DEPRESSION, ANXIETY, AND COPING IN PERIPARTUM WOMEN DURING COVID-19 PANDEMIC

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Abstract. Background and Objectives: *The World Health Organization declared pregnant women and mothers of infants to be among the most vulnerable groups during the COVID-19 pandemic. This study, a part of a large international prospective study, aimed to 1) evaluate the levels of perinatal depression and anxiety, 2) determine the risk and protective factors that predict perinatal mental health outcomes, and 3) ascertain the possible effects of different behavioral coping strategies to overcome stress and challenges during Covid-19 lockdowns and restrictions.* **Materials and Methods:** *This is a comparative cross sectional, non-interventional study of non-clinical population of peripartum women (N = 328, 62% pregnant, 38% mothers of infants). Participants completed the adapted Bulgarian version of Coronavirus Perinatal Experiences – Impact Survey (COPE–IS), which includes self-assessment scales of depression (Edinburgh Postnatal Depression Scale, EPDS) and anxiety (Generalized Anxiety Disorder Screener, GAD-7), preferred coping strategies and social support questions.* **Results:** *24.8% of pregnant women and 23% of mothers of infants showed very high (≥ 13) EPDS score, while 22.8% of pregnant women and 18.3% of mothers of infants presented severe (≥ 10) GAD-7 symptoms. Several hierarchical linear regression analyses revealed that: 1) history of previous mood disorders of the mother was a predictor of depression and anxiety peripartum, 2) perceived social support and decreased time on social media were protective factors postnatally, 3) family time had beneficial effect on mental health outcomes for both periods, 4) coping strategies and the risk and protective factors predicting mental health outcomes in peripartum women appear in different configurations in the two studied periods – pregnancy and postpartum.* **Conclusions:** *Tailoring interventions to address behavioral coping strategies, while taking into account the different stages of pregnancy and early motherhood, holds promise for optimizing mental health outcomes in this vulnerable population, especially during critical periods of global or local crises.*

Key words: *peripartum depression, peripartum anxiety, Covid-19, coping strategies, risk and protective factors*

INTRODUCTION

Pregnancy is a unique period in a woman's life, marked by uncertainty, heightened fears and hopes. Unforeseen non-normative events, such as a global pandemic and lockdowns, amplify stress levels, testing the resilience and coping capacities of individuals, families, communities, and the whole society and could contribute to heightened emotional strain during the period surrounding childbirth [1]. Systematic review and meta-analysis carried out during the pandemic have reported higher rates of prenatal depression (25% to 31%), postnatal depression (22%) and anxiety in pregnant women (34% to 42 %) compared with the pre-pandemic period [2, 3]. International large-scale epidemiological studies of pregnant women and mothers of infants provide evidence that during health epidemics, levels of anxiety and depression are expectedly elevated and remain higher throughout the entire first year after childbirth [4]. Peripartum depression and anxiety are among the primary risk factors for the mental health and development of children. Data from controlled retrospective and prospective studies over the past three decades in the field of neuropsychology, neurology, developmental psychology, and attachment theory unequivocally demonstrate the direct dependence of the development of brain structures in the first two years after birth on the quality of the interaction between the child and the primary caregiver and maternal care [5]. The emotional bond between the infant and the caregiver represents an environment for brain development and, later on, a fundamental means of adaptation to the world. Considering the long-term effects of perinatal mental health of mothers on their children, the present study is aimed at assessing the levels of anxiety and depression, and shed light on different factors contributing to these mental health outcomes.

The Bulgarian governmental strategy for dealing with the risks of the spread of the COVID-19 virus were primarily forcing lockdowns and restricting social contact, where even a huge part of medical appointments was declined if the case was not considered urgent. These measures can be considered effective in terms of physical safety but raise a lot of questions about people's mental health. Social relationships play a central role in individuals' existence, and social support is considered to be a protective factor for peripartum mental health [6]. The support perceived by pregnant women, both in terms of practical assistance, information, and emotional support, plays a crucial role in safeguarding their mental health. Thus, peripartum women in Bulgaria were forced to change their usual ways (or find alternative ones) of receiving social support while keeping physical distance. Studies focussing on experiences, emotional needs and spontaneous coping solutions of peripartum women are scarce [7]. There are few Bulgarian studies on mental health of peripartum women [8, 9]. Other studies explore the impact of the pandemic on stress levels and mental health of different clinical groups of patients in Bulgaria [10, 11, 12]. The immediate and long-term impact of the pandemic on mental health of peripartum women is understudied. One of the aims of this study is to explore what are preferred ways of Bulgarian women in meeting the emotional pressure of both peripartum period and pandemic.

One way of dealing with isolation during the pandemic was by using digital technology and social media as means of social connection. On the one hand, the use of social media could be beneficial to peripartum women in terms of maintaining social connection with significant others and participation in different online support groups. On the other hand, more time spent on social media could be considered potentially psychologically harmful. For example, increased Ebola-related media exposure during the 2014 Ebola crisis was significantly associated with higher levels of psychological distress and Ebola-related worry [13]. The controversy had been ascertained in regard to social media consumption [14, 15]. The present study is addressing the gap in knowledge about pros and cons of social media use during Covid-19 pandemic by exploring the effect of increased/decreased time in social media and increased/decreased following of news coverage on levels of anxiety and depressive symptoms in pregnant women and mothers of babies under the age of 6 months in Bulgaria.

Previous research identified specific behavioural coping strategies as risk and protective factors for peripartum mental health. Eating comfort foods has been associated with increased anxiety and depressive symptoms among peripartum women while getting a good night's sleep has been negatively associated with anxiety, depressive, and PTSD symptoms [16]. Peripartum women who spent more hours per day attending to COVID-19 information were more likely to experience anxiety symptoms [15, 16]. Werchan and colleagues identified four behavioural phenotypes of coping strategies that associate with maternal psychosocial distress during the COVID-19 pandemic [17]. According to their results, phenotypes with high levels of passive coping strategies (like eating comfort foods, increased screen time, social media) were associated with elevated symptoms of depression, anxiety, and global psychological distress. On the contrary, the use of active coping strategies

like seeking social support and engaging in self-care activities was associated with greater resiliency.

AIMS AND OBJECTIVES

The aim of this study was to explore the impact of different risks and protective factors on levels of anxiety, depression, and post-traumatic stress symptoms in peripartum Bulgarian women during the COVID-19 pandemic.

The primary objectives were:

1) To evaluate levels of perinatal depression and anxiety symptoms. To assess the proportion of women above the clinical cut-off point on a validated self-report scale for depression and anxiety disorders.

2) To determine the risk and protective factors that predict perinatal mental health outcomes. The factors included in this study are part of methodology developed for a huge international study [1].

The hypothesis is that specific risk and protective factors (e.g., low social support, previous history of mental health disorders, different behavioural coping strategies) will be associated with an increase of depression and anxiety during the COVID-19 pandemic.

MATERIALS AND METHODS

Study design

The study design of the Bulgarian data presented here is a comparative cross sectional, non-interventional study of non-clinical population of peripartum women, recruited via social media for participation in an online survey, for the period June 2020 – March 2021. The paper presents part of the Bulgarian data from a prospective observational cohort study on the impacts of the COVID-19 pandemic on the perinatal health of pregnant women and mothers of infants in 14 countries [1].

Participants

Bulgarian peripartum women were reached through social media (Facebook) and invited to complete an anonymous online self-assessment survey. The questionnaire included a wide range of scales: screening for peripartum depression and anxiety, medical history, preferred behavioural coping strategies used, perceived and received social support, and assessment of changes in routine pregnancy follow-up. The inclusion criteria for the study are: (1) pregnant women or biological mothers of infants six months old or younger; (2) mothers aged over 18 years; (3) respondents living in Bulgaria. Exclusion criteria are: (1) women without newborn children and not currently pregnant; (2) mothers who are minors

at the time of the study; (3) for the period 2020-2021, residence is outside of Bulgaria. Intended sample size, calculated according to the number of newborns in the previous year was estimated as a minimum of 300 participants for Bulgaria. The Bulgarian sample consists of 328 women.

Variables and Instruments

Coronavirus Perinatal Experiences – Impact Survey (COPE–IS)

The methodology is described in detail elsewhere [1]. The conducted online study presented here employs a revised and adapted Bulgarian version of Coronavirus Perinatal Experiences – Impact Survey (COPE–IS), which also includes the Edinburgh Postnatal Depression Scale (EPDS) [18, 19]. The COPE–IS assesses several areas. The present study focuses on some of them: 1) COVID-19 related experiences (exposure and symptoms, any death of family members or friends, etc.); 2) social support (seeking, provided, needed, and perceived support, and level of distress experienced with changes in social support due to the COVID-19 pandemic). For the purposes of the current study one item was used, measuring the perceived social support ("Currently, how supported do you feel by your social network?"), answers given in 7-point Likert scale from 0 (not supported) to 6 (very supported); 3) coping and adjustment specifically formulated for assessing of strategies during pandemic [18]. The inquiry "What are you doing to cope with your stress related to the COVID-19 outbreak? (check all that apply)" is followed by a list of behavioural strategies, formulated as statements (see Figure 2); 4) physical and mental health history (the women's and/or family member's history of chronic medical conditions (incl. mood and/or anxiety disorders, and current treatment of medical conditions) was assessed using self-report with yes/no options for an answer.

Edinburgh Postpartum Depression Scale

The Edinburgh Postpartum Depression Scale is a widely used and well-known screening tool for assessing the prevalence of depressive symptoms and the risk of developing perinatal depression, which, regardless of the name of the scale, is also used during pregnancy. A self-report scale assesses women's mood and experiences during the past week, which includes experiencing sadness, worry, dark thoughts, and others. Answers are given on a four-point Likert scale formulated differently for different items from "most of the time or yes, quite often …" to "never, No, not at all…". There are reverse items, and values from 0 to 3 are assigned. The higher results indicate greater strength and manifestation of depressive symptoms. Cronbach's α was 0.878 for the whole

sample in this study (0.884 for pregnant women, and 0.867 for postpartum women). In the international study, a threshold of 13 was chosen to identify clinically significant depressive symptoms. The choice of threshold value in past studies has varied across populations, but the accumulated data in meta-analyses, reviews and validation studies of language and cultural versions of the EPDS indicate that a threshold of 13 achieves maximum diagnostic accuracy of depressive states [19, 20].

Generalized Anxiety Disorder Screener (GAD-7)

Anxiety symptoms are evaluated using the Generalized Anxiety Disorder screening scale (GAD-7), which is based on criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV and DSM-IV-TR). Over the past decade, GAD-7 has been used in various studies as for evaluation of the result (outcome measure), even after 2007 it is recommended as postpartum screening tool from the British Association [21]. The seven self-report items are formulated to assess anxiety, tension, restlessness, and irritability. The response scale is identical to the previous instrument, high values indicate increased anxiety, and here scores can range from 0 to 21. Cronbach's α was very high for GAD-7 in the present study – 0.933 for the whole sample (0.938 for pregnant women, and 0.926 for postpartum women). The threshold used in the present study is 10; this score and higher is considered to be within the range of clinically manifested symptoms.

Statistical Analysis Approach

The gathered data was analysed using IBM SPSS Statistics version 20. Survey data were manually checked for accuracy and consistency before analysis. From an original 588 entries, 260 were removed due to unfinished questionnaire or missing data. Descriptive statistics for study variables, including differences by group (pregnant women and mothers of infants), are presented first. The frequency and percentage measures were employed to depict the levels of depression and anxiety symptoms as well as the participants' demographic data and preferred ways of coping (social support preferences and used behavioural coping strategies). Several identical hierarchical linear regression analyses were conducted to examine the effects of predictors (risk and protective factors) of peripartum depression and peripartum anxiety for both groups of participants. In the first step of the analysis, we added personal history of mental health problems and mental health problems of relatives. In the second model explored we added perceived social support. "Enter" method was used in the regression analysis. Literature reviews and previous research data clearly demonstrate that mental health problems (of the preg-

nant woman/mother or in the family members) are risk factors, predicting depression and anxiety symptoms peripartum, whereas perceived social support is a protective factor [8, 9, 21]. In the third model, we add all 23 behavioural coping strategies from COPE-IS instrument. We use "stepwise" method analysis with exploratory purposes in order to identify potentially important coping strategies associated with peripartum depression and anxiety.

RESULTS

Descriptive Statistics and Group Comparison

During the period from June 2020 to March 2021, 328 women (62% pregnant, 38% mothers of infants under the age of 6 months) from over 30 locations in Bulgaria participated in the study. The age of the group of pregnant women ranged from 20 to 42 years (M = 30.49, SD = 4.33). The age of the group of mothers of infants under 6 months ranged from 22 to 42 years (M = 31.46, SD = 4.058). Marital status and educational level are presented in Table 1.

Perceived social support in the whole sample is M = 3.39 (min. 0, max. 6, SD = 1.82), M = 3.34 (SD = 1.80) for the sub-sample of pregnant women, and M = 3.45 (SD = 1.85) for postpartum mothers. Preferred ways of receiving social support during the pandemic are summarised in Fig. 1.

Table 1. Participant characteristics

	Participants	
	Pregnant women	Mothers of infants
	N = 199	N = 124
Age, years, M (SD)	30.33 (4.48)	31.60 (3.93)
First pregnancy/child	(N = 266) 59.8%	(N =170) 53.5%
Living in (%) N=197/121	(N = 197)	(N = 121)
Capital	61.4%	68.3%
Big town	18.3%	8.9%
Small town village	20.3%	22.8%
Marital status (%)	(N = 200)	(N = 124)
Married	52.5%	65.3%
Living with a partner	46%	33.1%
Separated/divorced	1%	–
Single parent	0.5%	0.8%
Widowed	–	0.8%
Education level (%)	(N = 200)	(N = 124)
Master's degree or higher	56%	53.2%
Bachelor's degree	31.5%	33.1%
High school diploma	11%	13.7%
Middle school diploma	1%	–

How are you currently trying to meet your needs for social support?
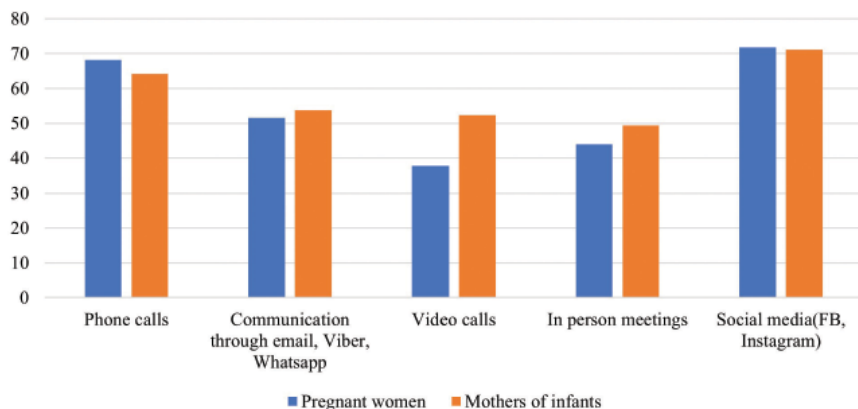
Fig. 1. Social support preferences of pregnant women and mothers of infants

Levels of depression and anxiety among Bulgarian peripartum women in the current sample are shown in Table 2. 24.8% of pregnant women and 23% of mothers of infants showed very high (≥ 13) EPDS score, while 22.8% of pregnant women and 18.3% of mothers of infants presented severe (≥ 10) GAD-7 symptoms.

Table 2. Levels of depression and anxiety symptoms among Bulgarian pregnant women and mothers of infants

	Edinburgh Postnatal Depression Scale		Generalized Anxiety Disorder Screener	
Cut-off	≥ 10 score	≥ 13 score	≥ 7 score	≥ 10 score
Pregnant women (N = 202)	40.1%	24.8%	44.6%	22.8%
Mothers of infants (N = 126)	37.3%	23%	36.6%	18.3%

In regard with family status, the sample in the study appeared homogeneous, with only 1.5% of single or divorced/separated pregnant women and 1.6% widowed or single mothers of infants (see Table 1). Education level was reported in four categories: middle school diploma (only 1% of pregnant women), high school diploma, bachelor's degree, and master's or higher academic degree (Table 1).

Over half of women in the sample (55.1%: 51.6% of pregnant women and 59.4% mothers, respectively) reported history of mental health problems (diagnosed or not) in a family member. Personal mental health problems were self-reported by 20.6% of women in the whole sample (21.5% of pregnant and 19.1% of mothers).

A survey on the preferred ways of behavioural coping with stress and sources of support (part of the COPE-IS questionnaire) revealed that most of the women

have "decreased time following news coverage", and spent "increased time on social media" and received support from family or friends as ways of dealing with tension and stress (Fig. 2).

Regression Analysis and Regression Models

Regression analysis was conducted to investigate the individual impacts of predictors on peripartum depression, the explained variance (R^2) of peripartum depression, and the change in R^2 (ΔR^2) with the inclusion of variables. Table 3 and Table 4 present the standardized regression coefficients (β), coefficients of determination (R^2), and changes in coefficients of determination (ΔR^2) resulting from the inclusion of additional predictors. In model 1, peripartum depression was predicted by history of mental health problems of the participant or of a family member. The f^2 statistic (calculated as $R^2/(1-R^2)$), is approx. 0.342 for antepartum depression and approx. 0.431 for postpartum depression. In Cohen's framework, small effect sizes have f^2 around 0.02, medium effect sizes around 0.15, and large effect sizes around 0.35 (Cohen, 1988). Both models, for pregnant women and for mothers of infants, have strong predictive power according to Cohen's terms.

In model 2, perceived social support was added to the regression equations, which increased the explained variance of antepartum depression from 13.6% to 14.9% ($\Delta R^2 = 0.013$) and for postpartum depression from 12% to 17.6% ($\Delta R^2 = 0.056$). Regression coefficients showed that perceived social support has predictive power when controlling for mental health problems.

In model 3, all 23 behavioural coping strategies (listed in Fig. 2) were added to the regression equation using "stepwise" method. Only coping strategies contributing to the prediction of the model are listed in Tables 3, 4, 5, and 6. This increased the explained variance of antepartum depression from 14.9% to 25.5% ($\Delta R^2 = 0.106$) and for postpartum depression

What are you doing to cope with your stress related to the COVID-19 outbreak?

Fig. 2. Preferred coping strategies

from 17.6% to 30.1% ($\Delta R2 = 0.125$). The f² statistic (calculated as R2/(1-R2)), is approx. 0.087 for antepartum depression and approx. 0.127 for postpartum depression, which in both cases is considered a small to medium effect size. The results show that after controlling history of mental health problems and perceived social support, coping strategies have added predicting power for peripartum depression. However, the preferred coping strategies of pregnant women and of mothers of infants are different and the predictive power of different combinations of factors is established for pregnant and peripartum women.

Table 3. Summary of regression analysis for predicting antenatal depression

Model	Variable	B	SE	β	ΔR2	R2
1					-	.136
	Personal mental health problems	4.99	.961	.360***		
	Mental health problems of relatives	-0.993	.956	-.071		
2					.013	.149
	Personal mental health problems	5.08	.950	.362***		
	Mental health problems of relatives	-1.178	.953	-.084		
	Perceived social support	-.438	.220	-.132*		
3					0.106	.255
	Personal mental health problems	5.05	.889	.361***		
	Mental health problems of relatives	-0.69	.900	-.050		
	Perceived social support	-.350	.207	-.105		
	CS: Eating comfort foods (e.g., candy and chips)	5.08	1.456	.218**		
	CS: Engaging in more family activities (e.g., games, sports)	-2.60	.789	-.210**		
	CS: Nothing special	-2.27	.893	-.165*		

*p < .05, **p < .01, *** < .001. CS – (Behavioral) Coping Strategy

Table 4. Summary of regression analysis for predicting postpartum depression

Model	Variable	B	SE	β	ΔR2	R2
1					-	.120
	Personal mental health problems	4.28	1.129	.328***		
	Mental health problems of relatives	-1.25	1.057	-.102		
2					.056	.176
	Personal mental health problems	4.12	1.094	.316***		
	Mental health problems of relatives	-.79	1.034	-.065		
	Perceived social support	-.72	.237	-.252*		
3					0.125	.301
	Personal mental health problems	3.99	1.019	.305***		
	Mental health problems of relatives	-.55	.957	-.045		
	Perceived social support	-.78	.229	-.271**		
	CS: Engaging in more family activities (e.g., games, sports)	-2.26	.810	-.210**		
	CS: Talking with mental health care provider (therapist, psychologist, counselor)	-4.89	1.52	.242**		
	CS: Decreased time in social media (Facebook, Instagram…)	-2.23	.990	-.173*		
	CS: Increased time reading books or doing activities like puzzles, crosswords, etc.	1.90	.931	-.155*		

*p < .05, **p < .01, *** < .001. CS – (Behavioral) Coping Strategy.

We did the same line of statistical analysis to identify the predictors of peripartum anxiety. Tables 5 and 6 present the standardized regression coefficients (β), coefficients of determination (R2), and changes in coefficients of determination (ΔR2) resulting from the inclusion of additional predictors. When applied to both groups in model 1, peripartum anxiety was predicted by history of mental health problem of the participant for the whole sample but history of mental health problems of a family member predicted anxiety in postpartum women only.

In model 2, perceived social support was added to the regression equations, which increased the explained variance of anxiety in mothers of infants from 4.7% to 7.5% (ΔR2 = 0.028) but was not a significant predictor for pregnant women.

In model 3, coping strategies (listed in Fig. 2) were added to the regression equation. This increased the explained variance from 7.5% to 15.8% (ΔR2 = 0.083) for mothers of infants, and from 8.3% to 16.1% (ΔR2 = 0.078) for pregnant women. The f² statistic (calculated as R2/(1-R2)), is approx. 0.192 for antepartum anxiety (medium predictive power) and approx. 0.406 for postpartum anxiety – strong predictive power according to Cohen's terms.

Table 5. Summary of regression analysis for predicting antenatal anxiety

Model	Variable	B	SE	β	ΔR2	R2
1					-	.071
	Personal mental health problems	3.66	.932	.278***		
	Mental health problems of relatives	-2.93	.932	-.022		
2					.012	.083
	Personal mental health problems	3.74	.927	.284***		
	Mental health problems of relatives	-.460	.931	-.035		
	Perceived social support	-.394	.215	-.126		
3					.078	.161
	Personal mental health problems	3.76	.887	.285***		
	Mental health problems of relatives	.036	.898	.003		
	Perceived social support	-.350	.207	-.112		
	CS: Nothing special	-2.92	.891	.225**		
	CS: Engaging in more family activities (e.g., games, sports)	-1.94	.787	-.167*		
	CS: Eating comfort foods (e.g., candy and chips)	2.98	1.454	-.136*		

*p < .05, **p < .01, *** < .001. CS – (Behavioral) Coping Strategy

Table 6. Summary of regression analysis for predicting postnatal anxiety

Model	Variable	B	SE	β	ΔR2	R2
1					-	.181
	Personal mental health problems	4.37	1.11	.328***		
	Mental health problems of relatives	-2.82	1.04	-.226**		
2					.037	.218
	Personal mental health problems	4.23	1.08	.318***		
	Mental health problems of relatives	-2.43	1.026	-.195*		
	Perceived social support	-.61	.236	-.209*		
3					.071	.289
	Personal mental health problems	4.032	1.05	.303***		
	Mental health problems of relatives	-2.403	.98	-.193*		
	Perceived social support	-.625	.23	-.213**		
	CS: Increased time reading books, or doing activities like puzzles and crosswords, etc.	-2.11	.96	.169*		
	CS: Talking with a mental health care provider (e.g. therapist, psychologist, counselor)	3.69	1.57	.179*		
	CS: Decreased time on social media (Facebook, Instagram and other)	-2.32	1.03	-.177*		

*p < .05, **p < .01, *** < .001. CS – (Behavioral) Coping Strategy

DISCUSSION

The elevated levels of depression and anxiety in pregnant women and mothers of babies under 6 months old, in Bulgarian sample, were in line with the worldwide trend of critically deteriorated psychological well-being. Our findings partly confirmed results from previous studies of risk factors peripartum for development of mental health problems [22]. Women who have experienced any kind of mood disorders are more prone to suffer psychological distress and develop clinically significant levels of anxiety and depression [9, 19]. Our study confirmed that history of previous mood disorders of the mother is a predictor of depression and anxiety peripartum, revealed also in other Bulgarian studies [9]. Mental health problems in the family members surprisingly have an ameliorative effect on postpartum anxiety, probably because of successful optimization of resources and priorities. Results revealed a significant role of perceived social support as a protective factor for postnatal depression and anxiety. Social support significantly predicted only mental health symptoms postpartum but not during pregnancy. One possible explanation could be the shifting focus of the women from medical concerns during pregnancy to a more social and contextual factors when the child is born.

Social support as a vital protective factor for peripartum anxiety and depression was intricately linked with social media use during Covid-19 pandemic lockdowns and social isolation measures [23]. The exploration of the social media impact on perceptions and attitudes of people from vulnerable groups (like women peripartum) showed great variability depending on socio-cultural context and data from pre-pandemic research [15]. A pre-pandemic study with focus groups of mothers of babies and young children indicated mixed feelings and responses regarding the use of social media (Facebook) [24]. While Facebook was used to keep up with news and current affairs, and to connect with the local community, mothers also reported fear of missing out if they were not on the platform, some found it "addictive", and some women believed the use of Facebook contributed to their negative feelings, depression and anxiety. Another study with adults during the pandemic lockdown in Italy reports that perceived feeling of loneliness predicted excessive social media use and anxiety but excessive social media use also increased anxiety levels leading to a vicious cycle [14]. Excessive consumption of social media had an ambiguous effect on subjective experiences of anxiety in different social groups. Our results showed that increased time spent on social media by mothers of babies was linked to higher postpartum depression and anxiety symptoms which is in line with other findings in populations of peripartum women in the COVID-19 pandemic period [17]. Impact of social media was not a significant predictor of mental health in pregnant women. The design of the study does not allow us to infer with any clarity neither the purpose of social media use nor to assess the reliability of information sources perceived through chosen social media. The ambiguity of information and also flooding with statistics about death rates in Bulgaria, and also the abundance of conspiracy theories might have contributed to a higher insecurity and chaos spread through social media channels. Data from other research sug-

gest that when social media is used to engage in meaningful social connections and as an emotional support resource, especially during a time of global crisis and isolation, it can be beneficial to general physical and mental health and well-being [25]. Our results are in line with previous research on general social media use (Facebook), which has been shown to negatively affect mental health [12, 26].

In the present study an interesting and clear distinction of social media as a factor in mental health in postpartum period, but not during pregnancy, had been identified. Covid-19 has accelerated development, provision and use of technology in both social support initiatives and e-mental health applications [27]. Recent study on peripartum women experience of virtual support group during Covid-19 showed no improvement on their mental health outcomes [28]. Our study contributes to discussion among professionals and communities about the alternative means for receiving social support and enhancing sense of inclusion during pregnancy and postpartum, especially when for medical, sociocultural or other reasons, face to face contact and meetings are not possible. A broader national study of available resources for support of pregnant women and mothers of infants in Bulgaria is needed. Attitudes among different social groups and communities in Bulgarian society towards e-mental health resources and technology assisted social support have to be thoroughly studied before initiating any implementation of interventions or programs.

Incorporating some of the most preferred behavioural coping strategies as predicting factors significantly enhances our understanding of their role in peripartum depression and anxiety. The substantial increase in explained variance for peripartum depression and anxiety align with previous research emphasizing the importance of coping mechanisms in predicting peripartum depression, and the impact of coping processes in the development of postnatal depression [9]. In our study we analyse behavioural coping strategies formulated specifically to address the feasible strategies during Covid-19 restrictions. The present study reveals indirectly the importance of stability and predictability of daily routine – women, who reported to have done "nothing special" to cope with stress related to Covid-19 outbreak, have lower levels of depression and anxiety during pregnancy. In another pre-pandemic study, interaction between social support and types of coping styles with depression showed an interaction effect between subjective social support and positive coping styles in relation to EPDS scores [29]. Both the present study and the Ren and colleagues' study [29] were conducted in

the face of unexpected disasters – earthquake and global pandemic.

Family activities (as preferred behavioural strategy with a significant impact diminishing depression and anxiety peripartum) could be redefined as a relational strategy, representative for positive family dynamics and trust. Another behavioural relational coping strategy is an active search of help and support from mental health providers. Surprisingly, according to our results, mental health provider's support did not prove to be beneficial for postpartum depression and anxiety. Postpartum depression, as one of the emblematic mental health problems surrounding childbirth, has a comparatively long tradition of screening and treatment guidelines [19, 21]. Anxiety peripartum is a relatively new focus of researchers and practitioners. Ambiguous practices and lack of evidence-based programs in Bulgarian context might be partially explaining the surprising result in our study of negative impact of "talking with mental health provider"

Second, the cross-sectional design would allow only tentative comparison of differences during pregnancy and postpartum.

Finally, a limitation of this study is that we collected only self-report questionnaire data. In future studies it would be interesting case reports and interview data to be included and some at-risk population to be reached.

Limitations of the study

Our research has some limitations that might be compensated for in planning of further research. First, data for this study was gathered in an online survey format and thus obtained from a population of subjects who participated voluntarily. Self-selection might have led to homogeneity of the sample and biased demographic and other characteristics like: educational and marital status – over 85% holds an university degree, over 95% of the participants were either married or cohabiting with the father, all had the access and technology skills for using the social media, over 98% had uncomplicated pregnancy.

CONCLUSIONS

In conclusion, our study contributes to the growing body of research on the impact of Covid-19 pandemic on mental health and ways of coping of a particular, vulnerable group (pregnant women and mothers of infants) in Bulgarian society. Exploration of behavioural coping strategies, spontaneously developed and applied by peripartum women, confirmed the beneficial effect of decreased time in social media

postpartum on depression and anxiety symptoms, and beneficial effect of family time for the whole period. Well documented risk and protective factors predicting mental health outcomes in peripartum women appear in different configurations in the two studied periods – pregnancy and postpartum. Tailoring interventions to address behavioural coping strategies, while considering the distinct phases of pregnancy and early motherhood, holds promise for optimizing mental health outcomes in this vulnerable population, especially in critical periods of a global or local crisis.

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