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Postpartum depression screening in mothers and fathers at well-child visits: a feasibility study within the NASCITA cohort

Giulia Segre , Antonio Clavenna , Massimo Cartabia, Maurizio Bonati , NASCITA Working Group

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Laboratory for Mother and Child Health, Department of Public Health, Istituto di Ricerche Farmacologiche Mario Negri, Milan, Italy

Correspondence to
Maurizio Bonati;
maurizio.bonati@marionegri.it

ABSTRACT

Objective To assess the feasibility of the family paediatrician's (FP) role in identifying the signs of postpartum depression in parents in time to guarantee child well-being.

Design, setting and participants Data for this observational prospective study were collected within the NASCITA (NAscere e creSCere in ITAlia) cohort. During the first visit, paediatricians collected sociodemographic data regarding the parents and information about their health status, the pregnancy and the delivery. Whooley questions were administered during the first and second visits (scheduled 60–90 days after childbirth). Moreover, on the third visit (5–7 months after childbirth) the FP was asked to answer 'yes' or 'no' to a question on the parental postpartum depression, based on his knowledge and on the acquired information.

Results In 2203 couples who completed the assessment, 529 mothers (19.9%), 141 fathers (6.3%) and 110 (5%) couples reported any depressive symptomatology. Of these, 141 mothers (5.3% of the total sample) and 18 fathers (0.8% of the total sample) were classified as 'likely depressed'. An association was found between maternal postnatal depressive symptoms and having a diagnosed psychiatric disorder during pregnancy (OR 9.49, 95% CI: 3.20 to 28.17), not exclusively breastfeeding at hospital discharge (OR 1.76, 95% CI: 1.19 to 2.61) and the presence of child sleeping disorders at 3 (OR 2.46, 95% CI: 1.41 to 4.28) and 6 months (OR 2.18, 95% CI: 1.37 to 3.47). Another significant predictor of postpartum depression was being primiparous (OR 1.99, 95% CI: 1.31 to 3.02). Concerning the fathers, a significant association was reported only between likely depressed fathers and child sleeping disorders at 3 months (OR 7.64, 95% CI: 2.92 to 19.97). Moreover, having a likely depressed partner was strongly associated with depressive symptoms in fathers (OR 85.53, 95% CI 26.83 to 272.69).

Conclusions The findings of this study support the feasibility of an active screening programme for parental postnatal depression during well-child visits as an integral part of postpartum care.

Trial registration number NCT03894566; Pre-results.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Parental postnatal depressive symptoms have been identified early in the Italian paediatric primary care setting.
⇒ The family paediatrician's assessment was used to confirm the results of the Whooley questions completed by parents.
⇒ Whooley questions serve as screening tools only and cannot establish diagnosis of depression, therefore further assessment is required.

INTRODUCTION

Pregnancy and the transition to parenthood consists of life-changing events: the perinatal period, both antenatal (ie, pregnancy) and postnatal (ie, the first 6 months of an infant's life) represents a vulnerable time for developing psychological distress in both mothers and fathers.[1] Their symptoms may negatively impact the entire family system, as well as their children's developmental outcomes.[2 3]

Perinatal depression is defined in the Diagnostic and Statistical Manual of Mental Disorders-5th edition (DSM-5) as the occurrence of a major depressive episode during pregnancy and/or following childbirth, within 4 weeks after delivery; it is recognised as a subtype of major depressive disorder with the specification 'with peripartum onset'. This definition differs from what is typically used in clinical and research settings, which identifies perinatal depression as a non-psychotic depressive episode with onset either during pregnancy or up to 12 months postnatally, often occurring within the first 3 months.[3 4] Depression is characterised by sadness, loss of interest or pleasure in daily activities, changes in weight/appetite and sleep, reduced concentration, fatigue or loss of energy and suicidal ideation. Perinatal depression should not be confused with 'postpartum baby blues', which is a common reaction characterised by a state of fluctuating mood, irritability, fatigue,

tearfulness and feelings of anxiety that generally resolves within 10–14 days after childbirth.

Prevalence estimates vary widely depending on the type of diagnostic criteria, sampling procedures, location of populations, time periods and measures used to assess mental disorders.[5–8]

The prevalence of perinatal depression in women is about 10% in medium-high income countries and 20% in low income countries.[7 9] A meta-analysis[10] found that 73% of the national variation in PostPartum Depression (PPD) prevalence depends on the disparities in wealth inequality and maternal-child-health factors. The global pooled prevalence of PPD was reported[10] to be 17.7% (95% CI: 16.6% to 18.8%) and in Italy 19% (95% CI: 18% to 21%). The few studies that were carried out to evaluate the prevalence of perinatal depression and anxiety in the Italian population show large variability; evaluations of maternal perinatal depression and anxiety recorded ranges of 1.6%–26.6% and 6.4%–20.5%, respectively.[11] An Italian study[12] assessing parents during the paediatric primary care visits (60–90 days after childbirth), using the Edinburgh Postnatal Depression Scale (EPDS), found that 4.7% of mothers and 1.7% of fathers were positive for depressive symptoms.

Paternal depression during the perinatal period is reported to vary between 8% and 10%.[13–15] An Italian study by Epifanio and colleagues[1] collected data from 75 first time Italian parents who were recruited in paediatric ambulatories and found that 5.7% of fathers and 20.8% of mothers resulted at risk of postpartum depression.

There is currently a substantial body of research on antenatal and postnatal depression risk factors.[16–20] The cause of perinatal depression is generally multifactorial: several characteristics have been strongly linked to postnatal depressive symptoms. These encompass a wide range of sociodemographic (parental age, low education, unemployment and socioeconomic status) and psychological and psychiatric (both a familial and personal history of depression, as well as anxiety and depression during pregnancy) factors. Stressful life events (negative life events and current events, and physical, psychological or sexual abuse), low levels of both antenatal and postnatal social support and obstetric and biological factors (history of miscarriage and pregnancy termination) also contribute.

Moreover, there are other significant couple-related factors that could affect postnatal depression, such as low marital satisfaction[21] and having a partner with depressive symptoms either prenatally or during the postpartum period.[22] Several studies[23 24] showed that maternal and paternal depressive mood were correlated most of the time and especially after birth: when the father suffers from depression, the symptoms of the mother may be exacerbated.

Although the EPDS is the most widely used measure of postpartum depression, several studies[25–27] have previously used two questions (measuring the experience of depressed mood or the loss of interest or pleasure in activities) to classify participants as having or not having postpartum depression. These Whooley questions were recommended by the National Institute for Health and Care Excellence guidelines to aid in the identification of potential depression in certain patient groups such as people with long-term conditions and women during the perinatal period.[28] The Whooley questions have been previously validated and used to screen depression in primary care populations and other clinical populations.[25 29 30] Littlewood and colleagues,[31] compared the results of the Whooley questions with those of the EPDS and the diagnostic reference standard (Clinical Interview Schedule – Revised (CIS-R)) during pregnancy and the early postnatal period (3–4 months after childbirth). Diagnostic performance characteristics were close for the Whooley questions and the EPDS both during pregnancy and postnatally. Similarly, another study[32] analysed the validity of the PHQ-2 (Patient Health Questionnare-2), the two-question screen with simple yes/no responses—also known as Whooley questions, and the PHQ-9 at the initial visit (0–1 month postpartum), using the SCID interview (Structured Clinical Interview for DSM-5) as the reference. The highest sensitivity (100%) for identifying postpartum depression was seen with the two-question screen, and the highest specificity (94%) was seen with the PHQ-9, using complex scoring.

A comprehensive evaluation of emotional and behavioural symptoms is a crucial aspect in monitoring the well-being of both parents and infants. The present study aimed at evaluating the feasibility of a model for identifying mothers and fathers positive to Whooley questions at well-child visits by family paediatricians (FP). The identification of specific factors related to depressive symptoms among mothers can inform FP and general practitioners towards identifying and supporting the families that may benefit from early interventions.

METHODS

Data source

Data were collected within NASCITA (NAscere e creSCere in ITAlia): a prospective, population-based birth cohort study, set up by the Laboratory for Mother and Child Health of the Istituto di Ricerche Farmacologiche Mario Negri IRCCS in Milan in collaboration with the national Paediatric Cultural Association (ACP). The methods of the NASCITA cohort have been described elsewhere.[33 34]

This paragraph describes information already reported elsewhere.[35] Briefly, all Italian children receive primary healthcare exclusively from a FP until they are at least 6 years old as part of universalistic health system organisation. Seven well-child visits are scheduled by the paediatrician in Italy in the first 6 years of a child's life to monitor growth and development and offer preventive care. Additional visits are guaranteed when needed. From the beginning of April 2019 to the end of July 2020, newborns and their parents were recruited when seen by 129 FP for the first visit (scheduled within 45 days after birth), if parental consent was given.

During the first visit, paediatricians collected sociodemographic data regarding the parents, and information about their health status (eg, smoking habits and chronic diseases), the pregnancy and the delivery. Moreover, during the well-child visits information concerning anthropometric measures of the newborns and feeding and sleeping habits was collected, as well as on other parental actions in the early-life period that contribute to the future health and development of children.

The study was approved by the Fondazione IRCCS Istituto Neurologico Carlo Besta's Ethics Committee (February 2019, protocol n. 59)

Outcomes: mood symptoms

Data on parental mood symptoms were collected from December 2019 from a group of 2650 mothers and 2231 fathers. Participant characteristics are representative of the whole cohort population. Perinatal symptoms were evaluated at three time points by the FP. Due to technical reasons, Whooley questions were not added at the beginning of recruitment, but a few months later; resulting in their not being administered to the overall sample. In the present study, we included only families with complete data for all the visits, including the Whooley assessment.

The first assessment took place at the first visit. The mother was also asked if she had taken any psychopharmacological medication during pregnancy and if she had ever had any chronic medical condition. Depressive symptoms were assessed in both parents, individually, using the Italian version of the validated English version of the two-question case-finding instrument: Whooley questions.

Whooley questions were administered to the parents also during the second visit, which usually takes place between 60 and 90 days after birth and coincides with the period in which the risk of maternal postpartum depression is greatest.[7]

A positive response to at least one of the two binary questions (1) 'During the past month, have you often been bothered by feeling down, depressed or hopeless?' and (2) 'During the past month, have you often been bothered by little interest or pleasure in doing things?' was considered a positive test result for perinatal depression. These questions reflect the essential features of depression: depressed mood and anhedonia. If a parent screened positive for depressive symptoms at both the first and second screening (Whooley questions), the FP recommended further psychological assessment to better investigate the symptoms and arrive at a possible diagnosis.

On the third visit (5–7 months after childbirth), the FP was asked to answer 'yes' or 'no' a question on the parental postpartum depression, based on his knowledge and on the acquired information (eg, patient medical history, anamnestic information). It is essential to highlight that, recently, Italy provided training for all FPs to enable them to recognise possible signs of depression and to inform them on how to use the Whooley questions.

The FP's opinion could not be considered a clinical diagnosis, but simply an identification of potential warning signs that should be monitored with greater attention. For many parents, the relationship they establish with their paediatric providers creates a trusting foundation on which to build important discussions about their own healthcare needs that directly affect their infant. Moreover, the FP is usually aware of both psychosocial and infant (eg, prematurity, congenital problems) risk factors that can contribute to contextualising parental mood symptoms. A 'yes' answer meant that the person was exposed (postnatal depression) and a 'no' answer meant the person was unexposed.

In the present study, mothers and fathers were categorised as 'likely depressed' if they scored positive on one or more Whooley questions during the first or second visit and the FP reported that they were exposed to postnatal depression. Parents were categorised as 'possibly depressed' if they either scored positive on one or more Whooley questions during the first or second visit or the FP reported that they were exposed to postnatal depression.

Statistical analyses

χ^2 tests were performed with the aim to evaluate the association between the reported covariates and the outcome measure, and a stepwise logistic regression analysis was performed. To identify factors influencing maternal depressive symptoms we computed OR considering the significance of the 95% CIs.

Variables associated with an increased risk of parental postnatal depressive symptoms in previous studies were selected as covariates. The covariates considered (reported in table 1) were as follows: geographical area of residence, age of the mother at delivery, maternal educational level, employment status, marital status, smoking and drinking habits of the mother, maternal chronic conditions, maternal psychiatric disorder during pregnancy, any psychiatric disorder in maternal family parity, Body Mass Index (BMI) at the beginning of pregnancy, gestational weight gain, type of delivery, skin-to-skin contact at partum, gender of the neonate, premature birth (<37 weeks), exclusive breastfeeding (at hospital discharge and 6 months), child hospitalised in the neonatal intensive care unit (NICU) for at least 7 days and child sleeping disorders. Mothers were grouped according to their BMI at the beginning of pregnancy into four categories, underweight (≤18.5), normal (18.6–24.9), overweight (25–29.9) or obese (≥30). To evaluate gestational weight gain, the weight variations recommended by the Institute of Medicine criteria were applied after grouping the mothers according to the prepregnancy BMI.[36 37] Statistical significance was evaluated using a 95% CI and a two-tailed p-value of <0.05. SAS software, V.9.4 (SAS, Institute, Cary, NC, USA) was used for all statistical analyses.

Table 1 Association between maternal and neonatal characteristics and maternal postnatal depression

Variable	Maternal postnatal depression		OR (95% CI)	P value
	Likely depressed mother (n=141)	Not depressed (n=2121)		
Geographical area of residence				
North	72 (51.1)	984 (46.4)	1.36 (0.91 to 2.01)	0.13
Centre	28 (19.9)	377 (17.8)	1.38 (0.84 to 2.26)	0.21
South	41 (29.1)	760 (35.8)	1	
Setting				
Urban	60 (42.6)	807 (38.1)	1.21 (0.85 to 1.70)	0.29
Rural	81 (57.4)	1313 (61.9)	1	
Maternal age at delivery				
<30	32 (23)	498 (24)	0.89 (0.57 to 1.39)	0.60
30–34	55 (39.6)	759 (36.6)	1	
≥35	52 (37.4)	819 (39.5)	0.88 (0.59 to 1.30)	0.51
Educational level*				
High	116 (84.7)	1810 (86)	1	
Low	21 (15.3)	295 (14)	1.11 (0.69 to 1.80)	0.67
Employment status				
Employed	101 (72.1)	1488 (70.6)	1.08 (0.74 to 1.58)	0.69
Unemployed	39 (27.9)	621 (29.4)	1	
Marital status				
With partner	137 (97.2)	2101 (99.1)	1	
Single	4 (2.8)	19 (0.9)	3.23 (1.08 to 9.62)	0.04
Mother consuming alcohol during pregnancy				
Yes	13 (9.6)	193 (9.2)	1.05 (0.58 to 1.89)	0.88
No	123 (90.4)	1909 (90.8)	1	
Mother smoker				
Never	90 (64.7)	1514 (71.7)	1	
Only before pregnancy	39 (28.1)	478 (22.6)	1.37 (0.93 to 2.03)	0.11
Smoking during pregnancy	10 (7.2)	119 (5.6)	1.41 (0.72 to 2.79)	0.32
Maternal chronic conditions				
Yes	33 (23.4)	422 (19.9)	1.23 (0.82 to 1.84)	0.31
No	108 (76.6)	1699 (80.1)	1	
Maternal psychiatric disorders during pregnancy				
Yes	6 (4.3)	9 (0.4)	10.43 (3.66 to 29.73)	<0.0001†
No	1335 (95.7)	2112 (99.6)	1	
Any psychiatric disorder in maternal family				
Yes	2 (1.4)	19 (0.9)	1.59 (0.37 to 6.90)	0.53
No	139 (98.6)	2102 (99.1)	1	
BMI at the beginning of pregnancy				
Underweight	12 (8.7)	154 (7.4)	1.20 (0.64 to 2.25)	0.56
Normal	91 (65.9)	1404 (67.5)	1	
Overweight	23 (16.7)	357 (17.2)	0.99 (0.62 to 1.59)	0.98
Obese	12 (8.7)	165 (7.9)	1.12 (0.60 to 2.09)	0.72
Gestational weight gain				
Below	52 (37.7)	757 (36.7)	1.32 (0.87 to 2.00)	0.20
Normal	42 (30.4)	806 (39.1)	1	
Over	44 (31.9)	498 (24.2)	1.70 (1.09 to 2.63)	0.02†

Continued

Table 1 Continued

Variable	Maternal postnatal depression		OR (95% CI)	P value
	Likely depressed mother (n=141)	Not depressed (n=2121)		
Primiparous				
Yes	101 (71.6)	1097 (51.8)	2.35 (1.61 to 3.42)	<0.0001†
No	40 (28.4)	1021 (48.2)	1	
Spontaneous delivery				
Yes	81 (57.9)	1347 (63.5)	1	
No	59 (42.1)	774 (36.5)	1.27 (0.90 to 1.79)	0.18
Newborn gender				
Male	74 (52.5)	1082 (51)	1	
Female	67 (47.5)	1039 (49)	0.94 (0.67 to 1.33)	0.74
Preterm birth (37 weeks)				
Yes	8 (5.7)	123 (5.8)	0.98 (0.47 to 2.04)	0.95
No	133 (94.3)	1997 (94.2)	1	
Skin-to-skin contact at partum				
Yes	96 (68.1)	1623 (76.7)	1	
No	45 (31.9)	494 (23.3)	1.54 (1.07 to 2.23)	0.02†
Child hospitalised in the NICU for at least 7 days				
Yes	6 (4.3)	31 (1.5)	3.02 (1.24 to 7.38)	0.02†
No	133 (95.7)	2078 (98.5)	1	
Exclusive breastfeeding at hospital discharge				
Yes	79 (56)	1517 (71.6)	1	
No	62(44)	601 (28.4)	1.98 (1.40 to 2.80)	<0.0001†
Exclusive breastfeeding at 6 months				
Yes	25 (18)	576 (28)	1	
No	114 (82)	1479 (72)	1.78 (1.14 to 2.77)	0.01†
Child sleeping disorders at second visit (2–3 months after childbirth)				
Yes	26 (18.4)	135 (6.4)	3.31 (2.09 to 5.24)	<0.0001†
No	115 (81.6)	1975 (93.6)	1	
Child sleeping disorders at third visit (5–7 months after childbirth)				
Yes	36 (25.5)	282 (13.3)	2.23 (1.49 to 3.32)	<0.0001†
No	105 (74.5)	1831 (86.7)	1	
Time spent outdoors (hours/day)				
>1	75 (53.2)	1311 (62.1)	0.69 (0.49 to 0.98)	0.04†
<1	66 (46.8)	800 (37.9)	1	

*Educational level: low: no schooling or primary vs high: secondary school or university.
†P value of χ^2 for trend test.
NICU, neonatal intensive care unit.

Patient and public involvement

Patients were indirectly involved in the development of the research questions and questionnaires in that the technical-scientific committee that was set up to supervise the study, and that collaborates in creating and revising the questionnaires, involves professionals (eg, paediatricians, pharmacists and educators) who are also parents. The public is involved through the dissemination of cohort results and information on childhood diseases or conditions to parents and the general public on the study's website.

RESULTS

Our sample consisted of 2650 mothers and 2231 fathers who had complete data for all the visits considered. Univariate analyses were carried out to verify if there were significant differences in sociodemographic characteristics between the children included and those not included in the present study; sociodemographic characteristics of the families involved were tested. The sociodemographic characteristics of the families involved and the comparison of included versus excluded families are reported in

the online supplemental appendix (table 1). Slight differences were observed between the two samples concerning maternal educational level, occupational status, geographic and residential areas and couple nationality, meaning that the observed prevalence of depressive symptoms could be slightly different in under-represented populations.

In the present study, maternal mean age was 33.1 years (SD=5.3) and nearly 40% of mothers were over 35 at the delivery. Nearly all of the women (98.8%) were married or lived with their partner, almost 55% were primiparous. The majority of mothers were well educated and employed in paid work (71.3%); 23.5% reported having smoked before pregnancy, and 9% consumed alcoholic beverages during the pregnancy; 22 women reported having had psychiatric conditions during pregnancy. Paternal mean age was 36.1 years (SD=6.2) and more than half of fathers were over 35 at the time of childbirth. Three quarters were well educated and nearly all (96%) were employed in paid work.

Of 2650 newborns, 63% were born with spontaneous delivery and 51% were males; 5.8% were preterm and at birth 48 infants were admitted to an intensive care unit for at least 7 days. At hospital discharge, 69.6% of newborns were breastfed exclusively, while at 6 months after birth, the majority (73.5%) was not fed exclusively with breast milk. Sleeping disorder prevalence was about 8% at the 3 months visit and 15% at the 6 months visit.

A total of 529 mothers (19.9%) had any depressive symptom. Of these, 141 (5.3% of the total sample) were classified as 'likely depressed' and 388 as 'possibly depressed'; 80% of the sample (2121 mothers) reported no symptoms of depression (control group). (figure 1).

A total of 141 fathers (6.3%) had any depressive symptom. Of these, 18 (0.8% of the total sample) were classified as 'likely depressed' and 123 as 'possibly depressed'; 93.7% of the sample (2090 fathers) reported no symptoms of depression (control group). (figure 2).

Within 2203 couples who completed the assessment, 1768 reported no symptoms of depression. In 110 couples (5%) both parents reported any depressive symptomatology, and in 12 (0.054%) of these couples, both mothers and fathers were considered 'likely depressed'.

There was a fair agreement between FP's evaluation and the Whooley test for mothers (K=0.35) and a slight agreement for fathers (K=0.20)

For the specific aim of the present study, we decided to focus on the comparison between likely depressed mothers/fathers and the control group.

Results of the univariate analyses evaluating the relationship (statistically significant) between pregnancy, delivery and newborn related variables, and depressive symptoms are shown in table 1. Mothers who had a diagnosis of psychiatric disorder during pregnancy had a 10-fold increased risk of being likely depressed (OR 10.43, 95% CI: 3.66 to 29.73). Similarly, single women (OR 3.23, 95% CI: 1.08 to 9.62), or those who reported an excessive weight gain during pregnancy (OR 1.70,

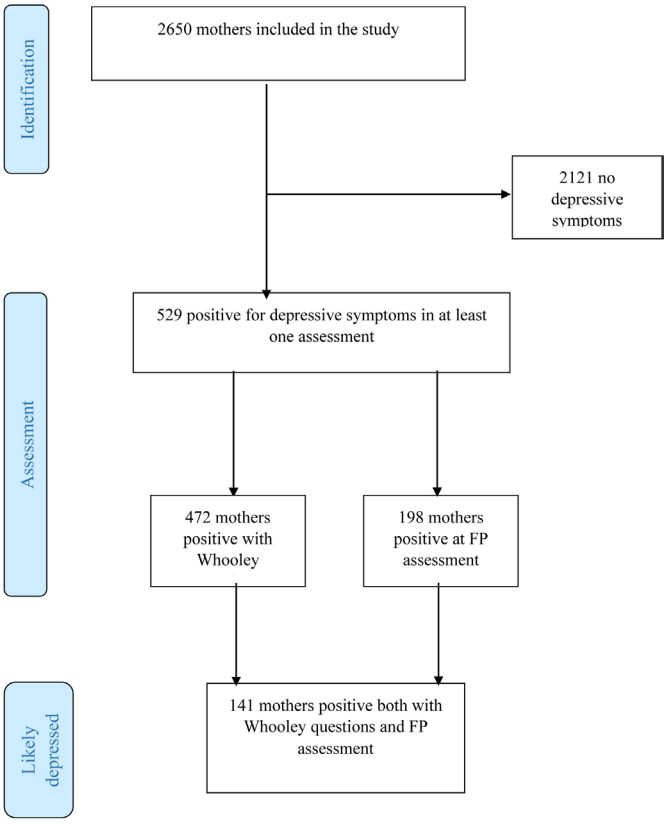

Figure 1 Study selection, mothers. FP, family paediatricians.

95% CI: 1.09 to 2.63) had a statistically increased risk of being highly depressed as compared with the no symptoms group. Moreover, the risk of developing depressive symptoms was higher (OR 2.35, 95% CI: 1.61 to 3.42) for primiparous mothers.

Reduced skin-to-skin contact at partum (OR 1.54, 95% CI: 1.07 to 2.23) was observed in mothers with depressive symptoms. Newborns of mothers with depressive symptoms were at higher risk of being hospitalised in NICU for at least 7 days (OR 3.02, 95% CI: 1.24 to 7.38), not being exclusively breastfed at hospital discharge (OR 1.98, 95% CI: 1.40 to 2.80) and at 6 months of age (OR 1.78, 95% CI: 1.14 to 2.77) and of having sleep disorders at three (OR 3.31, 95% CI: 2.09 to 5.24) or 6 months of life (OR 2.23, 95% CI: 1.49 to 3.32). Spending at least 1 hour per day outdoor should be considered a protective factor for the dyad (OR 0.69, 95% CI: 0.49 to 0.98). The results of the stepwise regression analyses findings (table 2) confirmed the association between maternal postnatal depressive symptoms and having a diagnosed psychiatric disorder during pregnancy (OR 9.49, 95% CI: 3.20 to 28.17), not exclusively breastfeeding at hospital discharge (OR 1.76, 95% CI: 1.19 to 2.61), and the presence of child sleeping disorders at three (OR 2.46, 95% CI: 1.41 to 4.28) and 6 months (OR 2.18, 95% CI: 1.37 to 3.47). Another significant predictor of postpartum depression was being primiparous; not being a first-time mother was, in fact, a

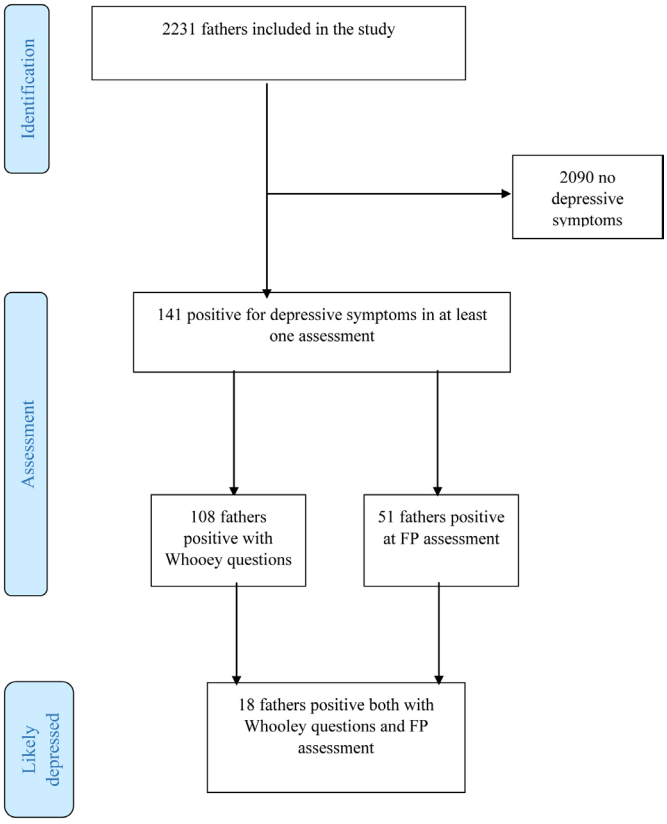

Figure 2 Study selection, fathers. FP, family paediatricians.

protective factor for this outcome (OR 1.99, 95% CI: 1.31 to 3.02).

Concerning the univariate analyses of fathers (online supplemental appendix table 2), a significant association was reported only between likely depressed fathers and child sleeping disorders at three (OR 7.64, 95% CI: 2.92 to 19.97) and 6 months (OR 3.66, 95% CI: 1.41 to 9.50). Moreover, having a likely depressed partner was associated with depressive symptoms in fathers (OR 85.53, 95% CI: 26.83 to 272.69). Multivariate analyses confirmed these associations, with the exception of child sleeping disorders at 6 months.

Thus, a significant association was found between couples in which both parents were likely depressed and child sleeping disorders at 3 months (OR 8.19, 95% CI 2.57 to 26.08).

Table 2 Variables associated with maternal postnatal depression at the stepwise logistic regression analysis

Variable	Value	OR (95% CI)	P value
Maternal psychiatric condition during pregnancy	Yes	9.49 (3.20 to 28.17)	<0.0001*
	No		
Primiparous	Yes	1.99 (1.31 to 3.02)	0.0012*
	No		
Exclusive breastfeeding at hospital discharge	Yes	1.76 (1.19 to 2.61)	0.0048*
	No		
Child sleeping disorders at second visit (2–3 months after childbirth)	Yes	2.46 (1.41 to 4.28)	0.0016*
	No		
Child sleeping disorders at third visit (5–7 months after childbirth)	Yes	2.18 (1.37 to 3.47)	0.0011*
	No		

*indicates significant p-values, p<0.05.

DISCUSSION

To the best of our knowledge, this is the first study to evaluate the routine assessment of parents with the Whooley questions in the Italian paediatric primary care setting. Paediatricians are the first healthcare providers to advocate for infants' health and safety[38] and may have a crucial role in detecting risk and protective factors as an integral part of routine care and the relationship with the child and the family. For this reason, the paediatric providers, being the sole healthcare professionals with whom the family has frequent contact, have the responsibility to include assessment and consideration of parental and family environmental factors that may affect children's health,[39] maternal depression being one of these. Paediatric providers are increasingly aware of the prevalence of postpartum depression and its potential effects on children; 85% agree that recognising maternal depression is their own responsibility.[40 41] The FP's role is to support parents and refer them for help in order to facilitate their access to therapy resources and treatments. As already indicated, in the present study, the FP, based on his knowledge on the family condition (eg, patient medical history, anamnestic information), provided an opinion on parental depressive symptoms. This could not be considered a clinical diagnosis, but simply an identification of potential warning signs that should be monitored with greater attention. The FP has an important role in the early identification of maternal depression symptoms: the Whooley questions completed by parents, in addition to the FP's clinical notes, can lead to higher rates of screening as well as a greater identification of postpartum depression risk in parents.

Similar studies have been conducted worldwide[42 43] using the EPDS to detect depressive symptoms. The AAP[44] recommends both the EPDS and the two-questions screening tool to be integrated into the well-child care schedule. We found that 19.9% of the women and 6.3% of men showed any postnatal depressive symptomatology and our rates were similar to the prevalence of PPD in the first year after the birth of the child reported in other studies.[10 45] Moreover, it is important to highlight that 5.3% of the mothers and 0.8 of the fathers were considered as likely depressed; those parents are the one who may need for further help and psychological assessment due to greater probability of clinical depression. Our study protocol included use of the Whooley questions because this assessment tool comprises only two items, it is shorter to fill out (compared with the 10 items included in the EPDS), and is routinely adopted by FPs in some Italian geographical settings as part of the well-child check-up

visits. The aim was to consider their use as a routine tool to be used in paediatric clinical care.

The present work identified several sociodemographic and maternity-related factors as being associated with maternal PPD. Concerning postpartum depressive symptoms, significant differences were observed in mothers with antenatal psychiatric illness and those who did not report mental disorders during pregnancy. Our findings, in agreement with those of other studies,[12 18] supported the finding that the presence of mood disorders and/or anxiety during pregnancy were predictors of postpartum depressive symptoms in mothers. Similarly, the pooled results of a recent review and meta-analysis[46] reported that there was a significant correlation between the history of previous mental illness and depression in perinatal women. Our results were in contrast with the findings of a recent study[47] that reported evidence for an almost twofold higher risk of developing postpartum depression among mothers who had a family history of any psychiatric disorder compared with mothers without.

Another risk factor that increased the risk of PPD symptoms was being a single mother. Consistent with our findings, Gebregziabher *et al*[48] reported that mothers with no husband/partner support after delivery were nearly six times more likely to develop postpartum depression than those who had partner support. Partner support can be economic, but fathers could also help to share chores, as the additional task of infant care can overwhelm mothers. Higher rates of mental health problems among single mothers have been reported.[49 50] In particular, Kim and colleagues[51] found that the prevalence of depression differed notably between the single mothers (33%) and the control group (8%).

Exclusive breastfeeding at hospital discharge has been reported as a significant protective factor for maternal postpartum depression. A systematic review and meta-analysis[52] specifically focused on this topic and, in agreement with our findings, their results indicated an increased risk of developing PPD (89%) in non-exclusively breastfeeding women compared with exclusively breastfeeding women. This could be attributed to the role of two hormones, prolactin and oxytocin, associated with both lactation and depression.[52 53] It is important to highlight that recent research suggested that the relationship between breastfeeding and PPD may be bidirectional, suggesting that PPD may reduce rates of breastfeeding and breastfeeding may reduce rates of PPD.[54]

Furthermore, we found that first time mothers had increased odds of developing PPD symptoms compared with multiparous women. Mixed results in relation to parity are reported in the literature. While one study[55] stated that no differences were observed between primiparous and multiparous mothers, both during pregnancy and after childbirth, another[56] showed higher postpartum prevalence among primiparous mothers.

We also observed a significant association between both maternal and paternal depression and child's sleep at 6 months. Parental depressive symptoms have already been associated with infants' behavioural sleep problems.[57] For mothers, higher depressive symptoms at 5 months were associated with increased infant night-time awakenings at 9 months.[58] Infant sleep patterns are strongly associated with a new onset of depressive symptoms in the postpartum period:[59] mothers who exhibited major depressive symptomatology at 4 and 8 weeks were significantly more likely to report that their baby woke up three times or more between 10 PM and 6 AM and to indicate that their baby did not sleep well.

In Italy, children are usually brought by mothers to paediatric visits. Thus, as our data confirm, the present study involved a bigger sample of mothers; any data related to paternal mental health for those fathers (16% of the sample) who did not participate were collected. The results confirm evidence from the literature reporting that the prevalence of mothers with postpartum depression was higher than the paternal prevalence. As already demonstrated,[60] paternal postpartum depression is a reality for a notable proportion of men, and is associated with factors such as poor physical health, unemployment and unwanted pregnancies. This form of depression, however, is not well known to the public, and is under-researched and underacknowledged in clinical practice, meaning that there are few specific treatments and that a large number of fathers is likely suffering in silence.

Fathers, although rarely studied, have reported poorer general health and more psychological stress when their infants had behavioural sleep problems.[61] Sleep problems have already been associated with increased paternal depressive symptoms both at 4 (adjusted mean difference 2.64 (1.27–4.00)) and at 6 months of age (adjusted mean difference 2.56 (1.28–3.84))[62]

The findings of this study, although not innovative in terms of indicating potential risk factors related to postpartum depressive symptoms, support the feasibility of the FP's contribution to early detection of potential depressive symptoms in both mothers and fathers caring for their newborns. An active screening programme for parental postnatal depression during well-child visits as an integral part of postpartum care should be contemplated. Whooley questions are easy to administer and effective in increasing the effectiveness of preventive and/or therapeutic programmes. The early identification of parents at risk of developing PPD on the part of paediatricians and general practitioners, and the directing of these parents to mental health operators and/or services should be part of the professional's tasks to guarantee the well-being of children and their families.

Several limitations have to be kept in mind when interpreting the results of this study: first of all, as already mentioned, Whooley questions serve as screening tools only, and cannot establish diagnosis of depression without other tests. As suggested by a recent meta-analysis,[63] using the Whooley questions followed by a secondary case-finding tool could

reduce the misdiagnosis risk. Maternity and primary care services require simple, quick screening tools to know who to refer for care. Second, due to the limited number of 'likely depressed' fathers, only a few significant correlations emerged; we were unfortunately not able to collect any information on paternal drinking habits, which may have resulted in factors influencing depressive symptoms. Moreover, it should be taken into account that the sample was relatively advantaged (in terms of education, employment and marriage). The FP participated on a voluntary basis and most of them were educated to the best practices for supporting early child development. It is possible that these FP are not fully representative of Italian paediatricians in that they may be particularly more sensitive to perinatal mental health. Finally, we were not able to collect information concerning parental history of abuse, their social support and socioeconomic status, cited in the literature as important risk factors for PPD. Prospective studies with follow-up of parents who present with symptoms suggestive of depression would therefore be desirable.

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ORCID iDs
Giulia Segre http://orcid.org/0000-0002-4105-377X
Antonio Clavenna http://orcid.org/0000-0001-5536-4192
Maurizio Bonati http://orcid.org/0000-0003-3997-3726

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