Original Article Pol J Public Health 2016;126(1): 28-31

MAGDALENA SZALEWSKA[1], MONIKA BORYCZKA[1], ANNA KAPICA[1], JUSTYNA LEMEJDA[1], MARTA ŁUKASIK[1], ELŻBIETA PIETRYKA-MICHAŁOWSKA[2], JOLANTA SZYMAŃSKA[3]

# Pregnant women's knowledge on early orthodontic prevention – a questionnaire survey

**Abstract**

**Introduction.** Ensuring proper conditions for the development of the masticatory organ of the child can prevent or reduce the incidence of malocclusion.

**Aim.** The study aimed to assess the knowledge of mothers on selected elements of early orthodontic prevention.

**Material and methods.** A questionnaire survey was carried out among 234 pregnant women and women in childbirth from Lower Silesia, Lublin and Lubuskie voivodships. The survey included questions about demographics of mothers, such as age, place of residence, education level, and 10 questions on selected elements of early orthodontic prevention.

**Results.** The knowledge of mothers on the early orthodontic prevention is associated with the level of education and the place of residence – women with higher education and living in large cities have the greatest expertise in this field, although it is still inadequate in general population of women.

**Keywords:** orthodontic prevention, children, pregnant women.

**DOI:** 10.1515/pjph-2016-0006

## INTRODUCTION

Early orthodontic prevention involves proper management of growth and development of the masticatory organ, which can be achieved by providing chewing organ with appropriate functional incentives and eliminating any harmful agents that inhibit or interfere normal rhythm of development [1]. In practice, therefore, preventive measures lie in the hands of dentists, pediatricians, midwives, and especially the parents and the people from child's environment. Preventive and early treatment should cover all the nursery, preschool and school children. Education of parents, and especially mothers, should begin even during pregnancy, which is closely connected with the correct method of infant feeding, proper laying of the child during sleep and feeding, control of the harmful oral habits, observance of oral hygiene, the use of methods of prevention and treatment of caries, thereby counteracting the effects of premature loss of milk teeth and the use of preventive extractions [2].

## AIM

The aim of this study was to assess the knowledge of mothers on selected elements of early orthodontic prevention.

## MATERIAL AND METHODS

A questionnaire survey was carried out among 234 pregnant women and women at childbirth from Lower Silesia, Lublin and Lubuskie voivodeships. The first part included questions about demographic data such as age, place of residence and level of education. The characteristics of the study group are presented in Table 1. The second part of the questionnaire contained 10 multiple choice questions and the answers consisted in indicating one of the possible replies. The questions and possible answers in the survey are presented in Table 2, and the distribution of responses "*correct*", "*wrong*" and "*do not know*" in Figure 1. The results were statistically analyzed using the software Statistica 10. There was adopted statistically significant relationship at $p \leq 0.05$.

## RESULTS

Most of the women (67.09%; n=157) marked a correct answer that the child during sleep should be placed while sleeping on a small pillow or flat, so that the head is higher than the rest of the body. Distribution of wrong answers was as follows: 23.93% (n=56) answered that the child during sleep should lie flat without a pillow, on a large pillow with a raised head – 3.42% (n=8), with the head lower than the rest of the body – 1.28% (n=3). "I do not know," was answered by 4.27% (n=10) of respondents. The responses were not associated with the age of women (univariate ANOVA F=2.64, df=4, p=0.051) or with the place of residence (Pearson's $Chi^2$=10.00,

[1] Students Scientific Circle at Chair and Department of Paedodontics, Medical University of Lublin, Poland
[2] Department of Mathematics and Medical Biostatistics, Medical University of Lublin, Poland
[3] Chair and Department of Paedodontics, Medical University of Lublin, Poland

**TABLE 1. Characteristics of the study group.**

| **Total (n)** | | **234** |
|---|---|---|
| Mean age (years) | | 31.5±76 |
| Place of residence | village | 93 (39.74%) |
| | town < 50 thousand inhabitants | 103 (44.02%) |
| | town 50-200 thousand inhabitants | 24 (10.26%) |
| | town > 200 thousand inhabitants | 14 (5.98%) |
| Education | primary | 4 (1.71%) |
| | lower secondary | 9 (3.85%) |
| | vocational | 41 (17.52%) |
| | general secondary | 28 (11.97%) |
| | secondary vocational | 24 (10.26%) |
| | post-secondary | 28 (11.97%) |
| | higher | 100 (42.74%) |

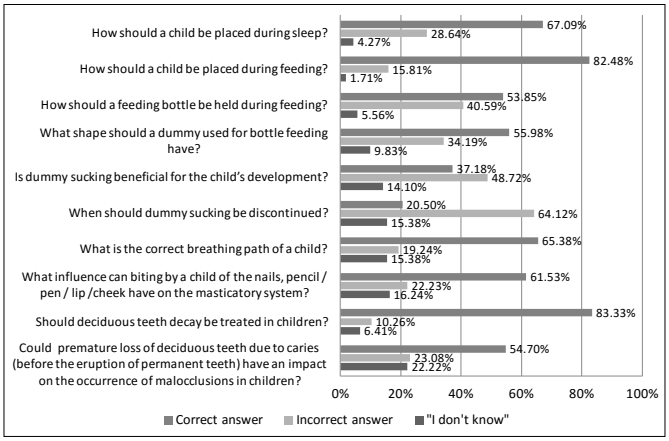


**FIGURE 1. Distribution of responses.**

df=8, p=0.26), however, they were related to the education level of respondents (Pearson's Chi$^2$=31.00, df=16, p=0.013). It was found that the higher level of education the more often the mother marked the correct answer. Mothers who replied "do not know" significantly more often had lower secondary education.

Statistical analysis showed that the place of residence affects significantly the selection of the correct answer related to the position of the child during feeding. More often the correct responses were given by women living in large and medium-sized towns than living in rural areas (Pearson's Chi$^2$=13.94 df=2, p=0.008). Also, the level of education affected in a statistically significant way the selection of responses (Pearson's Chi$^2$=19.44, df=4; 0.006). Along with the level of education the proportion of women who chose the correct answer increased, from 46.15% for women with lower secondary education to 91.00% for women with higher education.

The place of residence had a statistically significant impact on the choice of answers (Pearson's Chi$^2$=27.28, df=8, p=0.0006) concerning proper position of the bottle during feeding. Women from villages at approximately the same percentage chose two answers – 37.63% indicated the correct answer "at 90 degrees in relation to the child's mouth" and 30.11% indicated incorrect answer "as horizontally as possible" (proportion applies to all respondents living in rural areas), while respondents inhabiting towns significantly more often chose the correct answer (57.89% residents of small towns and 66.99% women living in towns with more than 50 thousand inhabitants). Also, the level of education affected in a statistically significant way the selection of responses (Pearson's Chi$^2$=27.87, df=16, p=0.033). Women with higher education significantly more often chose the correct answer, while women with post-secondary, secondary, vocational or lower-secondary education at the utmost statistically significantly more often chose the wrong answer.

In the opinion of 55.98% (n=131) women a dummy should have anatomical shape, which was the correct answer, while – replies: "elongated shape, with round cross section" – 20.51% (n=48) "of short oral part "– 4.70% (n=11) and "oblong, tapering to the oral part "– 8.97% (n=21) – were incorrect.

**TABLE 2. Questions and answers included in the survey.**

| | |
|---|---|
| 1. | How should a child be placed during sleep? |
| | • flat without a pillow<br>• with a small pillow or flat so that the head should be placed higher than the rest of the body<br>• with elevated head on a big pillow<br>• the head should be lower<br>• the head should be lower below the rest of the body<br>• I don't know |
| 2. | How should a child be placed during feeding? |
| | • vertically<br>• at an angle with head above the rest of the body<br>• horizontally<br>• at an angle with head lower than the rest of the body<br>• I don't know |
| 3. | How should a feeding bottle be held during feeding? |
| | • at 90 degrees in relation to child's lips<br>• as vertically as possible<br>• at an angle with simultaneous resting on a child's chin<br>• as close to the child's nose as possible<br>• I don't know |
| 4. | What shape should a dummy used for bottle feeding have? |
| | • anatomical<br>• elongated, with circular cross section<br>• with a short oral part<br>• oblong, tapering to the oral part<br>• I don't know |
| 5. | Is dummy sucking beneficial for the child's development? |
| | • yes<br>• no<br>• I don't know |
| 6. | When should dummy sucking be discontinued? |
| | • in 4$^{th}$ month of child's life<br>• in 6$^{th}$ month of child's life<br>• in 12$^{th}$ month of child's life<br>• in 18$^{th}$ month of child's life<br>• I don't know |
| 7. | What is the correct breathing path of a child? |
| | • while resting through the nose<br>• while resting through the mouth<br>• during the day through the mouth, at night through the nose<br>• during the day through the nose, at night through the mouth<br>• I don't know |
| 8. | What influence can biting by a child of the nails, pencil / pen / lip /cheek have on the masticatory system? |
| | • positive influence on the growth of maxilla and mandible<br>• negative influence on the growth of maxilla and mandible<br>• allows cleaning the teeth<br>• no influence on the development of the masticatory system<br>• I don't know |
| 9. | Should deciduous teeth decay be treated in children? |
| | • yes<br>• no<br>• I don't know |
| 10. | Could premature loss of deciduous teeth due to caries (before the eruption of permanent teeth) have an impact on the occurrence of malocclusions in children? |
| | • yes<br>• no<br>• I don't know |

The remaining 9.83% (n=23) women chose the answer "*do not know*". Statistical analysis showed that the place of residence significantly affected the response selection (Pearson's $Chi^2$=17.41, df=4, p=0.002). Women living in towns significantly more often chose the correct answer, while those coming from the countryside in a similar percentage chose each of possible answers. With the increase in the level of education the proportion of women who opted for the answer "the anatomical shape" increases – from 30.77% for women with lower secondary education at best to 66.0% for women with higher education. The observed differences were statistically significant (Pearson's $Chi^2$=16.85, df=8, p=0.032).

Almost half of the respondents incorrectly answered the question, "Is dummy sucking beneficial for child development?" by selecting an affirmative answer – 48.72% (n=114). The correct answer was given by 37.18% (n=87) women and the remaining respondents had no opinion on the subject – 14.10% (n=33). Regardless of the place of residence the majority of women believed that a dummy had beneficial effects on child development (Pearson's $Chi^2$=7.91; df=4, p=0.095). The mothers' education level did not differentiate the choice of answers. In each category of education, most of the women were convinced that the dummy had a positive impact on child development (Persona $Chi^2$=15.35, df=8, p=0.053).

In the opinion of 20.5% (n=48) of women, discontinuation of dummy sucking should begin in the 18$^{th}$ month of life, which is the correct answer. Incorrect replies were chosen by 26.92% (n=63) of women – "in the 12$^{th}$ month of age", 23.50% (n=55) – "in the 6$^{th}$ month of age", 13.68% (n=32) – "in the 4$^{th}$ month of age." "I do not know" was given by 15.38% (n=36) of women. In medium-sized and large towns (over 50 thousand inhabitants), significantly more women chose the answer "in the 12$^{th}$ month of age", while women living in small towns and villages in a similar percentage chose the answer "in 4$^{th}$, 6$^{th}$, 18$^{th}$ month of the child's life." The observed differences are statistically significant (Pearson's $Chi^2$=33.33, df=8, p=0.0005). The level of education does not affect in a statistically significant way the selection of responses (Pearson's $Chi^2$=24.89, df=16, p=0.072).

The correct answer to the question: "What is the correct breathing path of the child?" – was given by 65.38% (n=153) of respondents. The place of residence had a statistically significant influence on the choice of response ($Chi^2$=15.74, df=8, p=0.04). The percentage of women who chose the correct answer increased from 57.61% for the rural residents to 84.21% of respondents living in medium and large towns. The level of education had a statistically significant impact on the choice of the correct answers ($Chi^2$=33.28, df=16, p=0.007). With the increase in the level of education the percentage of women who chose the correct answer increased, from 47.50% for the lowest level of education to 76.0% for people with higher education.

The adverse impact of children's biting of nails, pencil/pen/lip/cheek on the development of the maxilla and mandible was known to 144 women (61.53%). The positive impact of the above-mentioned behavior was confirmed by 3.41% (n=8) of the women, the fact that biting has no influence on the development of maxilla and mandible was confirmed by 18.38% (n=43) of respondents and 16.23% (n=38) did not know how these behaviors could affect the development of maxilla and mandible in the child. The level of education had a statistically significant influence on the choice of response ($Chi^2$=35.30, df=16, p=0.004), and it was found that although in each category of education, most women chose an answer confirming the negative impact, but these percentages grew from 37.50 % for people with lower secondary education at best to 78.0% for women with higher education. The responses were not related to the place of residence ($Chi^2$=14.06, df=8, p=0.08).

In the opinion of 83.33% (n=195), there is a need for treatment of cavities in primary teeth, while 10.26% (n=24) of respondents do not believe that tooth decay of milk teeth should be treated and 6.41% (n=15) of respondents do not know whether milk teeth need to be treated. The responses were not related to the place of residence ($Chi^2$=6.11; df=4, p=0.19), while the level of education had a statistically significant influence on the choice of response ($Chi^2$=26.158, df=8, p=0.001). With the increase in the level of education the percentage of women who believed that milk teeth should be treated, increased. This percentage increased from 75.0% in the group of women with the lowest level of education to 94.0% among women with higher education.

Only 54.70% (n=128) of respondents believe that the premature loss of deciduous teeth due to tooth decay can affect the occurrence of malocclusion in children. The place of residence affected the response selection ($Chi^2$=15.34, df=4, p=0.004). Significantly more women living in towns (both to 50 thousand and over 50 thousand inhabitants) chose the correct answer, while residents of rural areas equally often chose the wrong answer. The level of education also affected in a statistically significant way the selection of the correct answer ($Chi^2$=15.77, df=8, p=0.046). With the increase in the level of education the percentage of women who knew about the negative impact of premature loss of deciduous teeth on malocclusion increased.

## DISCUSSION

Future mothers should be aware of the correct principles of child care, including those that are related to early orthodontic prevention. The present research has shown that the knowledge in this field among pregnant women is insufficient.

It is worrying that almost half of expectant mothers is convinced of the beneficial effects of dummy sucking to calm a child. Research of Bueno et al. [3] shows that prolonged dummy sucking may lead to open bite, and the probability of occurrence of this defect increases 33.3 times when sucking for over 3 years. As they also demonstrated – the occurrence of overjet greater than 5 mm increased 2.7 times, and of abnormal overbite 12.32 times. Moimaz et al. obtained similar results [4]. They show that in children with the habit of thumb sucking or dummy sucking overjet greater than 3 mm often occurs (p=0.028, p=0.010, p=0.017, for thumb respectively – 12, 18 and 30 months; p<0.0001 for dummy) and open bite (p=0.0008, p=0.003, p=0.0008 for the thumb, respectively – 12, 18 and 30 months, p=0.0003 12 and 18 months and p<0.0001 for the 30 months in the case of a dummy). The habit of dummy sucking at the age of 30 months was linked to an increased occurrence of overbite – more than 3 mm (p=0.002). Montaldo et al. [5] also demonstrated the adverse impact of the dummy sucking habit, which is associated with a higher risk of cross bite, open bite and Angle's Class II (Class II molar relationship) (p<0.01). It is known that the habit of sucking a dummy has many adverse consequences,

so it is important that at the appropriate time it should be eliminated. Unfavorably, only 1/5 of the women surveyed have the correct knowledge that the dummy should be discontinued at 18th month of age.

Mouth breathing in a child causes reduced airflow through the nasal cavity, which in turn may lead to the development of increased facial height, open bite in the anterior region, increased overjet and narrow palate [6]. De Castilho et al. [7] in the study of 408 children showed that mouth breathing occurs in 48.5% of the population. In 106 of the children at the same time bruxism appeared, in 14 – changes in the construction of the palate, 46 of them sucked a dummy, and at 29 children had at the same time the habit of thumb sucking. On the other hand Thomaz et al. [8] found that a long period of mouth breathing and short duration of breastfeeding may contribute to the higher prevalence in adults of convex face profile and less common a concave face profile. It is worrying therefore that in our study little more than 65% of expectant mothers knew about the proper breathing path.

It is known that milk teeth affected by caries should be treated because their premature loss causes a change in the position of the remaining teeth and the loss of space needed for proper eruption of permanent teeth. When posterior teeth move frontally, they cause secondary crowding of teeth erupting later, and the unilateral loss of a front tooth can cause disruption of the midline of the incisors resulting from the shift of the adjacent teeth to the free space [9]. Al-Shahrani, et al. [10] found among boys who prematurely lost their milk teeth higher incidence of right-sided Angle's Class II, left-sided Angle's Class II (p=0.062), right-sided Angle's Class III, left-sided Angle's Class III (p=0.062), bilateral cross bite and abnormal overjet. Premature loss of deciduous teeth is still too frequent, which was confirmed by Grippaudo et al. [11] in their studies conducted among 3017 children – in 14.6% of the children there was premature loss of deciduous teeth. The authors of the present study show that the vast majority of mothers (83%) are aware of the need for treatment of dental caries of milk teeth, which is quite favorable, however, almost 55% of respondents are aware of the impact of the loss of deciduous teeth on the occurrence of malocclusion in children.

## CONCLUSION

1. The level of knowledge of mothers on the early orthodontic prevention is associated with the level of education and the place of residence – women with higher education and living in large towns have the greatest expertise in this field, although it is still inadequate in all women.
2. Health education aimed at future mothers should take into account providing wide-ranging information necessary to ensure the conditions for the proper development of the masticatory organ in their child.

**REFERENCES**


1. Łabiszewska-Jaruzelska F. Ortopedia szczękowa. Warszawa: PZWL; 1997, p. 205-6.
2. Polek A, Szyper-Szczurowska J, Loster BW. Rola pediatrów i lekarzy rodzinnych w profilaktyce wad zgryzu u dzieci w okresie niemowlęcym i poniemowlęcym. Dent Med Probl. 2013;50:328-40.
3. Bueno SB, Bittar TO, Vazquez Fde L, et al. Association of breastfeeding, pacifier use, breathing pattern and malocclusions in preschoolers. Dental Press J Orthod. 2013;18(1):30.e1-6.
4. Moimaz SA, Garbin AJ, Lima AM, et al. Longitudinal study of habits leading to malocclusion development in childhood. BMC Oral Health. 2014;14:96.
5. Montaldo L, Montaldo P, Cuccaro P, et al. Effects of feeding on non-nutritive sucking habits and implications on occlusion in mixed dentition. Int J Paediatr Dent. 2001;21:68-73.
6. Majorana A, Bardellini E, Amadori F, et al. Timetable for oral prevention in childhood – developing dentition and oral habits: a current opinion. Prog Orthod. 2015;16:39.
7. de Castilho LS, Abreu MH, de Oliveira RB, et al. Factors associated with mouth breathing in children with developmental disabilities. Spec Care Dentist. 2016;36:75-9.
8. Thomaz EB, Cangussu MC, Assis AM. Maternal breastfeeding, parafunctional oral habits and malocclusion in adolescents: a multivariate analysis. Int J Pediatr Otorhinolaryngol. 2012; 76:500-6.
9. Karłowska I. Zarys współczesnej ortodoncji. Warszawa: PZWL; 2013. p. 70.
10. Al-Shahrani N, Al-Amri A, Hegazi F, et al. The prevalence of premature loss of primary teeth and its impact on malocclusion in the Eastern Province of Saudi Arabia. Acta Odontol Scand. 2015;73:544-9.
11. Grippaudo C, Pantanali F, Paolantonio EG, et al. Prevalence of malocclusion in Italian schoolchildren and orthodontic treatment need. Eur J Paediatr Dent. 2013;14:314-8.



**Corresponding author**
Jolanta Szymańska
Chair and Department of Paedodontics,
Medical University of Lublin, Poland
Karmelicka 7 Str., 20-081 Lublin
E-mail: szymanska.lublin@gmail.com