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Prenatal and familial factors of caries in first permanent molars in schoolchildren living in urban area of Łódź, Poland



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ABSTRACT

The objective of the present work is to identify the set of prenatal and familial factors that contribute to dental caries of first permanent molars in preschool and young schoolchildren, which will make it possible to determine a high-risk group that should be considered for special preventive measures. This study contributes to the evidence for the multifactorial nature of dental caries. Material was collected during a 2009–2010 study conducted in randomly selected schools and kindergartens in the city of Łódź (Poland). Only children with first permanent molars present were considered for the analysis, which limited the database to 1131 children. Dental examinations were accompanied by a questionnaire completed by the parents, covering items pertaining to prenatal and familial determinants. The present study shows that there are significant differences in the prevalence of caries in first molars between children of different ages (5–13 lat) and that no such differences exist

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between boys and girls. The prenatal and familial factors conducive to caries include maternal education level (OR=0.55), mode of delivery (OR=0.63) and birth order (OR=0.63). Mothers' smoking habit is also associated with increased caries prevalence in children. Caries prevention should already begin during the prenatal period primarily in respect of mothers with lower educational attainment who are pregnant with a second or subsequent child.

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Introduction

Dental caries continues to be the most widespread disease of the human masticatory system despite the fact that its incidence showed a downward tendency in the 1980s and 1990s (Ruiken et al., 1986; Whelton, 2004). According to the latest report of the Polish Ministry of Health on the oral health of the Polish population in the years 2010–2012, the prevalence and intensity of dental caries in children over age 5 is still greater than the WHO forecasts (Petersen and Kwan, 2010; Wierzbicka et al., 2012).

Poland is a country with a high experience of caries. The prevalence of caries in preschoolers is over 65%, ranging from 66.97% to 86.35% depending on the region. The main causes of such a high prevalence of caries in children are familial factors: lack of parental health awareness, irregular attendance to dental clinics, improper oral hygiene (Bedos et al., 2005; Bruzda-Zwiech et al., 2012).

In Łódź, central Poland, in order to strengthen teeth against tooth decay, water fluoridation is applied to top up levels of naturally occurring fluoride in the water. Taking into account the current organization of national health services, programs of caries prevention appropriate to the age and the risk of caries development have been proposed.

Etiological factors of dental caries include the presence of acidogenic bacteria and carbohydrates in the oral cavity, susceptibility of dental tissues to decalcification, time and frequency of action of pathogenic factors on dental tissues, fluoride deficiency, and inadequate oral hygiene (Featherstone, 2008; Fisher-Owens et al., 2007; Hanioka et al., 2011; Isong et al., 2012; Kawashita et al., 2011).

In the literature, many authors point to the relationship between dental caries in children and feeding habits in early childhood such as improper bottle feeding, an inadequate diet and improper dietary habits, and to other factors such as place of residence, country of parents' birth and general and specific genetic factors (Fisher-Owens et al., 2007; Mattila et al., 2000; Shearer et al., 2011; Vereecken et al., 2004). Analysis of dietary-hygienic habits in terms of the intensity of dental caries in school children in Łódź was presented in Bruzda-Zwiech et al. (2005), Kowalik and Szczepańska (2014), and Proc et al. (2006).

Other factors contributing to caries prevalence include obesity and low socioeconomic status (SES) of the family (Alm, 2008; Fisher-Owens et al., 2007; Hanioka et al., 2011; Isong et al., 2012; Julihn et al., 2009; Wigen and Wang, 2012). It is also known that children with caries experience at a younger age are significantly more prone to subsequent caries development (Leroy and Declerck, 2013). The present study aims to contribute to the evidence for the multifactorial nature of dental caries.

In Poland, and in the world, the number of children in families and parents' education are commonly used indicators informing about a socioeconomic status (SES) of the family and about modification of morphological traits such as body height or weight-growth ratio (Gopinath et al., 2012; Lamerz et al., 2005; Żądzińska et al., 2012). According to the literature, women's smoking during pregnancy increases risk of dental caries in especially their children's deciduous teeth (Leroy et al., 2008; Hanioka et al., 2011) but there are unclear findings concerning permanent teeth (Aligne et al., 2003; Hanioka et al., 2011; Tanaka et al., 2010).

In particular, the situation regarding caries in first permanent molars requires re-classification. These teeth, though permanent, begin forming in prenatal life and may respond to maternal behaviors in a way similar to deciduous teeth.

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