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Impact of Sociodemographic Features of Mothers on Breastfeeding in Croatia: Questionnaire Study

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Aim. To determine sociodemographic features that describe mothers who are likely to wean their babies earlier then is recommended and whether the rates of breast-fed children in Croatia had improved since 1996.

Methods. A sample of 500 mothers was selected from the population of women who had delivered 2 to 12 months before the interview. The sample was stratified according to the region, urbanization, and child's age. The questionnaire was designed to give a sociodemographic profile of the mother and to describe child's present nutritional habits, duration and reasons for breast-feeding, and reasons for weaning. Chi-square test was used to estimate statistical differences of two qualitative variables. ANOVA test was used for multiple group comparisons.

Results. There were significantly more breast-feeding mothers among older than among younger women (46.3% vs 31.7%; $p=0.041$). Significantly greater proportion of women with higher educational level breast-fed, as compared with less educated women (53.8% vs 31.3%, $p=0.002$). Percentage of non-smokers among breast-feeding mothers was significantly higher than that of smokers (45.0% vs 25.7%, $p=0.001$). After the age of 3 months, 30.7% of children were still breast-fed, and only 11.0% after 6 months of age. With regard to the nutritional habits in the first year of life, 40.0% of all children were fed with cow's milk. Supplementary feeding was started by 29.2% of respondents before the end of the third month.

Conclusion. Older, better educated, and non-smoking mothers in Croatia breast-fed at a higher rate then young, less educated, and smoking mothers. Older mothers also weaned their children significantly later than the young ones. Percentage of children fed with cow's milk during the first year of life is disturbingly high and introduction of solids into child's nutrition is earlier than recommended.

Key words: *breast-feeding; child; Croatia; educational status; infant food; maternal age; smoking*

Breastfeeding plays a major role in children's health status and development, and its values have been recognized for a long time. There are also suggestions that it prevents appearance of some chronic diseases later in life (1-5). Recognizing the benefits of breast-feeding, the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) introduced in 1989 a world-wide program for breast-feeding promotion known as "Ten steps to successful breast-feeding", which also included the initiative "Baby-friendly hospital" (6). The program was initiated as a response to decreasing rates of breast-feeding and simultaneous expansion of commercial milk supplements and their aggressive advertising.

As all over the world, this program started in Croatia in 1993. In 1996, UNICEF supported a large survey study in Croatia to explore the influence of the 1991-1995 war on breast-feeding and WHO/UNICEF campaign results. Although it showed that a rate of children that have never been breast-fed decreased from 9.3% to 5.4%, the average duration of breast-feeding was 3.4±2.9 months during the war period (7). Another survey, which also assessed the results of breast-feeding promotion in Croatia and explored habits in child's nutrition, revealed very low breast-feeding rate and high prevalence of feeding children diluted cow's milk during the first six months of life (8). It clearly showed that Croatia had not achieved a satisfactory level of national awareness on breast-feeding, although all kinds of medical personnel were included in the promotion campaign. It was not surprising that the rates of breast-feeding were far under recommended in many countries as well (9).

Besides war as a suppressive environment, there could be several reasons for a failure of the campaign in Croatia. By 2000, 15 of the total of 32 maternity hospitals in Croatia achieved a title of "baby-friendly" hospitals. Unfortunately, industrial baby food donations were a regular occurrence in maternity hospitals, which was a violation of the WHO's International code of Marketing of Breast-milk Substitutes (10). This directly hindered the process of evaluation of maternity hospitals in Croatia and created the need for legal provision concerning promotion of breast-feeding (11). Social support and positive attitude towards breast-feeding are generally still undeveloped.

For example, there is no education on breast-feeding in primary and secondary schools. Also, a relatively small proportion of mothers attend maternity courses, which promote breast-feeding.

The former campaign had targeted maternity hospitals and health workers who would educate and influence mothers during their stay at hospital after delivery and later, e.g., during home visits by community nurses. Breast-feeding support groups were also formed and started their activity in 1998 (12). They were designed as self-aid groups of breast-feeding mothers, recruited from maternity hospitals. They would counsel and support each other, supervised by the community nurses.

All these actions presumed that mothers still had not formed their attitudes towards breast-feeding during their pregnancies, although it is well know that the majority of attitudes of mothers-to-be are formed early during pregnancy or even before conception (13).

A study about features describing mothers who would not breast-feed or would wean earlier has not been carried out in Croatia so far. Reports from developed countries describe those mothers as predominantly younger and primiparous, with lower educational status, lower income, and smoking habit (14-16).The aim of out study was to explore these features in Croatian mothers and to assess whether the rates of breast-fed children had improved since 1996.

Subjects and Methods

Subjects

The target population was defined as "mothers of children aged 3 to 12 months, living in Republic of Croatia during November 2001". We used the database of mothers who have given birth to a child during 2 to 12 months before the study (17). Our sample comprised 500 mothers taken from the population of 44,000 mothers of children aged 3 to 12 months. The sample was stratified by region, urbanization, and child's age. Samples of mothers drawn from each of the six Croatian regions were proportionate to the relative size of the total population in each region (Table 1). Mothers within each region were stratified according to the proportion of population living in the regional capital city and the rest of the region (four subsamples) and according to children's age-groups (three subsamples).

Sample Size

The level of 95% confidence (p = 0.05) was used. Desired level of precision for the rates of breast-fed children was set to ±2%, with respect to the decrease in the rate of never breast-fed children from 9.3% to 5.4%, as shown in the previous study (7). Under the assumption that approximately 5% of children had never been breast-fed at the time of the survey (November 2001), the needed sample size was n = 456 ($n = \pi(1-\pi)z^2/D^2$; n = needed sample size; π = estimated population proportion – 0.05 in the case of children who have never been breast-fed, 0.5 as the worst case scenario for other results; z = 1.96 – z value associated with the desired confidence level of 95%; D = p-π – desired level of precision ±0.02 for the main finding; ±0.05 for the other results). For other results, the desired precision level was set at ±5%. Under the worst case assumption of population proportion of π = 0.5, the needed sample size was n = 384. The expected incidence rate of eligible respondents within the sample frame was 95%. Completion rate was expected to be approximately 95% for the main questions, so the needed sample size (for the main findings) was n = 500.

Distribution of mothers was the same as distribution of the children due to the assumption that there was no correlation between the region and the number of children born by one mother. Mothers in the sample were ranked according to their education to low (primary school), medium (secondary or high school), and high education level (university). They were also ranked by age in three groups: 24 and younger, 25-30, and 31 and older.

Data were collected in mothers' households, from November 1, 2000 to January 6, 2001. The fieldwork was carried out by 57 interviewers (all female), mainly students, and controlled by six regional supervisors. Interviewers received special instructions on how to fill out questionnaires, and most of them had already participated in similar surveys. Forty-one questionnaires were incorrectly filled out and therefore excluded from analysis.

Questionnaire

The questionnaire consisted of three parts. The first part contained questions about child's characteristics such as age, sex, birth order, birth weight, current weight, and Apgar score. The second part contained seven questions about child's nutritional habits. One of them investigated all types of food given to the child during the previous month and had multiple available answers. Those who declared to be breast-feeding (n = 187) answered open-ended questions about reasons for breast-feeding and reasons, timing, and sorts of eventual supplementary feeding. Respondents who did not breastfeed (n = 272) were answering open-ended questions concerning the reasons and timing of weaning. There were 264 valid answers. The third part of the questionnaire contained questions concerning sociodemographic features of mothers (maternal age, education, household income, smoking habit, and marital and work status).

Statistics

We used Statistica (Version 6.0, StatSoft Inc., Tulsa, OK, USA) software package for Windows to perform statistical analysis of the data. Chi-square test was used to estimate statistical differences of two qualitative variables. ANOVA test was used for multiple group comparisons.

Results

Sociodemographic Characteristics of Mothers

Mothers were asked to specify all sorts of food they had been feeding their child during the last 30 days (multiple available answers; Table 2). Out of 459 mothers included in the analysis, 187 (40.7%) declared they breast-fed (with or without supplementary nutrition) and 272 (59.3%) did not (Table 3).

Those who were not breast-feeding during the last month were asked when they weaned and to

Table 1. Population characteristics of mothers of newborn children in different geographical regions of Croatia

Region	No. (%) of mothers	
	population*	sample†
Zagreb (capital) and surroundings	11,170 (25.4)	107 (23.3)
Rijeka, Kvarner, Istra and Gorski Kotar	4,388 (10.0)	34 (7.4)
Dalmatia	8,646 (19.6)	108 (23.5)
Slavonia	8,556 (19.5)	86 (18.7)
Northern Croatia	8,022 (18.2)	89 (19.4)
Lika and Banovina	3,219 (7.3)	35 (7.6)
Total	44,000	459

*Distribution of mothers in different geographical regions in 2000.
†Distribution of mothers in this survey.

Table 2. Feeding habits of infants during 30-days before interview (multiple answers available)

Baby food	Mothers	
	No.	%
Baby tea	317	69.1
Baby juice	303	66.0
Commercial baby food	298	64.9
Commercial milk formula	217	47.3
Breast feeding	187	40.7
Cow's milk (diluted or not)	185	40.3
Other	52	11.3
Pumping own milk into bottle	14	3.1

Table 3. Sociodemographic characteristics of surveyed mothers (n = 459) and their breastfeeding habits

Sociodemographic characteristics	characteristics	Mothers breastfeeding (No.,%)			chi-square	p
		no	yes	total		
Age (years):	≤24	86 (68.3)	40 (31.7)	126	6.37	0.041
	25-30	106 (57.3)	79 (42.7)	185		
	≥31	79 (53.7)	68 (46.3)	147		
Education:	primary school	101 (68.7)	46 (31.3)	147	12.89	0.002
	secondary school	122 (59.2)	84 (40.8)	206		
	vocational and university	49 (46.2)	57 (53.8)	106		
Household income (KN):*	≤4000	89 (59.3)	61 (40.7)	150	0.67	0.719
	4001-7000	96 (57.1)	72 (42.9)	168		
	≥7001	87 (61.7)	54 (38.3)	141		
Smoking:	no	197 (55.0)	161 (45.0)	358	12.07	0.001
	yes	75 (74.3)	26 (25.7)	101		
Total		272 (59.3)	187 (40.7)	459		

*1 KN = 0.13 EUR.

name three most important reasons for weaning. The most frequent answer (64.7%) was that "there was not enough milk"; 17.8% of mothers stated that "the baby did not want to suckle" and only 9.3% of mothers stated that the reason to wean was "baby getting used to additional food" (Table 4).

Table 4. Most important reasons for weaning (open-ended question, 3 answers)

Reason for weaning	Mothers	
	No.	%
There was not enough milk	174	64.7
The baby did not want to suckle	48	17.8
The baby was hungry	38	14.1
Baby getting used to additional food	24	9.3
The milk was not good	21	8.9
The mother was ill	20	7.4
The baby was ill	6	2.2
Doctor's recommendation	4	1.5

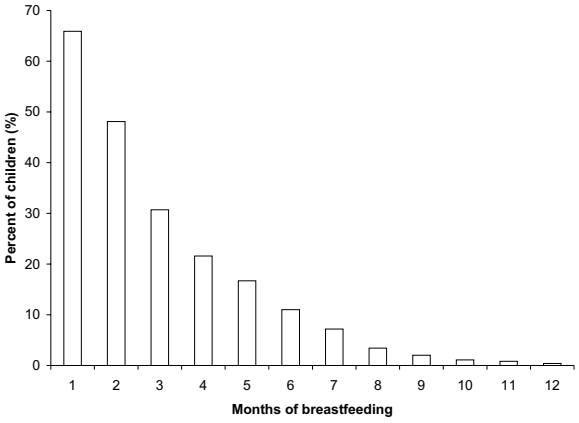

Figure 1. Percentage of breast-fed children.

Only 24 (12.8%) of 187 breast-feeding women were exclusively breast-feeding. They were asked to specify the three most important reasons for them only to breastfeed and not to introduce any other kind of food. The most important reason for 50% of mothers was that "she was having enough milk".

In the sample of mothers who were breast-feeding during the last 30 days, the rate of breast-feeding was significantly higher among the oldest group of women (46.3%) than among medium-aged (42.7%) or youngest (31.7%) (Table 3). Women with higher education (ie, university degree) breast-fed more frequently (53.8%) then women with secondary (40.8%) or primary school (31.3%). Also, non-smoking mothers breast-fed significantly more frequently than smoking mothers (45.0% vs 25.7%, p = 0.001). There was no significant difference in rates of breast-feeding among women with different household income (p = 0.719).

The average duration of breast-feeding was 3±2 months (range, 0-12 months). By the child's age of 3 months, 264 (69.3%) mothers stopped breast-feeding, whereas 89% mothers have weaned the child by the age of 6 months (Fig. 1).

Mothers in the older age-group breast-fed significantly longer than those in the younger group (3±3 months vs 2±2 months; F = 3.44, p = 0.041). Educational level, household income, and smoking did not seem to influence the duration of breast-feeding.

Mother's age did not influence the time of introduction of solids (F = 2.34, p = 0.099), but mothers with higher education started giving additional food significantly later then less educated ones (5 ± 2 months vs 4 ± 2 months, p = 0.006). The most frequent reason for starting supplementary food was mother's perception of not having enough milk (26% of mothers).

Only 39 (8.6%) out of 459 mothers attended an antenatal course for pregnant women.

Sociodemographic Characteristics of Infants

Breast-feeding rates were significantly higher in younger children. Child's sex (p = 0.451), birth order (p = 0.351), or Apgar score (p = 0.319) did not influence breast-feeding rates (Table 5). Birth weight had borderline impact (p = 0.057) on breast-feeding, in a sense that low birth weight infants were less frequently breast-fed than those of normal or high birth weight. Answers to the question, "Did your child have any health problems in the last 30 days?", revealed a significant difference (p = 0.011) between those children who were breast-fed and those who were not: breast-fed children (22.8%) were less likely than those who were not breast-fed (33.9%) to have any health problems.

Infant's Nutritional Habits

There were 185 (40%) children fed cow's milk in the first year of life. Although indications for feeding a

Table 5. Sociodemographic characteristics of breastfed children (N = 455) of mothers surveyed*

Sociodemographic characteristics	characteristics	Breastfed children (No., %)			χ^2	p
		no	yes	total		
Age (months):	1-4	33 (32.7)	68 (67.3)	101	53.90	<0.001
	5-6	55 (54.5)	46 (45.5)	101		
	7-8	53 (60.2)	35 (39.8)	88		
	9-12	131 (77.5)	38 (22.5)	169		
Birth weight (grams):	≤2499	20 (74.1)	7 (25.9)	27	9.17	0.057
	2500-3000	47 (68.1)	22 (31.9)	69		
	3001-3499	100 (60.6)	65 (39.4)	165		
	3500-4499	97 (55.1)	79 (44.9)	176		
	≥4500	7 (38.9)	11 (61.1)	18		
Apgar score:	<10	65 (61.3)	41 (38.7)	106	0.99	0.319
	10	117 (55.5)	94 (44.5)	211		
Birth order:	1	122 (62.2)	74 (37.8)	196	6.69	0.351
	2	103 (60.6)	67 (39.4)	170		
	3	47 (50.5)	46 (49.5)	93		
Gender:	male	127 (57.5)	94 (42.5)	221	0.57	0.451
	female	145 (60.9)	93 (39.1)	238		
Did it have any health problems in the last 30 days?:	yes	92 (68.7)	42 (31.3)	134	6.53	0.011
	no	179 (55.8)	142 (44.2)	321		
Total		271 (59.6)	184 (40.4)	455		

*The sample of children was smaller than the sample of mothers due to four partially improperly filled questionnaires .

child less than 6 months of age diluted cow's milk are well defined and exceptional, 21.0% of children fed cow's milk were under that age and 13.0% were younger than 4 months.

Regarding the introduction of solid food, 154 (29.2%) of mothers started supplementary feeding before the end of the third month. Almost half of mothers introduced solids during the fourth and fifth month and 21.4% after 6 months of age. The average of children before introduction of solids was 4.2±1.7 months.

Discussion

Our study showed that Croatian mothers who were more likely to breast-feed were older, better educated, and non-smokers, ie, the sociodemographic profile of a breast-feeding mother in Croatia corresponded to that in developed, industrialized countries (18).

The observed rates of breast-fed children in Croatia are still below the satisfactory level, and even poorer than those from 1996, when 50% of all mothers have stopped breast-feeding after 4 months of age and 20% of children were breast-fed after 6 months of age (8). This discrepancy can be ascribed to various factors, such as differences in the samples, research methodology and questionnaire. However, the difference in the rates of breast-fed children among different age groups occurred mainly because children one and two months old were not included in our sample. We excluded mothers of those children due to assumptions that they were nursing very young babies and only adjusting to the post-partum period, and that they would not be able or willing to respond to our interviewers in desirable rates. The second reason for their exclusion was the fact that most mothers were breast-feeding their children during the first two months of life (8).

The child's age was strongly associated with breast-feeding rates. Low birth-weight infants were less frequently breast-fed, probably due to frequently co-existing premature birth and cesarean section. This usually results in later breast-feeding initiation (19). Another reason is their poorer ability to suck. Birth order of the child did not influence the change in the trend of feeding, e.g., from artificial feeding to breast-feeding, among mothers with previous children. Unfortunately, we have not investigated previous breast-feeding habits of those mothers, although it was found to be independently associated with feeding choice (20).

Regarding the earliest time of introduction of solids, which should be between 4 and 6 months of age, we found that too many children were given solid food before the fourth month. Insufficient amount of mother's milk was most frequently claimed reason for the introduction of solids. It seems that many mothers are convinced that offering complementary food to a child results in growth advantage over exclusive breast-feeding. These results are similar to those from 1996 (8), which show that this attitude has not changed over the years of the campaign. Although an association between the time of the introduction of solids and breast-feeding duration has not been found (21), solid food (especially in infants with a history of atopy) increases the risk for the development of food allergy (22). Therefore, further efforts should be made to decrease those rates.

Another great problem in infant nutrition is cow's milk. Giving cow's milk to a child in the first year of life is justified in certain situations, mostly in difficult socio-economic conditions. Although still high, the prevalence of children under six months of age who were fed cow's milk was evidently lower (21%) than that in 1996 (8). It is certainly the result of women's education about child's nutrition during the campaign and can also be partially explained by slow but certain improvement of general economic situation since the end of the war.

Two most frequently mentioned reasons for weaning were the perceived inadequate amount of produced milk and infant's inability to suck (or faulty sucking technique). This is an indicator that maternity staff's professional guidance and support needs to be

re-evaluated. Although community nurses visit all discharged mothers, giving proper instructions concerning breast-feeding technique should be more strongly emphasized.

We could expect higher total rates of breast-fed children in the future due to a general trend of women getting married and giving birth at older age. Young and less educated mothers should be informed about the benefits of breast-feeding and motivated to breast-feed in the pre-partum period because breast-feeding intention is associated with breast-feeding initiation (23,24). Smoking persons are usually less receptive for all sorts of health promotion attempts, which may explain lower rates of breast-feeding among mothers who smoke, but they should be properly informed about the advantages of breast-feeding.

Our study could not properly assess the impact of mother's marital or work status on breast-feeding because 75% of respondents in our sample were employed and 95% were married. The question about the attendance of prenatal classes was included on the assumption that it would affect feeding practices favorably, but the number of mothers who attended such courses was too small to draw any conclusions.

In conclusion, we have identified that young, less educated, and smoking mothers in Croatia were less likely to breast-feed. The next step should be to observe their attitude toward breast-feeding during the pregnancy. For that purpose, a detailed questionnaire should be used, including previous experiences, knowledge about breast-feeding, partner's attitude toward it, and perception of social support. This could give us a clearer picture of main obstacles that maintain breast-feeding rates low in Croatia.

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