

PREDICTORS OF EXCLUSIVE BREASTFEEDING 6-9 WEEKS AFTER DELIVERY: A PROSPECTIVE COHORT STUDY Public Mental Health Perspective

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SUMMARY

Background: There are numerous benefits of exclusive breastfeeding (EBF) on mother and child wellbeing. The objective was to find out whether depression, posttraumatic stress disorder and personality traits at the time of delivery are associated with EBF six to nine weeks after delivery.

Subjects and methods: The targeted population were women who delivered in Croatian largest University maternity hospital. The scores of The Edinburgh Postnatal Depression Scale (EPDS), The Big Five Inventory (BFI) and The Impact of Events Scale (revised) – IES-R three to five days after childbirth were measured to predict self-reported EBF status six to nine weeks after the delivery. Six to nine weeks after the delivery data on breastfeeding were collected for 259 (69.6%) out of initially 372 enrolled women.

Results: Six to nine weeks after the delivery 151/259 (58.3%) were still exclusively breastfeeding their child. After adjustment for all other variables, women who gave their second childbirth had significantly higher odds for longer EBF than primiparous women (OR=2.12; 95% CI 1.10-4.10). Higher EPDS result was significantly associated with lower odds for EBF (OR=0.92; 95% CI 0.85-0.99).

Conclusion: Parity and depressed mood immediately after the delivery are associated with EBF six to eight weeks after the delivery. Depression symptoms are a moderator between parity and exclusive breastfeeding, so multiparous women without depressive symptomatology are more prone for EBF.

Key words: breastfeeding – depression - personality trait - posttraumatic stress disorder

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INTRODUCTION

Benefits of exclusive breastfeeding (EBF) in first few months after childbirth on mother and child wellbeing are very well known (physical and psychological benefits, bonding and attachment). According to World Health Organization (WHO), besides numerous physical health benefits, children that were breastfed perform better on intelligence tests and have higher school attendance while mothers that breastfeed have reduced risk of postpartum depression. WHO recommended exclusive EBF in first six months before introducing complementary feeding (WHO 2008). Besides that, recently, on a group of 1267 children 6 years old it has been found that breastfeeding and active bonding protects against children's internalizing behaviour problems (Liu et al. 2013). That amplifies public mental health importance of breastfeeding promotion and of mental health strategy development which will improve bonding between the mother and her child. WHO and UNICEF in 2002 jointly developed the Global Strategy for Infant and Young Child Feeding which aims to improve the nutritional status,

growth and development, health, and thus the very survival of infants and young children, through optimal feeding. It is in the midst of the aggression against Croatia, thanks to UNICEF, that Croatia began to implement the WHO/UNICEF breastfeeding promotion program entitled Baby-Friendly Hospital Initiative. In 1993 all Croatian maternity hospitals have formally joined the initiative. Three years later, in 1996, the first Croatian maternity wards became Baby-Friendly Hospitals. This year, 23 years after the program initiation, last maternity ward in Croatia has achieved all required criteria to become Baby-Friendly Hospital (World Breastfeeding Trends Initiative, 2016). In recent years various non-governmental organizations have also confirmed their place in supporting breastfeeding through telephone lines and/or counselling centres in Croatia (Telefončić, RODA, IBCLC savjetnica za dojenje, etc.). Also, telephone support for breastfeeding mothers in maternity hospitals, breastfeeding support groups led by health visitors and other breastfeeding services led by professionals have been implemented throughout the country in the last few decades.

Complex set of factors which are related to socio-demographic characteristics, biomedical factors, health-care practices, social support, community attitudes, and public policy factors influenced breastfeeding practices and duration (Scott & Binns 1998, Yngve & Sjoström 2001). These factors and their effects are not consistent across all cultures. For example, in developed countries, better educated women are more likely to breastfeed, whereas in poorer countries the opposite tends to be the case (Dennis 2002, Scott & Binns 1998, Yngve & Sjoström 2001). Older, better educated and non-smoking mothers in Croatia breastfed at a higher rate than young, less educated and smoking mothers (Berović 2003). Another Croatian study found that mothers who attended breastfeeding support group more often continued breastfeeding for at least six months if they had higher monthly household income, did not smoke during pregnancy, decided to breastfeed after birth and intended to breastfeed for longer than six months (Bošnjak et al. 2009).

According to the Feeding and nutrition of infants and young children published by WHO in 2003 (Michaelsen et al. 2003), Croatia was at the bottom (27th out of 30 countries) of the list of different countries of the European Region in breastfeeding prevalence with less than 40% of children breastfed during first 3 months and less than 20% breastfed during first 6 months (Croatian data for the year 1995). At that moment similar situation has been found in developed countries like Ireland and UK (Michaelsen et al. 2003). But, a lot has been done since then in Croatia. Recent data show improvement in this regard. In 2013 in Croatia there were 71.8% of infants breastfed during the first 2 months, 58.2% between the 3rd and 5th month and 19% of infants 6 months old or older, meaning that on average 65% of infants old 6 months or less were exclusively breastfed. From the public health perspective, in promoting breastfeeding, one of the very helpful measures is paid maternity and paternity leave. Mothers in Croatia can use fully paid maternity leave for 26 postnatal weeks (3rd EU member states position). Estonia, for example, provides only 6 fully paid postnatal weeks (European Parliament 2014). Other benefits like partially paid second half of the first postnatal year, benefits for third and every next child (financial support, support in the duration of maternity leave) influence not only breastfeeding but also natality rates.

Psychological factors are also important in initiation and duration of breastfeeding.

Early cessation of breastfeeding was found to be significantly associated with existing postnatal depression (Henderson et al. 2003). On the other hand, a Norwegian study including 42 225 women found that breastfeeding cessation is a risk factor for increased anxiety and depression. Women with high levels of anxiety and depression during pregnancy who stop breastfeeding early are at an additional multiplicative risk for postpartum anxiety and depression (Ystrom 2012).

Little is known about relation of EBF with posttraumatic stress disorder after childbirth. It has been found that posttraumatic stress disorder symptomatology after childbirth is connected with somatic complications of breastfeeding, like pain and sore nipples (Rowlands & Redshaw 2012). Traumatic delivery and depressive symptoms were associated with exclusive breastfeeding abandonment (Machado et al. 2014).

There are few recent investigations of personality traits connected with breastfeeding duration.

It has been found that mothers who reported high levels of extraversion, emotional stability and conscientiousness were significantly more likely to initiate and continue breastfeeding for a longer duration (Brown 2014). In another study extraversion and openness have been statistically significantly connected to breastfeeding (Wagner et al. 2006).

Therefore, we decided to investigate eventual contribution of above mentioned psychological factors (PTSD symptomatology, depressive symptomatology and personality traits) together with available sociodemographic data to find most important factors for EBF abandonment 6-9 weeks after childbirth. From the public mental health perspective it is crucial to find factors of early EBF abandonment, which could help to develop strategy to increase EBF and mother-child bonding. Aim of this study is to find out whether depression, posttraumatic stress disorder and personality traits at the time of delivery are associated with exclusive breastfeeding (EBF) six to nine weeks after delivery.

SUBJECTS AND METHODS

Study design and setting

This study was the secondary objective of Croatian prospective cohort study: primary objectives were published in other two separate studies (Srkalović Imširagić et al. 2014, 2016).

This prospective cohort study was performed at the Department of Gynecology and Obstetrics, University Hospital Centre Zagreb, School of Medicine University of Zagreb. Recruitment was done during four weeks in January and February 2012. Baseline sociodemographic data collection was done three to five days after delivery. The scores of The Edinburgh Postnatal Depression Scale (EPDS), The Big Five Inventory (BFI) and The Impact of Events Scale (revised) – IES-R were measured three to five days after delivery. The follow up measurement of self-reported EBF was done six to nine weeks following delivery. The study protocol was approved by the Ethics Committee of the Department of Gynecology University Hospital Centre Zagreb and Ethics Committee of the School of Medicine University of Zagreb. All participants have given the informed consent. The study was designed and executed in accordance with World Medical Association Declaration of Helsinki 2013 (World Medical Association 2013).

Participants

Targeted population were women who delivered in Croatian largest University maternity hospital during January and February 2012. Available, eligible population size was N=395.

23 participants out of 395 participants were excluded for following reasons: 11 had no permanent domicile address, 2 didn't speak Croatian, 8 refused to participate, 2 were undergoing psychiatric treatment (addiction). At the end, a total of 372 women were included in the study three to five days after the delivery (Figure 1).

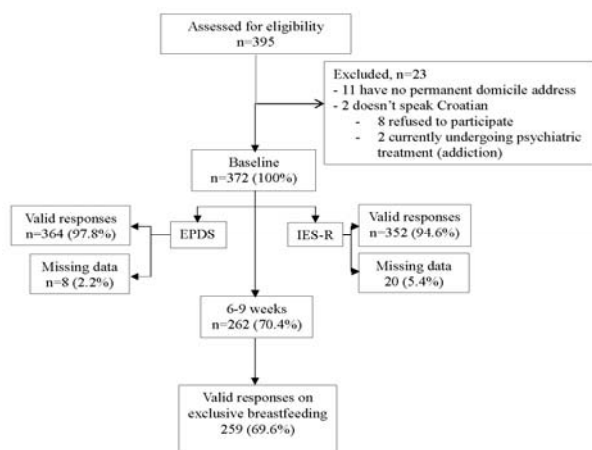


Figure 1. Participants flow diagram

Of the 372 included women 24 (6.5%) were mothers of preterm infants. A majority of participants, 366 (98.4%), were living with a partner at the time of delivery. Three to five days after the delivery data on breastfeeding were correctly collected for 366 (98.4%) women. Out of 366 women 312 (85.2%) succeeded to initiate breastfeeding and 54 (14.8%) didn't succeed at that moment. Six to nine weeks later 262 (70.4%) remained in the study while 110 (29.6%) were lost for follow up. Data on breastfeeding were collected for 259 (69.9%) women, which was our final study sample (n=259). A majority of remaining participants, 255 (98.5%) were living with a partner 6-9 weeks after childbirth. Nineteen women (7.3%) of the remaining study sample were mothers of preterm infants. Participants were aged from 15 till 45 years, median age was 30 with IQR from 27 till 34. For half of them this was the first delivery 132 (52.3%). A majority of participants were employed 209 (81.0%) (Table 1).

The participants had to be literate and have available post-office address and telephone number. An exclusion criterion was a known psychiatric illness treated with psychotropic medications in anamnesis (affective disorders, psychosis, anxiety disorders, addiction).

We did a consecutive sample of all women giving birth during the enrollment period. For the follow up all participants were contacted by phone and instructed about the follow up questionnaire that was sent to them by mail. Fulfilled questionnaires were sent back to researchers by mail.

Table 1. Participants baseline characteristics 3-5 days after delivery (n=259)

	n	(%)
<i>Sociodemographic characteristics</i>		
Age (years); median (IQR)	30	(27-34)
Education		
secondary school or less	122	(47.1)
higher education	137	(52.9)
Employment		
yes	209	(81.0)
no	49	(19.0)
Domicile		
village or small town ^a	97	(37.5)
city	162	(62.5)
Parity		
primiparous	132	(52.3)
2 nd delivery	78	(30.8)
3 rd or later delivery	43	(17.0)
<i>Delivery</i>		
Mode of delivery		
vaginal birth	197	(76.1)
caesarean section	62	(23.9)
Duration of delivery (hours), median (IQR)	7.0	(4.0-12.0)
<i>Attitudes</i>		
How long they believe they will breastfeed? (months); median (IQR)	12	(6-12)
How long they believe they should breastfeed? (months); median (IQR)	12	(8-12)

Data were not properly collected for age in 4(1.5%) participants; employment in 1 participant (0.4%); parity in 6 (2.3%) participants; IQR = interquartile range; ^a Village or small town was defined as the place with ≤20 000 inhabitants what separates Croatian cities with maternity hospitals within general or county hospitals from places with only maternity wards in health centres or no maternity facilities at all

Instruments

Exclusive breastfeeding (EBF) status

Key outcome was self-reported EBF status six to nine weeks after delivery. EBF was defined according to WHO/UNICEF definition as infants who were fed with only breast milk from his/her mother or wet nurse through breastfeeding or expressed breast milk and no other liquids or solids (except for drops of syrups with nutritional supplements or medicine) were given to infants (WHO 2008).

The Edinburgh Postnatal Depression Scale (EPDS)

EPDS was used to measure depressive symptomatology as a predictor of EBF.

EPDS is a 10-item postpartum depression screening questionnaire completed by mothers and scored by clinicians (Cox et al. 1987). A validated Croatian translation was used (Nakić Radoš et al. 2013). EPDS cut off score for diagnosis of depressive disorder is between 9-14 (Elisei et al. 2013, Cox 1987, Nakić Radoš et al. 2013).

The Big Five Inventory (BFI)

BFI was used to measure personality traits as predictors of EBF. The Big Five Inventory (BFI) (Benet-Martínez & John 1998) questionnaire was used that consists of 44 items constructed to allow quick and efficient assessment of the 5 personality dimensions – extraversion, agreeableness, conscientiousness, neuroticism and openness. Self-report ratings for each item were made on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). In the Croatian sample, the coefficients of internal reliability (Cronbach α) were from 0.69 to 0.80 (Hudek-Knežević & Kardum 2009).

The Impact of Events Scale (revised) – IES-R

IES-R was used to measure traumatic experience of childbirth as a predictor of EBF.

To screen for PTSD symptoms, the Impact of Events Scale (revised) – Croatian (convergent validation) version (IES-R) was used. It is a 22-item self-report measure which assesses subjective distress caused by traumatic events (Weiss & Marmar 1997). The IES-R was translated and validated (convergent validation) in Croatian with a reliability of (Cronbach α) 0.91 (Ljubotina & Muslić 2003). IES-R cut off point of ≥ 24 was used as the indicator of clinically relevant traumatic birth experience (Çorapçioğlu et al. 2006).

Statistical analysis

Statistical significance was set to $p < 0.05$ and all confidence intervals were given at 95% confidence level. In all instances two-tails tests were used. Distributions of numeric variables were described by medians and interquartile ranges if Kolmogorov-Smirnov test indicated significant departures from the normal distribution. Correlation of attitude on advisable duration of breastfeeding and the expectation on how long the actual breastfeed will last was analyzed by Spearman's rank correlation. Association of sociodemographic, delivery and psychological characteristics was assessed in two steps. In first step a series of univariate binary logistic regression analysis was done. All variables that were statistically significantly associated with EBF at the level of $p < 0.25$ (Hosmer & Lemeshow, 2000) were simultaneously entered into the multivariate, adjusted binary logistic regression analysis. Odds ratios were given as the measures of standardized effects sizes accompanied with their 95% confidence intervals. The moderating effect of EPDS score to the association of parity and EBF was analyzed by "Process" release 2.12 (Hayes 2014). We used Johnson-Neyman technique as implemented in "Process" to analyse statistical significance of association of parity and EBF at different levels of EPDS. Johnson-Neyman technique enables us to recognise levels of EPDS (moderator in this case) at which the association of parity and exclusive breastfeeding is or is not statistically significant. The probability of EBF 6-8 weeks after delivery was calculated from odds as follows: probability = odds ratio/(1+odds

ratio). Data analysis was done by R: a language and environment for statistical computing (R Development Core Team 2008).

RESULTS

Data on breastfeeding in second study point were collected for 259 (69.9%) women. Their own expected duration of breastfeed median was (IQR) 10 (6-12) months. Attitude on how long they should breastfeed and believe on how long they will probably do it, were significantly correlated (Pearson's $r = 0.67$; $r^2 = 0.45$; $p < 0.001$). Less than half of these two variables' variances were of the same origin. Six to nine weeks after the delivery 151/259 (58.3%) were still exclusively breastfeeding their child. Median psychological baseline characteristics 3-5 days after delivery are presented in Table 2.

Table 2. Participants psychological baseline characteristics 3-5 days after delivery (n=259)

	Median	(IQR)
Personality traits (BFI)		
Extraversion	30	(27-34)
Agreeableness	35	(31-39)
Conscientiousness	36	(33-40)
Neuroticism	19	(16-23)
Openness	36	(32-41)
Posttraumatic stress disorder (IES-R)	14	(5-24)
Depression (EPDS)	5	(2-8)

BFI = Big Five Inventory; IES-R = Impact of Events Scale revised; EPDS = The Edinburgh Postnatal Depression Scale

All of the investigated psychological variables were statistically significant at univariate level: neuroticism, PTSD symptoms and depression symptoms in a way that they reduce chances for EBF. Additionally, we have found that some of the demographic variables as employment and second delivery were statistically significant in a way that they improve chances for EBF (Table 3).

When adjusted for age, employment, mode of delivery, neuroticism and Impact of events scale result, meaning for all variables that were univariately associated ($p < 0.25$) with EBF 6-9 weeks after the delivery, only parity and The Edinburgh Postnatal Depression Scale result were statistically significantly and independently associated with EBF (Table 3). Women who gave their second childbirth had significantly higher odds for longer EBF than primiparous women. Higher The Edinburgh Postnatal Depression Scale result was significantly associated with lower odds for EBF. Domicile, education and duration of delivery and all other personality traits except neuroticism (extraversion, agreeableness, conscientiousness and openness) didn't reach statistical significance at the level of $p < 0.25$ to be entered in a multivariate analysis (Table 3). Our results regarding five personality traits measured by BFI: Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness (Table 2) are similar to previous results in general and in Croatian population (Schmitt et al. 2007).

Table 3. Association of sociodemographic, delivery and psychological parameters with exclusive breastfeeding 6-8 weeks after delivery (n=259)

	Exclusive breastfeeding 6-8 weeks after delivery				Univariate		Multivariate, adjusted			
	yes (n=151)		no (n=108)		OR _{uni} (95% CI)	p	OR _{adj} (95% CI)		p	
Sociodemographic characteristic										
Age (years)	31	(27-34)	30	(27-34)	1.03	(0.98-1.09)	0.227	1.00	(0.94-1.07)	0.882
Education, n (%)										
secondary school or less	68	(55.7)	54	(44.3)	1					
higher education	83	(60.6)	54	(39.4)	1.22	(0.74-2.00)	0.430			
Employment, n (%)										
yes	128	(61.2)	81	(38.8)	1.94	(1.04-3.63)	0.039	1.59	(0.76-3.30)	0.219
no	22	(44.9)	27	(55.1)	1			1		
Domicile, n (%)										
village or small town ^a	56	(57.7)	41	(42.3)	1					
city	95	(58.6)	67	(41.4)	1.04	(0.62-1.73)	0.886			
Delivery										
Parity										
primiparous	67	(50.8)	65	(49.2)	1			1		
2 nd delivery	53	(67.9)	25	(32.1)	2.06	(1.15-3.69)	0.016	2.12	(1.10-4.10)	0.025
3 rd or later delivery	28	(65.1)	15	(34.9)	1.81	(0.89-3.70)	0.103	1.94	(0.85-4.42)	0.114
Mode of delivery, n (%)										
vaginal birth	121	(61.4)	76	(38.6)	1.70	(0.96-3.02)	0.071	1.33	(0.68-2.60)	0.403
caesarean section	30	(48.4)	32	(51.6)	1			1		
Duration of delivery (hours)	6.3	(3.5-12.0)	7.8	(4.5-11.1)	0.99	(0.96-1.03)	0.780			
Psychological characteristics										
Personality traits (BFI)										
Extraversion	30	(27-34)	30	(27-33)	1.01	(0.96-1.07)	0.693			
Agreeableness	36	(31-38)	35	(31-39)	1.02	(0.97-1.07)	0.551			
Conscientiousness	37	(33-40)	37	(33-40)	1.01	(0.96-1.06)	0.709			
Neuroticism	19	(16-22)	20	(16-24)	0.95	(0.91-0.99)	0.047	0.98	(0.93-1.04)	0.577
Openness	36	(32-40)	36	(32-41)	0.99	(0.95-1.04)	0.773			
Posttraumatic stress disorder (IES-R)	13	(5-21)	18	(6-29)	0.98	(0.96-1.00)	0.011	1.00	(0.98-1.03)	0.910
Depression (EPDS)	4	(1-8)	6	(3-10)	0.91	(0.86-0.96)	0.017	0.92	(0.85-0.99)	0.035

Data are presented as median (interquartile range) if not stated otherwise

OR_{uni} = univariate odds ratio for exclusive breastfeeding; OR_{adj} = multivariate, binary logistic regression adjusted odds ratio for exclusive breastfeeding; 95% CI = 95% confidence interval of odds ratio; BFI = Big Five Inventory; IES-R = Impact of events scale revised; EPDS = The Edinburgh Postnatal Depression Scale

a. Village or small town was defined as the place with ≤ 20.000 inhabitants what separates Croatian cities with maternity hospitals within general or county hospitals from places with only maternity wards in health centres or no maternity facilities at all

Table 4. Conditional association of parity with exclusive breastfeeding 6-8 weeks after delivery by the levels of The Edinburgh Postnatal Depression Scale (EPDS) score 3-5 days after delivery (n=259)

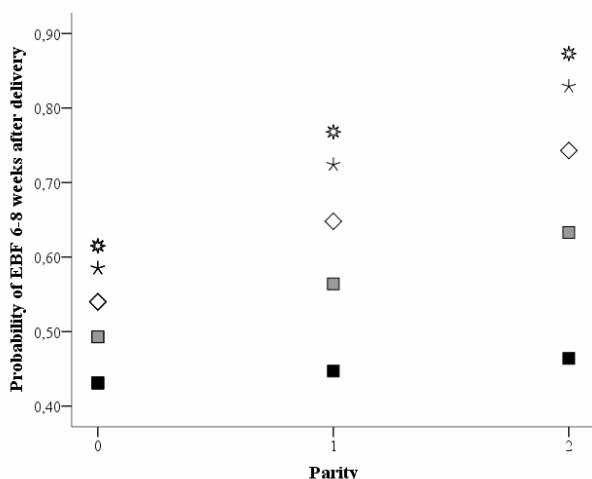
EPDS values	Association of parity and EBF			Probability of EBF
	OR	(95% CI)	P	
10 th percentile (0.0)	2.07	(1.13-3.79)	0.018	67%
25 th percentile (2.0)	1.86	(1.14-3.01)	0.013	65%
50 th percentile (5.0)	1.57	(1.08-2.28)	0.018	61%
75 th percentile (8.0)	1.33	(0.89-2.00)	0.164	57%
90 th percentile (12.0)	1.07	(0.58-1.98)	0.834	52%

OR = odds ratio for exclusive breastfeeding; 95% CI = 95% confidence interval

According to Hosmer and Lemeshow test the model acceptably well fitted the data ($\chi^2=8.97$; $df=8$; $p=0.345$). Based on model 66.4% of women were correctly classified. Nagelkerke pseudo R² was 0.11.

The Edinburgh Postnatal Depression Scale (EPDS) score 3-5 days after delivery had the moderating effect

on parity association with EBF six to nine weeks later (Table 4, Figure 2). At low values of EPDS parity and EBF were significantly associated. At EPDS level of ≥ 6.5 points the association of parity and later EBF was not statistically significant. On this particular sample level EPDS of 6.5 points leaves 64% of the sample



EPDS score - percentiles

- 90th percentile (12.0)
- 75th percentile (8.0)
- ◇ Median (5.0)
- ★ 25th percentile (2.0)
- * 10th percentile (0.0)

Figure 2. Probability of exclusive breastfeeding 6-8 weeks after delivery by parity, at different levels of The Edinburgh Postnatal Depression Scale (EPDS) score 3-5 days after delivery (n=259)

below and 36% of the sample above this point. In other words, parity and EBF six to nine weeks after the delivery are significantly associated in approximately two thirds of women and they are not in one third.

DISCUSSION

All of the psychological variables that we expected to be significant were significant at univariate level: neuroticism, PTSD symptoms and depression symptoms - reduce chances for EBF. Additionally, we have found that some of the demographic variables as employment and second delivery improve chances for EBF. On multivariate level, only parity and depressive symptomatology remain significant.

Employment in previous European studies (Bonet et al. 2013, Skafida 2012) was not connected with better chances for EBF. Since in Croatia women usually have fully paid first six month of maternity leave, employed mothers can be at home and breastfeed. In relation with that, employed mothers usually have better financial situation which is together with degree of education previously found to be connected with longer breastfeeding in European countries and in Canada (Dennis 2002, Yngve & Sjostrom 2001). In contrary to these results, we didn't find connection between education and exclusive breastfeeding on univariate level.

That finding could be explained with a fact that more than a half of our population was university educated (52.9%), which doesn't reflect Croatian general population education pattern.

It has been found that emergency and elective caesarean deliveries are similarly associated with a decreased

rate of exclusive breastfeeding compared with vaginal delivery (Zanardo et al. 2010). We didn't find statistically significant connection between mode of delivery (vaginal birth or caesarean section) with exclusive breastfeeding on univariate level. Still, even in our study, a larger number of women who gave vaginal birth breastfed exclusively, and this effect almost reached statistical significance on the univariate level. Difference in results between our and Zanardo's study could be connected with a different time of measurement, because Zanardo et al. measured 7 days, 3 months and 6 months after childbirth, and we measured only 6-9 weeks after childbirth. In our study, this is probably connected with established breastfeeding support to a mother after caesarean section, and reduced use of bottle-feeding with a formula even after caesarean section in a Croatian largest university hospital in which investigation has taken place.

It has been found that duration of delivery was connected to PTSD and depression postpartum (Modarres et al. 2012, Srkalović Imširagić et al. 2009). Depression (Ystrom 2012) and PTSD postpartum (Beck et al. 2011) are connected with reduced breastfeeding duration. We didn't find connection between duration of birth and exclusive breastfeeding in our study in a level which we found to be enough to be entered in the multivariate model. It also could be connected with improved technique and knowledge about anaesthetic use during labour which reduces traumatisation since our last study in the same hospital (Srkalović Imširagić et al. 2009), but the use of anaesthetic during labour was not investigated in this study.

Personality traits as extraversion, emotional stability, openness and conscientiousness have been statistically significantly connected to breastfeeding (Brown 2014, Wagner et al. 2006). We didn't find that kind of positive connection of above mentioned personality traits and EBF in our study, but on univariate level we found that neuroticism reduces chances for EBF.

The difference between Brown's and our study could be explained with several factors. In Brown's study authors used Ten Item Personality Measure which is a shorter version of BFI which was used in our study. Also, they had larger number of participants (602 mothers) different time of measurement (6-12 months after childbirth). Different cultural and social aspects of living between UK and Croatia could also play a role in this regard. But still, Brown et al. assumed that characteristics associated with introversion and anxiety may prevent women from seeking support or challenging negative attitudes of others at this critical time which is applicable to our study result as well, since anxiety is an important part of neuroticism trait, which we found to be negatively connected with EBF.

In Wagner's study where in multivariate model extraversion and openness remain significant authors used a totally different questionnaire - a standardized

personality inventory (NEO-PI-R), and they explored decisions to initiate breastfeeding at one time point (up to 24-96 hours) after childbirth, which is different time point than in our study, and also different measures since they measured decisions to initiate breastfeeding, but not actual success in breastfeeding.

According to results of this study, in Croatian population, women who had second delivery were more prone to breastfeed exclusively. It has been found previously in Croatian population that multiparous women with previous breastfeeding experience of more than 6 months have better attitude toward breastfeeding (Pavicic Bosnjak et al. 2012). Similarly to our results, a Brazilian study including 34 435 children 6 months old has found that multiparous women EBF more often (Venancio & Monteiro 2006).

In contrary, in US (Sutherland et al. 2012) women were more prone to initiate breastfeeding after first pregnancy. This difference could be explained with a fact that US mothers can use only 12 weeks of unpaid maternity leave (The Family and Medical Leave Act, 1993).

On multivariate level we found that birth of second child increases OR for EBF and that depressive symptomatology 3-5 days after childbirth reduces chance of EBF. On the other hand, a large study in Norway found that breastfeeding cessation is a risk factor for increased anxiety and depression, and that women who were depressive in pregnancy had reduced chance for breastfeeding (Ystrom 2012). Authors of this study used linear regression analysis to predict anxiety/depressiveness 6 months postpartum in a four steps. Although authors of this study had a far bigger sample (42 225 women), used different methodology, and had different aims depressive symptomatology was a factor connected with reduced (exclusive/predominant) breastfeeding duration and vice versa, like shown in our study. According to the Ystorm's study, primiparous women had reduced chances for anxiety/depression symptomatology 6 months after childbirth. But in this study the sample wasn't stratified to first birth, second birth and third birth and more as in ours (authors of the Ystorm's study just used primiparous versus plural birth). Also, the two studies had different measuring time points (6-9 weeks vs. 6 months). In our additional analysis, we found that protective function of second birth has been lost if women had higher depressive symptomatology (more than 6.5 on EPDS). This score is below of cut off score for screening of depressive disorder of above mentioned scale, which is between 9-14 (Cox 1987, Elisei et al. 2013, Nakić Radoš et al. 2013).

One of the most important recommendations of our investigation, which is applicable to practice, is to use EPDS, a simple and reliable test, to screen women right after childbirth to find out who needs additional support towards improved breastfeeding practice and psychological support.

IES-r score as a measure of traumatic experience of childbirth was statistically significant on univariate

level. On multivariate level we didn't find statistically significant level. In a study conducted in USA on more than 1000 women, it was found that participants who had PTSD symptomatology after childbirth didn't breastfeed as long as they wanted and didn't exclusively breastfeed at 1 month (Beck et al. 2011).

Also we have found that primiparous women, regardless of whether they have depressive symptomatology or not, need additional support for breastfeeding practice. Previously it has been found that health care professionals can be a negative source of support if their lack of knowledge results in inaccurate or inconsistent advice (Dennis 2002). That's why additional education based on WHO recommendations (WHO 2008) of Croatian established midwifery and health visitors services towards public health organizations are recommended. In the future, promoting and strengthening governmental and non-governmental breastfeeding support service organizations as "telephone breastfeeding hot lines" and centres for breastfeeding with free access for all breastfeeding mothers with various educated medical professionals (psychologist, midwives, medical doctors) should be of greater importance and public health interest than today.

According to results of this article, there is still open space for public health professionals to further educate psychologist, midwives, medical doctors and mental health professionals to support breastfeeding in healthy women and to refer them to existing breastfeeding support network in Croatia. For women with minor psychological issues which don't need medication treatment, public mental health professionals should educate other mental health professionals to use proper recommended psychotherapeutic techniques (debriefing, cognitive behavioural therapy) (Ayers et al. 2008, Meades et al. 2011) to help breastfeeding women to develop self-confidence and reduce stress and depressive symptomatology.

This study has some limitations which have to be pointed out. Our study is preliminary, and didn't explore all the important aspects of the problem, for example smoking or dietary habits (Wallwiener et al. 2015), influence of drop out of the study, examining the reasons for stopping EBF (medical and non-medical reasons), so future studies with larger population would be recommended. Another limitation is that women in our sample were better educated than Croatian general population. Still, our results contribute to the important understanding of psychological aspects of the early breastfeeding cessation and help designing future studies. If we could determine possible risk factors for breastfeeding cessation in maternity ward, preventive actions (yet to be established) could be applied early before damage is done. This could be the basis for early preventive action against mental health problems of a new mother and her new born child.

CONCLUSION

Employment, lower levels of neuroticism and lower levels of posttraumatic stress disorder symptoms immediately after childbirth were related to exclusive breastfeeding 6-9 weeks after delivery at univariate level, but not anymore when all variables were entered in the multivariate model. However, even after controlling for these variables, higher parity (giving birth to a second child) and lower level of depression symptoms were significant predictors of exclusive breastfeeding 6-9 weeks after delivery. Furthermore, depression symptoms are a moderator between parity and exclusive breastfeeding, so multiparous women are more prone for exclusive breastfeeding (if they don't have depressive symptomatology).

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Contribution of individual authors:

Azijada Srkalović Imširagić and Dražen Begić designed the study and gave input for statistical analysis.

Azijada Srkalović Imširagić recruited the participants and collected the data. Azijada Srkalović Imširagić and Dražen Begić drafted the main parts of the manuscript. Iris Sarajlić, Irena Rojnić Palavra and Mirjana Orban gave input for the design of public health aspects of the study and drafted portions of the manuscript. All authors interpreted the results, participated in the critical revision of the manuscript to assess the important intellectual content and read and approved the manuscript.

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