Italian Journal of
Gynæcology & Obstetrics
September 2022 - Vol. 34 - N. 3 - Quarterly - ISSN 2385 - 0868

Puerperal depression risk assessment in new mothers hospitalized during COVID-19 lockdown measures

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ARTICLE INFO

History
Received: 10 February 2021
Received in revised form: 13 May 2021
Accepted: 30 August 2021
Available online: 12 September 2022

DOI: 10.36129/jog.2021.03

Key words
COVID-19; lockdown; pregnancy; puerperal; depression.

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ABSTRACT

Objective. International studies have found an increased risk of puerperal depression during COVID-19 pandemic. The present research aims to investigate the risk of puerperal depression within the obstetrics ward of Ospedale dell'Angelo (Venice Mestre), between March and June, 2020.
Patients and Methods. 98 new mothers (average age: 33 y/o, SD: 5) were asked to complete the 10 item version of the EPDS, 2-3 days after delivery and again 3 months later.
Results. The percentage of women with high score is 26.5%, less than what was found in 2016. The risk of puerperal depression does not change significantly 3 months after delivery. However, high scores on EPDS do not seem to be connected either to the type of birth or to the condition of primiparity of the mothers.
Conclusions. Some hypotheses have been proposed to explain the results obtained, such as quality of the assistance offered and/or the compliance and the coping skills acquired by families, which could be evaluated in future research.

INTRODUCTION

The term "puerperal depression" refers to a "depressive disorder of varying degrees, in temporal connection with the birth event, that can occur in the 0-12 months' timespan" [1]; DSM-5 lists Puerperal Depression among the Depressive Disorders "With onset in the peripartum that occurs during pregnancy or in the 4 weeks following childbirth" [2]; in Italy, the Ministry of Health estimates an incidence between 8 and 12% of the total number of women giving birth.

One of the most widely used screening tools for detecting the risk of puerperal depression is the 10-item version of the Edinburgh Postnatal Depression Scale (EPDS), with a sensitivity of 86%, a reliability of 0.88 (split-half reliability) and an internal consistency of $\alpha = 0.87$ [3].
What can be defined as risk factors for the onset of puerperal depression have been extensively studied in literature. These factors can be either environmental, biological, obstetric-gynecological, psychosocial or psychological [4]. On the other hand, protection factors were also identified: "elements

of support, for the person or for his / her context of belonging, capable of counteracting the level of risk and, therefore, the vulnerability to which they are exposed, favoring a good adaptation even in difficult conditions experienced in life" [5]. These include adequate coping skills, organization of childbirth preparation courses, information, instrumental and emotional support offered by those professionals (nursing homes, midwives, doctors, psychologists, *etc.*) who orbit around the mother-baby dyad in the first moments and days after birth, in contrast to the risk factor constituted by the separation between mother and child [6].

Following the first restrictions imposed to limit the spread of the COVID-19 pandemic, the carrying out of activities in the childbirth centers has also changed, with possible consequences on the psychological health of new mothers. Compared to before the pandemic, in different foreign hospital settings [7-11] a significantly higher number of respondents scored above the respective cut-off in the EPDS, even in a polyclinic in the province of Padua [12]. Women in pregnancy and during puerperium may represent a vulnerable population who could be severely psychologically affected by the measures needed to manage the pandemic, as seen in a recent case of puerperal psychotic episode occurred at the Department of Obstetrics and Gynecology of Verona [13]. Therefore, the question arose whether, even in the birth center at Mestre hospital, a psychological screening with EPDS could give different results compared to the past.

This study aims to compare the results of EPDS collected during the first lockdown period in Italy with the results obtained four years earlier by Righetti and colleagues [14]. The role of the same risk factors was also investigated: the type of delivery and the condition of primiparity, which could have a different relevance compared to 2016. Secondly, offering feedback to national and international literature is intended.

MATERIALS AND METHODS

The time frame that this research considered has been divided in two periods: a "time 0", between March and June 2020, and a "time 1", between June and August 2020. In each period the sample completed the questionnaire. Each participant took part to the survey in two moments three months apart.

This study was conducted at the Obstetrics and Gynecology ward at Ospedale dell'Angelo, Mestre. In this research, the 10-item version of the Edinburgh Postnatal Depression Scale (EPDS) was used, with an 8-point cut-off [15], considering a sample of mothers from the province of Venice. The participants were asked some personal data, in order to organize the responses obtained both at time 0 and time 1: compilation date, city of residence, first and last name initials, first and last name initials of the child, date of birth of the child. Furthermore, the participants were asked if this was their first delivery and if it was natural or caesarean, in order to verify if these variables were related to high EPDS scores.

Each hospitalized new mother over 18 years old, at their 2nd or 3rd day after delivery, was included; using the Italian version of EDPS, only Italian participants were selected. The questionnaire was first handed out to the mothers during their hospitalization (time 0). 3 months later, the participants received and filled out the same form a second time in digital format, at home (time 1).

Once the scores (both at time 0 and at time 1) were organized accordingly to the respective information on the delivery of the new mothers, we proceeded with the descriptive and inferential analysis of the data. Specifically, the average scores of both the total sample and the sample divided by cut-off were calculated. Then the t test was applied for independent samples (distinguished first by type of birth and then by primiparity) and paired samples (between time 0 and time 1), for which the Pearson correlation coefficient was also calculated.

RESULTS

98 new mothers participated in this study (average age: 33 y/o, SD: 5); no woman positive for COVID-19 was found at the time of admission. Personal and clinical data are shown below (**Table 1**), followed by the EPDS mean scores: 6.15 (SD: 3.827) at time 0 and 6.19 (SD: 4.266) at time 1 (**Table 2**).

The following table (**Table 3**) represents the correlation index ($r = .321$, $p = .001$) and the t index ($t = .085$, $p = .932$) from the comparison between time 0 and time 1 scores.

According to the findings, it was considered appropriate to divide the sample by cut-off, finding the mean score among over cut-off scores at time 0 (11.27, SD: 2.647) and the mean score at time 1 for the same group (7.65, SD: 4.454) (**Table 4**).

Table 1. *Sample's personal and clinical data.*

Provenance	Venice	24.5%
	Mestre	17.3%
	Marcon	8.2%
	Other Venetian municipalities	50%
Profession	Employee	55.1%
	Worker	15.3%
	Self-employed	9.2%
	Unemployed	9.2%
	Other	11.2%
Education	Master Degree or higher	42.9%
	Bachelor Degree	16.3%
	High School Graduation	30.6%
	Middle School Graduation	10.2%
	Married	45.9%
Marital Status	Living Together	51%
	Nubile	3.1%
Type of Delivery	Eutocic	77.6%
	Caesarian	22.4%
Condition	Primiparous	59.2%
	Multiparous	40.8%

Table 2. *Distribution of frequencies and mean scores at time 0 and time 1. Sample divided also by the significance of the cut-off (.00 for score < 8 and 1.00 for score > 8).*

		Score 0	Score 1
Whole Sample	N	98	98
	Mean	6.15	6.19
	SD	3.827	4.266
.00 (under cut-off)	N	72	65
	Mean	4.31	3.85
	SD	2.121	2.160
1.00 (over cut-off)	N	26	33
	Mean	11.27	10.82
	SD	2.647	3.548

The table below shows descriptive analysis of the sample divided by type of delivery and condition (**Table 5**), followed by inferential analysis' results. With sample divided by type of delivery, t = .989 (p = .325) at time 0 and t = .041 (p = .967) at time 1 (**Table 6**); while dividing the sample by the condition of the mother, t = 1.136 (p = .259) at time 0 and t = .276 (p = .783) at time 1 (**Table 7**).

DISCUSSION

Among the 98 mothers who participated in the study, the average score on the EPDS at both time 0 and time 1 falls below the cut-off. At time 0, 26 participants scored higher than 8 (26.5% of the sample), while at time 1 the scores above the cut-off were 33 (33.7%) (**Table 1**). Average scores correlate positively and do not differ significantly (**Table 3**). As regards the separate scores at time 0, high scores at time 0 decrease significantly at time 1, while there is a slight but significant increase among low scores, which in any case do not exceed the cut-off (**Table 4**).
Considering the type of delivery, 22 women underwent caesarean section (22.4%) and 76 completed eutocic delivery (77.6%). Regarding the condition of the participants, 58 primiparous (59.2%) and 40 multiparous (40.8%) participated. Dividing the sample by these criteria, no average score exceeds the cut-off (**Table 5**). Results of the t-test on the sample divided by type of birth are not relevant, therefore delivery seems to not sufficiently affect the risk of puerperal depression (**Table 6**). The same goes for the conditions of primiparity and multiparity (**Table 7**). All the factors considered do not seem relevant enough either at time 0 or time 1. Given the statistical limits, if we compare the data obtained by Righetti and colleagues, referring to a sampling carried out in 2016, with the international literature, it is clear that at the ward of Obstetrics and Gynecology of Mestre there is a lower risk of Puerperal Depression; if we then compare these last data with those collected (always at the same ward) in the lockdown period of March-June 2020, the Puerperal Depression risk is even lower. The study by Righetti and colleagues reports a percentage of scores above the cut-off equal to 35.8% of the sample (14). On the other hand, the present research, in the midst of the restrictive measures against the COVID-19 pandemic, reports a 26.5% of significant results, thus showing a decrease in the risk detected. The Mother-Child Department is recognized by Unicef as a "Child Friendly Hospital", for the com-

Table 3. *Pearson correlation and test for paired samples between time 0 and time 1.*

	N	Correlation	Sig.
	98	.321	.001

Score 1 & Score 0	t-test for paired samples							
	Mean	SD	SEM	95% CI		t	gl	Sig. (2-tailed)
				Inf.	Sup.			
	.041	4.727	.478	- .907	.989	.085	97	.932

Table 4. *Pearson correlation and test for paired samples between time 0 and time 1 (sample divided by cut-off at time 0: .00 for score 0 < 8 and 1.00 for score 0 > 8).*

		N	Mean	SD	SEM
.00 (under cut-off)	Score 1	72	5.67	4.101	.483
	Score 0		4.31	2.121	.250
1.00 (over cut-off)	Score 1	26	7.65	4.454	.873
	Score 0		11.27	2.647	.519

	N	Correlation	Sig.
.00 (under cut-off)	72	.239	.044
1.00 (over cut-off)	26	.331	.099

Score1 & Score 0	t-test for paired samples							
	Mean	SD	SEM	95% CI		t	gl	Sig. (2-tailed)
				Inf.	Sup.			
.00 (under cut-off)	1.361	4.143	.488	.388	2.335	2.788	71	.007
1.00 (over cut-off)	- 3.615	4.364	.856	- 5.378	- 1.853	- 4.224	25	.000

Table 5. *Distribution of the sample at time 0 and time 1 by type of delivery and condition, with relative average scores.*

	Delivery	N	Mean	SD	SEM
Score 0	Caesarean	22	6.86	4.400	.938
	Natural	76	5.95	3.651	.419
Score 1	Caesarean	22	6.23	5.291	1.128
	Natural	76	6.18	3.962	.454
	Condition	**N**	**Mean**	**SD**	**SEM**
Score 0	Primiparous	58	6.52	4.260	.559
	Multiparous	40	5.63	3.069	.485
Score 1	Primiparous	58	6.29	4.381	.575
	Multiparous	40	6.05	4.145	.655

Table 6. *Independent sample t-test (sample divided by type of delivery).*

		Levene's Test		t-test						
		F	Sig.	t	gl	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI	
									Inf.	Sup.
Score 0	Equal Variances Assumed	.891	.348	.989	96	.325	.916	.927	- .923	2.756
	Equal Variances Not Assumed			.892	29.87	.380	.916	1.027	- 1.182	3.015
Score 1	Equal Variances Assumed	2.202	.141	.041	96	.967	.043	1.038	- 2.018	2.104
	Equal Variances Not Assumed			.035	28.16	.972	.043	1.216	- 2.447	2.534

Table 7. *Independent sample t-test (sample divided by condition of the mother).*

		Levene's Test		t-test						
		F	Sig.	t	gl	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI	
									Inf.	Sup.
Score 0	Equal Variances Assumed	4.715	.032	1.136	96	.259	.892	.785	- .667	2.451
	Equal Variances Not Assumed			1.205	95.79	.231	.892	.741	- .578	2.362
Score 1	Equal Variances Assumed	.387	.536	.276	96	.783	.243	.881	- 1.506	1.992
	Equal Variances Not Assumed			.279	86.94	.781	.243	.872	- 1.490	1.976

mitment shown in the protection, promotion and support of breastfeeding, parenting and mother-child health. In addition to assistance from health personnel, the social network of new mothers also plays an important role during hospitalization. In fact, before the restrictions imposed to limit contagions from COVID-19, the afternoon was dedicated to families: companions and children were offered the opportunity to be together from 14:00 to 20:00, keeping 19:00 as the time for visits by people outside the family. Instead, starting from March 2020, access possibilities for visitors have been significantly reduced. Fathers were no longer allowed to enter the delivery room, nor to remain in the ward all afternoon, and visits are allowed to one person only per patient. So the risk of puerperal depression would seem to have decreased despite the greater isolation of puerperal women during the hospitalization.

Questions were raised about the possible reasons for this decrease, in a period marked by various emotional states. It could be due to the emotional and social support that pregnant women received during pregnancy, as well as the informative and instrumental support offered by the childbirth center before and at the time of delivery, the assistance of midwives and nurses and the practice of rooming-in. These are various protection factors that can effectively limit the level of risk [4]. Given the delicate historical period, maybe the healthcare staff has been more careful in welcoming the needs of the new mothers. They could have accepted the assistance offered, considering it even more important and useful than they could have ever done in non-emergency times. Another hypothesis is the fact that mothers (or even couples) could have increased their resilience, coping skills or found adequate strategies to deal with the critical aspects of a limitation of activities, and could have perceived a greater experience of protection and closeness to each other. Also the women might have invested more in the preparation for childbirth and the management of the future child, and therefore the contact with the newborn could have acquired greater importance. At the present time, the most relevant risk factors could simply be others, perhaps those most linked to the social environment and the repercussions of the COVID-19 pandemic. All this assuming that variations among average scores are not due to chance.

A multinational retrospective cohort study revealed that SARS-CoV-2 infection in pregnant women is associated with a 0.8% rate of maternal mortality, and an 11.1% rate of admission to the intensive care unit [16]; a secondary analysis concluded that early gestational age at infection, maternal ventilatory supports and low birthweight are the main determinants of adverse perinatal outcomes in fetuses with maternal COVID-19 infection; however significant risk of vertical transmission was not found [17]. Therefore, the management of suspected and confirmed gynecologic and obstetrics patients with COVID-19 needs to follow the same infection control procedures as the general population, as they could be more vulnerable to severe respiratory infections [18]. If the experience of the COVID-19 pandemic has taught something, it's that, beyond all the protocols that can be drawn up and applied, it is necessary to reconsider the possibility of offering tailor-made assistance based on trust and collaboration between professional and user, so that all treatments and indications can be accepted even in emergency contexts. Recent studies showed a relevant impact even on the wellbeing and mental health of healthcare providers among obstetric wards, in terms of psychological distress at individual, interpersonal and organizational levels [19, 20]. The experience of this historical period brought out the importance of coming to terms with what happened, in order to overcome critical issues generated by this situation.

CONCLUSIONS

In accordance with the findings, we can state that within the ward of Obstetrics and Gynecology at the Ospedale dell'Angelo in Mestre, the risk of puerperal depression was contained despite the Covid-related restrictions applied between March and June 2020, and even to a greater extent than in 2016. 3 months after birth, 33.7 % of the sample presented a significant score on the EPDS, therefore it would be advisable to investigate this, also because factors other than the type of birth and the condition of primiparity of the new mothers could have had an influence. In order to identify and further contain the risk, it may be useful to implement a systematic and effective psychological screening among the services of all the mothers taken care of by the ward.

At the end of this work we would like to underline that the data were collected on COVID-19 negative patients and therefore do not absolutely reflect the situation of birth centers where hospitalization for SARS-CoV-2 has been managed differently, with organizational and emotional consequences.

Nevertheless it is undeniable that no person can replace the warmth and closeness given by the family and the partner of the mothers.

COMPLIANCE WITH ETHICAL STANDARDS

Authors contribution

All the authors contributed equally to this work.

Funding

None.

Study registration

N/A.

Disclosure of interests

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Ethical approval

The ethical approval for this research has been obtained by "Nucleo per la Ricerca Clinica, Comitato Etico per la Sperimentazione Clinica della Provincia di Venezia" (Venice, Italy).

Informed consent

The informed consent was obtained by all the research's participants.

Data sharing

Data are available under reasonable request to the corresponding author.

ACKNOWLEDGEMENTS

We thank all the personnel of the Mother-Child Department of Ospedale dell'Angelo, without whose assistance this study would not have been possible.

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