordance with Organic Law 3/2018 on the Protection of Personal Data and guarantee of digital rights, in force in Spain.

## **RESULTS**

Table 1 shows the descriptive epidemiology of the cohort of intercountry adopted children and the prevalence of active dental caries. Of the 264 intercountry adopted children, 50.4% were female and 68.2% came from Eastern European countries, mainly Russia. The mean age at the time of the examination was 32 months. The prevalence of active dental caries in all intercountry adopted children was found to be 9.1% and dft index was 0.18 (95% CI: 0.11-0.25). The majorities were from Eastern European countries, mainly Russia. Dental caries was not detected in children from China, the Indian subcontinent, and Southeast Asia.

No child had fissure sealant (F). No child had filled (C, 2, D, 3) or missing (E) tooth, due to caries. Of the 24 children with active dental caries, all had carious crown (B) and only two had carious root (1).

**Table 1.** Descriptive Epidemiology of the Cohort of Intercountry Adopted Children and Prevalence of Active Dental Caries

	Total n (%)	Female n (%)	Male n (%)	Mean age (months)	Dental caries n (%)
<b>Children adopted</b>	264 (100)	133 (50.4)	131 (49.6)	32	24 (9.1)
<b>Origin</b>					
Eastern Europe <sup>a</sup>	180 (68.2)	63 (35)	117 (65)	33	22 (12.2)
China	46 (17.4)	43 (93.5)	3 (6.5)	18	0
Indian subcontinent <sup>b</sup>	13 (4.9)	11 (84.6)	2 (15.4)	47	0
Latin America <sup>c</sup>	11 (4.2)	8 (72.7)	3 (27.3)	51	1 (9.1)
Southeast Asia <sup>d</sup>	8 (3)	3 (37.5)	5 (62.5)	26	0
Africa <sup>e</sup>	6 (2.3)	5 (83.3)	1 (16.7)	31	1 (16.7)

<sup>a</sup> Russia (n = 159), Ukraine (n = 15), Kazakhstan (n = 6).

<sup>b</sup> India (n = 9), Nepal (n = 4).

<sup>c</sup> Colombia (n = 6), Bolivia (n = 3), Uruguay (2).

<sup>d</sup> Vietnam (n = 4), Philippines (n = 4).

<sup>e</sup> Ethiopia (n = 6).

## DISCUSSION

Intercountry adopted children present special characteristics that require a unique approach from the health point of view. For this reason, it is recommended that professionals who provide direct care to these children have training instruments that allow them to face their work with a guarantee. In these children, the initial medical evaluation should not be delayed more than 15 days after arrival. It should be borne in mind that infectious diseases account for the majority of observed medical problems and there is the possibility of transmission to members of the adopting family or the community. In addition, failure to identify and intervene early in their health problems can adversely affect their quality of life in future psychophysical development and increase the difficulties of adaptation and integration in the new family unit (Alberola López, S. et al., 2008).

The literature review indicates that the prevalence of active dental caries upon arrival in the host country ranges between 6% and 10% (Oliván Gonzalvo, G. 2021). In the cohort of intercountry adopted children in Aragon, the prevalence of active dental caries was 9.1%, being within the range described in the literature.

However, it should be noted that most children with active dental caries came from Eastern European countries, mainly Russia, with a prevalence of 12.2% in this population. Although casuistry was very scarce in children from Ethiopia, the prevalence of active dental caries was 16.7%. This higher prevalence of active dental caries has also been observed among Ethiopian children adopted by American families (Miller, L. C. et al., 2008).

These findings suggest that these children have been more exposed to risk factors for developing dental caries and that they have received poor preventive oral and dental care, both before and during their institutionalization, than those from other countries (Miller, L. C. et al., 2008; Tirella, L. G. et

al., 2008; & Miller, L. C. et al., 2007). Furthermore, the fact that no fissure sealant and filled decayed were observed in any child indicates the absent dental treatments during their institutionalization.

On the other hand, the prevalence of active dental caries among intercountry adopted children is much lower than that reported among children admitted to foster care in developed and industrialized countries due to abuse and neglect. The majority of up to 50% has been described (Oliván Gonzalvo, G. 2003). It is also lower than the prevalence of active dental caries reported among children aged 5-6 years in the Oral Health Surveys carried out in Spain in 2010 (Llodra Calvo, J. C. 2012), 2015 (Bravo Pérez, M. et al., 2016), and 2020 (Bravo Pérez, M. et al., 2020), where the prevalence ranges from 25% and 28.3%. However, it must be taken into account that the mean age at the time of exploration of the cohort of intercountry adopted children in this study was two years and eight months.

Nevertheless, although intercountry adopted children between 1 and 6 years of age in Aragon do not present a high prevalence of active dental caries in the examination upon arrival, the review of the literature reveals that decay is one of the main health problems that these children are at risk of developing after adapting to the host country (Oliván Gonzalvo, G. 2021). For this reason, it would be necessary to reinforce pediatricians and dentists in actions to promote dental health to prevent decay in the primary and secondary dentition and thereby could improve the health status of this population group of patients.

## CONCLUSION

Intercountry adopted children in Aragon do not present a high prevalence of active dental caries in the examination upon arrival. Anyway, it is necessary to strengthen pediatricians and dentists in actions to promote dental health to prevent tooth decay and thus improve the health status of this population group once

they have adapted and integrated into the host community.

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