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NON-PSYCHOTIC POSTPARTUM DEPRESSION AND INFANT'S DEVELOPMENT DURING THE FIRST YEAR POSTPARTUM

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A non-psychotic maternal postpartum depression (NPPD) has been reported to slow an infant's cognitive, emotional, and social-relational development, behavior and growth.

211 mothers and 211 children were included in a prospective study with three sections, at the 1-, 6-, and 12-month postpartum. Participants filled out the questionnaire constructed for research purposes, parameters for monitoring the regularity of development by the pediatric and patronage services and Edinburgh Postnatal Depression Scale (EPDS) in three time points postpartum. From a total of 211 mothers, NPPD was confirmed in 25 (11.85%) (score on EPDS ≥10). High score on EPDS (≥10) was maintained in 23 (10.9%) subjects 6 months postpartum, with no new subjects at risk. Statistical significance was found about partner's poor education level, partner's unemployment, subjective assessment of attractiveness, satisfaction with the relationship with the

partner, and freedom of expression and expectations ($p<0.05$). All follow-up parameters of the patronage and pediatric services at 1-, 6-, and 12-month time points do not differ statistically significantly about NPPD, except whether the baby laughs, or looks at hands at 12 months ($p<0.05$).

The prevalence of NPPD in Serbian mothers was consistent with international data, with subtle socio-emotional differences in infants becoming evident only at 12 months. These findings emphasize the importance of early detection and family-oriented interventions to mitigate potential long-term risks for child mental health.

Keywords: non-psychotic maternal postpartum depression, infant's development, infant's growth,

infant's behavior

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NEPSIHOTIČNA POSTPORODAJNA DEPRESIJA I RAZVOJ DETETA TOKOM PRVE GODINE NAKON PORODAJA

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Smatra se da nepsihotična majčina postporođajna depresija (NPPD) usporava kognitivni, emocionalni i socio-relacioni razvoj, ponašanje i rast odojčeta.

Dvestajedanaest majki i 211 dece je uključeno u prospektivnu studiju sa tri dela, na 1, 6 i 12 meseci nakon porođaja. Učesnici su popunili upitnik konstruisan u istraživačke svrhe, parametre za praćenje pravilnosti razvoja od strane pedijatrijskih i patronažnih službi i Edinburšku skalu postporođajne depresije (EPDS) u tri vremenske tačke nakon porođaja.

Od ukupno 211 majki, NPPD je potvrđena kod 25 (11,85%) (skor na EPDS ≥ 10). Visok skor na EPDS (≥ 10) je održan kod 23 (10,9%) ispitanica šest meseci nakon porođaja, bez novih ispitanica u riziku. Statistička značajnost je pronađena u vezi sa niskim nivoom obrazovanja partnera, nezaposlenošću partnera, subjektivnom procenom privlačnosti, zadovoljstvom odnosom sa partnerom i slobodom izražavanja i očekivanjima ($p < 0,05$). Svi parametri praćenja patronažnih i pedijatrijskih službi u vremenskim tačkama od 1, 6 i 12 meseci se ne razlikuju statistički značajno u vezi sa NPPD, osim da li se beba smeje ili gleda u ruke sa 12 meseci ($p < 0,05$).

Prevalencija NPPD kod majki u Srbiji bila je u skladu sa međunarodnim podacima, pri čemu su suptilne socio-emocionalne razlike kod odojčadi postajale očigledne tek sa 12 meseci. Ovi nalazi naglašavaju važnost ranog otkrivanja i intervencija usmerenih ka porodici kako bi se ublažili potencijalni dugoročni rizici po mentalno zdravlje deteta.

Ključne reči: nepsihotična postporođajna depresija majke, razvoj odojčeta, rast odojčeta, ponašanje odojčeta.

Introduction

A Non-psychotic maternal postpartum depression (NPPD) is a major public health issue with far-reaching consequences for the development of their offspring, with a prevalence of up to 15% in Serbia [1,2]. The latest research in the field suggests that we should consider the NPPD and its effects on the offspring not only in the initial postpartum period, but also in a broader context, particularly during the first year [3-5]. Infants during the first year are sensitive to the primary social environment, which in that period is made by the mother [4].

A large body of research has demonstrated that NPPD mothers lack emotional energy, motivation, and enjoyment of interaction accompanied by a negative cognitive style and rumination in which they misinterpret infant's behavior or cues [4]. NPPD mothers were found to be bad-tempered and antagonistic, they look at, vocalize, play, and affectionately touch their babies less [4]. NPPD is considered to be related to impaired parenting abilities and subsequent infant's poor developmental outcomes and growth, long-term dysregulated behavior, and a high risk of psychiatric disorders in adulthood [3, 5].

As a result of negative affect, poor emotional and learning support, and less contingent stimulation in NPPD mothers, early-childhood internalizing withdrawal, fear, and depression have been reported to slow cognitive, emotional, and language development, and behavioral externalizing problems including misconduct, high impulsivity, activity and aggression lead to a chronic maladaptive way of functioning and poor social-relational development [4, 5].

Early-childhood mental health defined as "a developing capacity to form close and secure adult and peer relationships, to process emotion, to explore ambiance and learn from the given" is sensitive to existing NPPD environment during rapid brain growth [6, 7].

The basis of an adequate mother-infant relationship and further development is "observe and respond" interaction in which the mother is receptive to observe and adequately interpret her infant's signals and communications and respond to them accurately and promptly with appropriate attention, gestures, or speech [8].

Previous research showed the damaging impact of NPPD on early-infant development, even absence of breastfeeding, impaired bonding and attachment insecurity, maternal incompetence in infant health care practices and utilization measures, and risk of maltreatment, over a period of up to 12 months postpartum [8-10]. NPPD was linked with disturbed sleeping rhythm, attention deficit hyperactivity disorder, conduct disorder, depression and anxiety, starting in early childhood and persisting into young adulthood [10]

Guided by the results of studies in the field, the goal of our research was to examine the relationships between NPPD and children's growth, cognitive, emotional, social and adaptive behavioral development by using data collected at the 1-, 6-, and 12-month timepoints of a prospective longitudinal study.

Method

The research was conceived as a prospective study with three sections, at the 1-, 6-, and 12-month time points. It was conducted at the Primary Health Center in Nis as part of the gynecological, patronage, and pediatric services. The data was collected in the period from January 2019 to June 2022.

Ethics

The design of the study was approved by the Medical Faculty Ethics Committee of Nis and the Primary Health Center Ethics Committee in Nis.

Participants

The initial participants were randomly selected among women who gave birth at the Clinic for Gynecology and Obstetrics in Nis, Serbia, with a registered health record and a selected doctor at the Primary Health Center Nis, Serbia. From 295 participants who gave birth during the follow-up period, 55 were excluded due to exclusionary factors and change of residence, 14 withdrew at the second time-point, and 10 at the third time-point, 14 refused to participate in the research at the insistence of their partners, 1 was excluded from the follow-ups, as her infant was diagnosed with a genetic disorder, and 211 mothers and 211 children were included in the analysis.

Inclusion criteria were: healthy mothers (euthymic during pregnancy, without previous NPPD or any depressive episode or history of psychiatric disorder and/or somatic disorder which could explain the presented depressive symptomatology), singleton pregnancy, pregnancy and/or birth without complications, children born at term and rated healthy.

The selected groups of mothers and their children were prospectively monitored, and the mother's psychological status and child neurodevelopment parameters were evaluated by the research psychiatrist and child psychiatrist at three time points: in the first month postpartum during the fifth home visit after leaving the maternity ward (mean infant age 28 days), in the sixth month and at the end of the first year postpartum during regular examination by a pediatrician and gynecologist.

Measures

The questionnaire constructed for research purposes consisted of questions regarding socio-demographic parameters like age, dwelling, level of education, employment status, partner’s level of education and childbirth, previous and/ or current pregnancy, attitude about and length of

breastfeeding, vaccination, partnership and emotional status, subjective assessment of the relationship with the partner, and regular parameters for monitoring the regularity of development by the pediatric and patronage services and questions for nurses and pediatricians regarding child neurodevelopment assessment. Child neurodevelopment assessment questions were made by a child psychiatrist by the propositions of Zero to Three 2012, and they concerned the emotional, social-relational, linguistic-social communications and cognitive domains, achieved ability, and adaptive behavioral development [7].

Maternal depressive symptoms were measured using the validated, standardized, and widely used Serbian version of the Edinburgh Postnatal Depression Scale (EPDS) [1, 2, 11, 12]. EPDS consists of ten self-reported items that scored 0-3 on the severity of cognitive and behavioral symptoms of depression [11]. The range is 0-30, and a cut-off score for the EPDS was set as 10, which has been validated for clinical use in Serbia [12]. The instrument includes precisely structured questions for the detection of the main complaints and a series of additional questions confirming the diagnostic criteria in Psychiatry. As EPDS identifies only the risk of NPPD, in the group of mothers at risk, a psychiatric diagnosis was established by a psychiatrist, based on the diagnostic criteria of the available classification systems, confirmed by the use of the Serbian version of the Mini International Neuropsychiatric Interview, version 6.0, which is used both in clinical and research work [13-15].

Statistical analyses

All data were statistically processed with SPSS statistical software (version 18). Data are presented as absolute frequencies, percentages, means, and standard deviations, where appropriate. Normality was assessed using Kolmogorov–Smirnov test. Differences between independent

samples were tested using Student's t-test. The level $p<0.05$ was chosen for the statistical significance assessment of the obtained results.

Results

NPPD

From a total of 211 mothers, NPPD was confirmed in 25 (11.85%) (score on EPDS ≥10). High score on EPDS (≥10) was maintained in 23 (10.9%) subjects 6 months postpartum, with no new subjects at risk. 77.7% of mothers were 25 to 35 years old, with average age M=29.11 (SD=5.18). Most of them currently live in Nis (94.3%), are married/ in a relationship (89.6%), have finished faculty (57.8%), and work (71.1%).

In relation to NPPD, no statistically significant difference was found in age, education, employment, partner, and economic status, while compared to partner's poor education level was found (p=0.017) (Table 1). Unemployed partners are statistically significantly more present in NPPD mothers compared to mothers without NPPD (14.5% vs 0.0%).

Table 1. Education, employment, partner and economic status in realtion to NPPD

	No NPPD		NPPD		p
	Number	%	Number	%	
Age					
18-24	10	5,4	1	4,0	0,706
25-35	143	76,9	21	84,0	
35+	33	17,7	3	12,0	
Education					
<8years	1	0,5	0	0,0	0,786
8-12 years	35	18,8	6	25,0	
≤14 years	40	21,5	6	25,0	
>14 years	110	59,1	12	50,0	
Employment status					
Unemployed	56	30,0	7	28,0	1,000
Employed	130	69,9	18	72,0	
Partner status					
Married	168	90,3	21	84,0	0,107
In a relationship	18	9,7	3	12,0	
Divorced	0	0,0	1	4,0	
Economic status					
High satisfied	178	95,7	23	92,0	0,278
Satisfied	4	2,2	0	0,0	
It’s ok	3	1,6	2	8,0	
Unsatisfied	1	0,5	0	0,0	
Partner’ education level					
Student	6	2,7	4	16,7	0,017
Unemployed	0	0,0	27	14,5	
Employed in the state sector	37	19,9	5	20,8	
Employed in the private sector	113	60,8	15	62,5	
Retired	3	1,6	0	0,0	

No statistically significant difference was found about pregnancy in order, help with children, and with the household about NPPD, while to the subjective assessment of attractiveness statistical significance was established (Table 2).

Table 2. Pregnancy and subjective assessment of attractiveness in relation to NPPD

	No NPPD		NPPD		p
	Number	%	Number	%	
Pregnancy in order					
First	168	90,3	20	8,0	0,234
Second	2	1,1	0	0,0	
Third or more	4	2,2	0	0,0	
Subjective assessment of attractiveness	4,35±0,80		4,33±0,56		0,023
Help with children	171	91,9	23	92,0	1,000
Help with household	150	80,6	22	88,0	0,538

Satisfaction with the relationship with the partner is statistically significantly different about NPPD (p=0.012). 89.2% of participants without NPPD and 62.5% of NPPD participants are completely and perfectly satisfied with their partners. Satisfaction with support, frequency of arguments, trust in the relationship, current emotional status, and fear that the partner will leave her do not differ statistically significantly about NPPD (p=0.098, p=0.197, p=0.095, p=0.503, respectively p=0.398) (Table 3). Freedom of expression and expectations are statistically significantly different about NPPD (p=0.012). All NPPD mothers declared that they mostly have freedom of expression and expectations.

Table 3. Relationship with partner and NPPD

	No NPPD		NPPD		p
	Number	%	Number	%	
Satisfaction with the relationship with the partner					
Not satisfied	1	0,5	1	4,2	0,012
More no, than yes	0	0,0	1	4,2	
Almost completely	19	10,2	7	29,2	
Completely	92	49,5	8	33,3	
Perfect	74	39,8	7	29,2	
Satisfaction with support					
Not satisfied	2	1,1	0	0,0	0,098
More no, than yes	5	2,7	3	12,5	
Almost completely	35	18,8	7	29,2	
Completely	57	30,6	8	33,3	
Perfect	87	46,8	6	25,0	
The frequency of arguments					
Very often	6	3,2	0	0,0	0,197
Often	2	1,1	0	0,0	
I can't judge	15	8,1	5	20,8	
Almost never	74	39,8	11	45,8	
Never	89	47,8	8	33,3	
Trust in relationship					
Completely	152	81,7	15	62,5	0,095
Mostly	26	14,0	5	20,8	
Occasionally doubts and complains	1	0,5	2	8,3	
He constantly checks and scolds me	2	1,1	1	4,2	
I don’t trust him	5	2,7	1	4,2	
Emotional status					
Completely in love	162	87,1	20	83,3	0,503
I think I love him	18	9,7	4	16,8	
Not in love	1	0,5	0	0,0	
I am not sure	5	2,7	0	0,0	
Freedom of attitudes and expectations in the relationship					
I am completely hindered and discouraged	13	7,0	0	0,0	0,012[2]
Only when he finds time to listen to me	4	2,2	0	0,0	
When he is in a good mood	4	2,2	0	0,0	
Mostly yes	37	19,9	12	50,0	
Yes, always and completely	128	68,8	12	50,0	
Fear that her partner will leave her					
Yes, often	13	7	1	4,2	0,398
Sometimes	20	10,7	6	25,0	
No, never	153	82,3	17	70,8	
NPPD and infant’s development at 1 month					

The follow-up parameters of the patronage and pediatric services are shown in Table 4. All parameters do not differ statistically significantly about NPPD ($p>0.05$) (Table 4). Pathological cognitive, emotional, and social-relational development is present in 13.3% of babies, 58.3% of babies are breastfed, and 84.4% of babies are vaccinated regularly. Preserved food-seeking reflex is present in 23.2% of babies, and preserved sucking and swallowing reflex in 23.2% of babies.

Table 4. Patronage and pediatric services monitoring parameters in relation to NPPD in the first month

First month postpartum	**Sample**		**No NPPD**		**NPPD**		**p**
Add weight	Number	%	Number	%	Number	%	
< 1kg	158	75,2	110	72,8	48	81,4	0,408
1-2kg	41	19,5	32	21,2	9	15,3	
>2kg	11	5,2	9	6,0	2	3,4	
Grown							
do 1cm	130	61,6	94	61,8	36	61,0	0,503
1-2cm	52	24,6	35	23,0	17	28,8	
>2cm	29	13,7	23	15,1	6	10,2	
Proper cognitive, emotional, social-relational development	168	79,6	121	79,6	47	79,7	1,000
Pathological cognitive, emotional, social-relational development	28	13,3	20	13,2	8	13,6	1,000
Sight and hearing preserved	198	93,8	143	94,1	55	93,2	1,000
Nutrition							
breastfeeding	123	58,3	85	55,9	38	64,4	0,529
breast-milk substitutes	29	13,7	22	14,5	7	11,9	
both	59	28,0	45	29,6	14	23,7	
Regular vaccination	178	84,4	128	84,2	50	84,7	1,000
Fontanelle							
in line	176	83,4	12	83,6	49	83,1	0,972
tucked in	22	10,4	16	10,5	6	10,2	
bulging	13	6,2	9	5,9	4	6,8	
Hygiene of the oral cavity	79	37,4	59	38,8	20	33,9	0,614
Changes on skin	68	32,2	44	28,9	24	40,7	0,141
Preserved foraging reflex	49	23,2	35	23,0	14	23,7	1,000
Preserved sucking and swallowing reflex	49	23,2	35	23,0	14	23,7	1,000

NPPD and infant's development at 6 months

The follow-up parameters of the patronage and pediatric services are shown in Table 5. All parameters do not differ statistically significantly about NPPD ($p>0.05$) (Table 5). Pathological cognitive, emotional, and social-relational development is present in 18.5% of babies, 46,4% of babies are breastfed, and 73% of babies are vaccinated regularly. Almost 80% of babies follow with their eyes, and more than 70% of babies turn in the direction of the sound. 70.1% of babies laugh, look at their hands, 50.7% of babies turn independently, 29.4% of babies take steps independently, and 53.1% of babies coo, utter voices. 92.4% of babies were eating, sleeping and bathing properly.

Table 5. Patronage and pediatric services monitoring parameters in relation to NPPD in the sixth month

Sixth month postpartum	**Sample**		**No NPPD**		**NPPD**		**p**
Weight	Number	%	Number	%	Number	%	
expected for age	156	73,9	113	74,3	43	72,9	0,576
below expected for age	32	15,2	21	13,8	11	18,6	
above expected for age	23	10,9	18	11,8	5	8,5	
Length							
expected for age	148	70,1	110	72,4	38	64,4	0,334
below expected for age	63	29,9	42	27,6	21	35,6	
Dentition	20	9,5	15	9,9	5	8,5	0,961
Proper cognitive, emotional, social-relational development	183	86,7	134	88,2	49	83,1	0,450
Pathological cognitive, emotional, social-relational development	39	18,5	26	17,1	13	22,0	0,529
Sight and hearing preserved	180	85,3	128	84,2	52	88,1	0,613
Nutrition							
breastfeeding	98	46,4	72	47,4	26	44,1	0,722
breast-milk substitutes	56	26,5	38	25,0	18	30,5	
both	57	27,0	42	27,6	15	25,4	
Regular vaccination	154	73,0	117	77,0	37	62,7	0,033
The conditions in which the baby resides							
acceptable	180	85,3	130	85,5	50	84,7	1,000
unacceptable	31	14,7	22	14,5	9	15,3	
Follow with a glance	167	79,1	122	80,3	45	76,3	0,651
Turns in the direction of the sound	155	73,5	113	74,3	42	71,2	0,770
Changes on skin	68	32,2	44	28,9	24	40,7	0,141
Laughs, looks at hands	148	70,1	111	73,0	37	62,7	0,193
Turns independently	107	50,7	81	53,3	26	44,1	0,294
Takes first steps independently	62	29,4	46	30,3	16	27,1	0,778
Coo, pronounces sounds	112	53,1	83	54,6	29	49,2	0,576
Proper nutrition, sleep, bathing	195	92,4	142	93,4	53	89,8	0,552
The baby is taken out of the house, exposed to the Sun	183	86,7	135	88,8	48	81,4	0,227
Templar	0	0,0					
Hip check done	152	72,0	115	75,7	37	62,7	0,060
Some disease present	40	19,0	31	20,4	9	15,3	0,510

NPPD and infant's development at 12months

The follow-up parameters of the patronage and pediatric services are shown in Table 6. All parameters do not differ statistically significantly about NPPD ($p>0.05$) (Table 6.), as well as with high score on EPDS (≥10) at 6 months postpartum ($p>0.05$), except whether the baby laughs, looks at his hands ($p=0.015$) (Table 7). It was found that babies of NPPD mothers smile and look at their hands significantly less compared to babies of mothers without NPPD (52.7 vs 34.2%) (Table 7).

Table 6. Patronage and pediatric services monitoring parameters in relation to NPPD at 12 months

12 months postpartum	**Sample**		**NonNPPD**		**NPPD**		**p**
Weight	Number	%	Number	%	Number	%	
expected for age	43	20,4	35	23,0	8	13,6	0,180
below expected for age	168	79,6	117	77,0	51	86,4	
Dentition	50	23,7	37	24,3	13	22,0	0,862
Proper cognitive, emotional, social-relational development	105	49,5	75	49,3	30	50,8	0,966
Pathological cognitive, emotional, social-relational development	0	0,0	0	0,0	0	0,0	-
Sight and hearing preserved	142	67,3	102	67,1	40	67,8	1,000
Nutrition							
breastfeeding	2	0,9	1	0,7	1	1,7	0,073
breast-milk substitutes	146	69,2	99	65,1	47	79,7	
both	63	29,9	52	34,2	11	18,6	
Regular vaccination	52	24,6	37	24,3	15	25,4	0,870
The conditions in which the baby resides							
acceptable	135	64,0	95	62,5	40	67,8	0,472
unacceptable	76	36,0	57	37,5	19	32,2	
Follow with a glance	181	85,8	130	85,5	51	86,4	1,000
Turns in the direction of the sound	142	67,3	102	67,1	40	67,8	0,923
Laughs, looks at hands	82	38,9	54	35,5	28	47,5	0,111
Turns independently	150	71,1	111	73,0	39	66,1	0,319
Takes first steps independently	51	24,4	35	23,0	16	27,1	0,533
Coo, pronounces sounds	64	30,3	46	30,3	18	30,5	0,972
Proper nutrition, sleep, bathing	202	95,7	144	94,7	58	98,3	0,250
The baby is taken out of the house, exposed to the Sun	180	85,3	126	82,9	54	91,5	0,112

Templar	138	65,4	100	65,8	38	64,4	0,850
Hip check done	120	56,9	87	57,5	33	55,9	0,864
Some disease present	68	32,2	50	32,9	18	30,5	0,739

Table 7. Patronage and pediatric services monitoring parameters in relation to 6 months high score on EPDS at 12 months

12 months postpartum	**No high score on EPDS**		**High score on EPDS**		**p**
Weight	number	%	number	%	
expected for age	9	5,8	3	5,5	0,375
below expected for age	120	77,4	47	85,8	
above expected for age	26	16,8	5	9,1	
Height					
expected for age	35	22,6	8	14,5	0,205
below expected for age	120	77,4	47	85,5	
Dentition	36	23,2	14	25,5	0,739
Proper cognitive, emotional, social-relational development	74	47,7	34	56,4	0,272
Pathological cognitive, emotional, social-relational development	0	0,0	0	0,0	-
Sight and hearing preserved	100	64,5	41	74,5	0,174
Nutrition					
breastfeeding	1	0,6	1	1,8	0,159
breast-milk substitutes	103	66,5	43	78,2	
both	51	32,9	11	20,0	
Regular vaccination	36	23,2	16	29,1	0,387
The conditions in which the baby resides					
acceptable	93	60,0	41	74,5	0,054
unacceptable	62	40,0	14	25,5	
Follow with a glance	134	86,5	47	85,5	0,854
Turns in the direction of the sound	107	69,0	35	63,6	0,463
Laughs, looks at hands	29	52,7	53	34,2	0,015
Turns independently	115	74,2	35	63,6	0,136
Takes first steps independently	34	21,9	17	30,9	0,182
Coo, pronounces sounds	46	29,7	18	32,7	0,673
Proper nutrition, sleep, bathing	147	94,8	54	98,2	0,293
The baby is taken out of the house, exposed to the Sun	130	83,9	50	90,9	0,200
Templar	105	67,7	33	60,0	0,299
Hip check done	91	58,7	29	52,7	0,441
Some disease present	55	35,5	13	23,6	0,107

In our research all follow-up parameters of the patronage and pediatric services about weight, development progress of children at 1-, 6-, and 12-month time points do not differ statistically significantly about NPPD, except whether the baby laughs, or looks at hands at 12 months.

Discussion

From the aspect of recognizing the importance of NPPD and the complex effect on offspring, we constructed the first prospective study in our area, with the intention of detecting the prevalence, risk factors, and consequences of NPPD on the emotional, cognitive, and social development, growth and behavior of offspring.

In our research, nearly 12% of participants were diagnosed with NPPD, which was maintained in almost the same percentage even at the 6-month assessment stage, with persistence in 10.9% at six months and no new cases by one year, which is consistent with the results of other studies [1,2,16,17].

Our findings indicate that most developmental parameters monitored by pediatric and patronage services (weight, reflexes, motor milestones and general social engagement), did not significantly differ between infants of mothers with and without NPPD at 1, 6, or 12 months. The only exception was that at 12 months, infants of NPPD mothers were significantly less likely to smile and look at their hands. These subtle socio-emotional differences suggest that maternal depression may initially exert its influence on infant affective and relational behaviors rather than on gross motor or cognitive milestones.

What our results also confirmed is that NPPD is more prevalent in participants whose partners have a poor education level and are unemployed, perhaps due to the fact that 57.8% of the examined group itself had a higher level of education, and 71.1% work, which was confirmed in

studies that included antepartum depression [16,17]. In support of potential rooted cultural beliefs, our results did not confirm the statistics between NPPD and economic status, daily help with children and the household detected in more developed countries, were being single, absence or poor social support and lower socioeconomic status were the most powerful risk factors [16,17].

NPPD mothers were nearly two times more likely to have underweight, and slower progress children in terms of growth in at aged 2 years with several behavioral problems estimated at age 4 years [6,16]. In our research all follow-up parameters of the patronage and pediatric services at 1-, 6-, and 12-month time points do not differ statistically significantly about NPPD, except whether the baby laughs, or looks at hands at 12 months. The more limited differences in our research may be reliance on routine pediatric service assessments, which may not capture subtler aspects of infant functioning. Nevertheless, both sets of findings point to the importance of family and relational contexts, consistent with our results showing significant associations between NPPD and partner-related variables (education, employment, and relationship satisfaction).

NPPD mothers more likely stop breastfeeding their children earlier then non-NPPD mothers, they raise children in inadequate conditions with unhealthy habits in terms of nutrition, sleeping and exposure to the Sun and fresh air, which was not statistically confirmed in our research, but percentage less children were breastfed and vaccinated when we look at the first and second cross-sections [19].

High score on EPDS was also associated with insecure infant attachment, lower infant social performance scores at 3 months, and lower scores in motor development at 6 months postpartum, which we did not detect with our research, though pathological cognitive, emotional, and social-relational development is present in 13.3% at 1-, and 18.5% at 6- month time points [4, 6].

Undeniably, we consider it urgent to conduct an additional series of prospective design studies in order to better understand the relation between NPPD and infant development, growth and behavior.

Several limitations should also be noted. Majority of women in this sample were highly educated, employed, and married or cohabiting, which limits the generalizability of results. Infant development was assessed through routine pediatric and patronage service parameters, which may not capture subtle cognitive and socio-emotional differences. The follow-up period was restricted to the first year of life, although long-term effects of maternal depression often emerge later in childhood [20]. Reliance on self-report (EPDS) may have introduced reporting bias due to stigma surrounding mental health. In addition, the relatively small number of mothers with NPPD and the single regional sample limit the generalizability of the findings. Potential confounding factors such as prior maternal mental health history or broader social support were not systematically assessed.

Conclusion

This prospective study confirmed that the prevalence of non-psychotic postpartum depression (NPPD) in Serbian mothers is comparable to international data, affecting approximately 12% of participants and persisting in a subset up to six months postpartum. While no significant differences in most infant developmental parameters were detected in the first year of life, socio-emotional markers at 12 months, such as smiling and hand-gazing, were significantly less frequent in infants of mothers with NPPD. These findings suggest that the earliest developmental effects of maternal depression may emerge in the socio-emotional domain, while gross motor and cognitive functions remain preserved in the first year. The persistence of maternal depressive symptoms and subtle infant differences highlight the need for systematic early screening, partner- and family-

oriented interventions, and long-term follow-up to prevent cumulative adverse outcomes for child mental health.

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