Prenatal attachment inventory during the SARS-CoV-2 pandemic

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ARTICLE INFO

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ABSTRACT

Objective. The mother's ability to attune herself to the child already from life *in utero* depend on the functioning of the biological hormonal channels that preside over foetal growth and well-being and the loving feelings that represent prenatal attachment. Loving attachment is the deep, specific and permanent bond that allows one to breastfeed, cradle and protect one's baby and not abandon it, and enables the mother to respond effectively to the baby's needs. The aim of this study is to investigate the psycho-emotional dimensions of women in the period of endogestation during the SARS-CoV-2 pandemic.

Materials and Methods. A cross-sectional study was conducted on a sample of Italian mothers enrolled online via social networks, and the validated Prenatal Attachment Inventory (PAI) questionnaire was used. The statistical analysis we performed by Shapirò-Wilk test, the Wilcoxon test and the Kruskall-Wallis test.

Results. The PAI study showed a high average prenatal attachment of the women in the sample, which increases as the pregnancy progresses and is greater in southern women and primipara.

Conclusions. From our study it can be deduced that women, having mostly good social and emotional support, manage to establish a bond with the child despite the stress due to the pandemic.

INTRODUCTION

The World Health Organization (WHO) on March 11, 2020 declared the outbreak of the new Coronavirus (COVID-19) a global pandemic [1].
COVID-19 is generally susceptible to all age groups, but the impact in pregnant women has attracted a lot of attention due to the unique immunological status of pregnancy and the increased risk of respiratory infections. In particular, the characteristic immune responses during the different gestational ages are intended to be closely related to the outcome of the infection [2, 3].
Hospitals, already under pressure from pandemic waves [4, 5] and excess mortality in certain risk groups [6], have instituted visitor restriction pol-

icies that do not allow support people, including the woman's partner, to be physically present in obstetric maternity units, even during labour, except in the delivery room [7, 9]. Pregnant women were no less affected than the general population; COVID-19 infection in epidemic areas has been detected in about one in ten women, regardless of the trimester of pregnancy [10, 11]. This extraordinary situation of isolation, loss of freedom, concern about the impact of COVID-19 on pregnancy or the possible vertical transmission of infection [10], and unfavourable obstetric outcomes can be challenging for maternal psychological health [11].

Depression and anxiety affect one in seven women during the perinatal period, and they are associated with an increased risk of preterm birth, reduced mother-child bondage, and delays in the child's cognitive/emotional development, which may persist in childhood [12-15].

The relationship between mother and child formed during the first stage of life is the most important because it serves as a prototype for various relationships in the later stages of an individual's life [16]. The subsequent social, emotional, and cognitive development of children may be influenced by the first mother-infant relationship [17]. So, it is important to understand the nature of the mother-infant bond during the pregnancy, the postpartum period and the factors that influence it. Physiological and social changes take place during pregnancy, and women need preparation to adapt to these new changes. Unpreparedness for these conditions during pregnancy can cause emotional distress [18]. The bond of attachment is the process of a relationship between mothers and children, and is an important component of the process of identity of the maternal role and in the adaptation to motherhood [16].

The maternal attachment, defined as an emotional bond [19] of the mother to her child, develops already during pregnancy [20-22]. The quality of the mother-infant bond is important, as it is predictive of maternal sensitivity [23] and is related to the child's developmental outcomes [24, 25].

There is support for a negative relationship between parental stress and the mother-child bond [24, 26]. It is suggested that parental stress is related to decreased sensitivity in parents, and increased intrusiveness and hostility towards the child [27]. Individuals with relationship difficulties may experience increased stress that may affect the quality of the mother-infant bond [16]. The mother-infant bond is also adversely affected by mothers' depressive symptoms during pregnancy and after birth and by the symptoms of post-traumatic stress disorder [28-31].

Bonding disorders tend to occur when there is difficulty in developing a connection between a child and its mother. Several risk factors have been reported, such as an undesirable pregnancy, painful childbirth, infants with illness, and the death of a twin child, can cause the onset [32]. Other factors that can influence the effectiveness of the bond include severe mother anxiety, easily stressed temperaments, infants with difficulty sleeping and feeding [33]. There are multiple notions about the disorder of the mother-newborn relationship. In addition, the results suggest that the mother's mood was strictly influenced by the effectiveness of attachment between the mother and the baby [31, 33].

The aim of this study is to investigate whether maternal-foetal attachment during the endogestation period has been affected by the increase in maternal stress and anxiety generated by the COVID-19 pandemic.

MATERIALS AND METHODS

Research design

The cross-sectional study was conducted on a sample of pregnant women enrolled through different groups on social networks, who were given a questionnaire in the period from 1st April to 14th October, 2020. The questionnaire was submitted to mothers living in Italy or abroad present in Facebook groups dealing with the topics of maternity, breastfeeding and childbirth, who voluntarily filled it out.

The questionnaire was in Italian language and contained the following variables:

- Socio-demographic characteristics: age, educational qualification, professional situation, region of origin and marital status.
- Characteristics related to pregnancy: weeks of gestation, presumed date of delivery, equality, cohabitation with the father of the child and if the woman has participated or would like to participate in a course of accompaniment to birth.
- Characteristics related to the psycho-emotional sphere: through the validated PAI questionnaire (Prenatal Attachment Inventory).
- Any disorders you had suffered from and if you have had amniocentesis.

The PAI (Prenatal Attachment Inventory) questionnaire is a validated instrument constructed to measure maternal-foetal attachment and developed by Müller in the nineties (1990, 1993, 1996). It is a self-report scale composed of Likert items with ordered modes from 1 ("almost never") to 4 ("almost always"). Scores may range from 21 to 84 with higher scores indicating increased attachment quality / intensity, but no critical thresholds for prenatal maternal attachment have been described. It investigates the emergence in particular of the feelings, thoughts, emotions of the mother towards the child she is expecting. The construct of PAI was created taking into account both theories related to attachment and those related to the ability to adapt to the changes that occur in pregnancy.

Statical analysis

The statistical analysis was carried out with STATA. For the continuous variables, the distribution of data was verified through the Shapiro-Wilk test and after verifying the distribution normality, which was "not normal", we carried out the analyses through non-parametric tests. Any differences between the mean of the two groups were evaluated through the Wilcoxon test, while in the case of three or more groups they were evaluated through a variance analysis (Kruskal-Wallis test for variables with the non-Gaussian distribution).

RESULTS

The sample consists of 1,734 women and the average age is 30.85 years.
The minimum age was 15 and the maximum was 46 years.
The women in our sample are 18.22% in the first trimester of pregnancy, 38.87% in the second trimester of gestation and 42.91% in the third trimester of pregnancy.
They responded for 46.83% from the North, for 21.11% from the Centre, for 29.82% from the South and Islands and for 2.25% from abroad.
In our sample, 46.77% were nulliparous compared to 53.23% who were pluriparous.
The work situation is set out in **Table 1**.
Most of the women in our sample (47.87%) believe they get average overall support, 29.76% high overall support, 22.37% low overall support.

Table 1. *Work situation of the sample.*

Profession	Frequency	%
Housewife	310	17.88
Unemployed	267	15.40
Free prof.	217	12.51
Dependent	743	42.85
Student	36	2.08
Part-time	161	9.28
Total	1734	100.00

56.63% planned pregnancy, 25.49% thought about a possible pregnancy, 9.92% had not planned pregnancy and 7.96% had not planned it but did not reject the idea.
Most of the women examined did not suffer from health problems during pregnancy (70.93%), while 29.07% suffered from them.
Most of the women experienced the body changes well: very well in 31.78% of the cases and fairly well in 50.35% of the cases.
For the majority of the women surveyed there was no major event during the endogestational period (38.47%). For others there were health problems (19.03%) and the global Coronavirus pandemic (13.49%) that weighed on their psychological experience.
32.58% of the women in our sample suffered from depression and of these 22.72% carried out a therapy that was in 58.38% of cases psychological, in 31.79% both psychological and pharmacological and in 9.83% only pharmacological.
The average PAI score resulting from our sample is 59.71, see **Table 2**
The PAI questionnaire shows that 60% of our sample feel love for the baby, 51.1% like to feel it move and 45% caress it through their belly. Despite this, only 18% dream of their baby, only 26% call it by its name and only 13.4% let others feel when it moves. We verified the distribution normality, which was not normal (Shapiro-Wilk test), for this reason we carried out analyzes with nonparametric tests (Kruskal-Wallis).
The PAI score was significantly higher in Southern and Island women (p < 0.05) than women from other Regions (Score in Southern and Island women was 60.6, score in the North women was 59.7, score in Centre women was 58.7 and score in abroad women was 57.6).
The difference in PAI scores in relation to the three trimesters of pregnancy was significant (p < 0.01). The score increased as the pregnancy progressed,

Table 2. *PAI questionnaire replies.*

	Hardly ever		Sometimes		Often		Almost always	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
I wonder what the baby is like now	28	1.6	266	15.3	859	49.5	581	33.5
I guess I call him by name	170	9.8	464	26.8	645	37.2	455	26.2
I like to hear it move	37	2.3	93	5.4	718	41.4	886	51.1
I think he already has his own personality	141	8.1	386	22.3	670	38.6	537	31.0
I let others feel when it moves	408	23.5	656	37.8	437	25.2	233	13.4
I know he suffers from the things I do	27	1.6	289	16.7	795	45.8	623	35.9
I design the things I will do with him	136	7.8	407	23.5	711	41.0	480	27.7
I tell others what he does in his belly	319	18.4	541	31.2	577	33.3	297	17.1
I guess which part of the baby I'm touching	262	15.1	423	24.4	631	36.4	418	24.1
I know when the baby sleeps	372	21.4	512	29.5	526	30.3	324	18.7
I can make the baby move	443	25.5	594	34.3	480	27.7	217	12.5
I buy/do things for the baby	214	12.3	427	24.6	636	36.7	457	26.4
I feel love for the child	8	0.5	65	3.7	601	34.7	1060	61.1
I try to imagine what he is doing inside the belly	63	3.6	270	15.6	746	43.0	655	37.8
I like to sit with my arms around my belly	86	4.9	349	20.1	680	39.2	619	35.7
I dream of the child	410	23.6	569	32.8	442	25.5	313	18.0
I know why the child moves	422	24.3	746	43.0	392	22.6	174	10.0
I caress the baby through the belly	34	1.9	174	10.0	737	42.5	789	45.5
I share secrets with him	608	35.0	541	31.2	366	21.1	219	12.6
I know the baby hears me	32	1.85	216	12.5	703	40.5	783	45.2
I'm very excited when I think of him	22	1.3	167	9.6	682	39.3	863	49.8

lower in the first trimester, higher in the third trimester (Score in the first trimester was 56.9, score in the second trimester was 58.1 and score in the third trimester was 62.5).

The difference in PAI was statistically significant in women expecting their first child compared to pluriparous women (p < 0.01).

DISCUSSION

Through our study, we investigated the possibility of maternal-foetal attachment being influenced by the COVID-19 pandemic. Most of our sample has a medium-high level of schooling and a working occupation. They have an average age of about 30 years and most of them live with the father of the child. Most of the women examined declare that they have desired / planned pregnancy.

About a third of the women in our sample had depression, this data confirms the results also reported by other studies regarding the level of anxiety and depression in future mothers during the COVID-19 pandemic [8, 11, 15, 34, 35].

Depression during pregnancy has been linked to numerous complications, such as premature birth [36, 37], low birth weight, foetal growth retardation [37, 38] and postnatal complications [39]. It has also been associated with hypertension, preeclampsia and gestational diabetes [40]. Anxiety, depression and stress during pregnancy are serious public health problems [34].

The mood and anxiety of the mother closely affect the effectiveness of the attachment between the mother and the child [16, 31, 41, 42].

Muller created the Prenatal Attachment Inventory (PAI) in 1993 [43]. PAI is a self-report questionnaire designed to measure prenatal attachment in terms of the affective relationship that develops between a mother and her foetus [43]. External validity has been established in several studies [44-48].

Most of the women in our sample felt love for their baby and just under half still had feelings of affection for him (likes to stroke his belly, feels him move, is excited thinking about him). So, most of the women in our sample manage to create a good bond. On the other hand, very few women wanted to call the baby by his name and dreamt of him. This could be related to the anxiety inherent in pregnancy that some mothers experience, in fact one third of our sample suffered from depression. Moreover, very few women let others caress their belly. This finding perhaps also related to the time of the pandemic and the presence of social distancing.

The results of our PAI study show a high average of women's prenatal attachment, which increases with the evolution of pregnancy, is greater in Southern women and in primiparous women. So, despite the anxiety related to the pandemic period, it is clear from the PAI data, that women have good social and emotional support and are able to establish a bond with the child.

The sample analysed presents a selection bias, it is represented by women who are present and active on social media, and therefore able to use tools and explore new territories, so we could identify them, to a certain extent, as women capable of self-reflection or in any case proactive to the dynamics of knowledge. The sample is thus composed of fairly young mothers capable of using social networks, not representative of the entire population. Thanks to their ability to use social networks, these are mothers who were able to find a connection with other mothers, so most of them were less affected by the isolation and distancing of the pandemic. It would be interesting to explore this issue with a different sampling.

CONCLUSIONS

Factors specifically related to the COVID-19 pandemic seem to play an indirect role in increasing psychological distress especially in some women in our sample. Early detection of anxiety, which includes the assessment of psychological factors such as attachment style, is critical for specific and targeted psychological interventions to counteract the negative impact they can have on women's psychosocial health, mother-child bonding, and child development.

Our findings can be used to formulate psychological interventions to improve mental health and psychological resilience during the COVID-19 outbreak. However, these data also suggest that the anxiety and stress generated by the pandemic have not affected the mother-child bond.

COMPLIANCE WITH ETHICAL STANDARDS

Authors contribution

All authors: Conceptualization, design, data analysis and interpretation, writing – original draft, writing – review & editing.

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