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Prenatal Attachment in Twin Pregnancy

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Abstract

Twin births are associated with several medical, healthcare, socio-emotional, psychological and developmental consequences for families. Parents generally describe twin pregnancies as physically and emotionally difficult. Moreover, compared to singleton pregnancies, twin pregnancies are reported to carry higher maternal as well as perinatal morbidity and mortality. The aim of this chapter is to review literature on twin pregnancy and to give a comprehensive framework about parents' experience of expecting twins. An important issue related to the psychological adjustment during twin pregnancies is prenatal attachment. During pregnancy, mothers use to think about their child-to-be, and they start to create representation of themselves as mothers. Prenatal attachment in twin pregnancies may differ from that in singleton ones. During a twin pregnancy, the mother-to-be has to deal with an identification process with two children at the same time and have to create a mental space that allow her to make representation of both children. The monitoring of these pregnancies is important for the creation and the consolidation of these maternal representations: ultrasound examinations revealed the fetal gender that facilitates naming the unborn twins and thinking to them as individuals and this is particularly important in the case of complicated twin pregnancies.

Keywords: twins, twin pregnancy, prenatal attachment, maternal-fetal relationship

1. Introduction

Currently, twin pregnancies account approximately for 3% of all live births [1]. The number of twin pregnancies has dramatically increased over the last four decades in all of the countries where we have information from vital statistics [2]. One of the main reasons for this recent increase of twin pregnancies is associated to the fact that mean maternal age at childbearing has considerably raised. The responsible factors are socio-economic contingencies and the

increase in the female employment rate. There is evidence indicating that the incidence of twin pregnancies is known to rise with mother's age [3]. This pattern has been attributed both to an increase in the level of gonadotropins with the age and to the rise of medically assisted reproductive technologies (ART) among older women.

This extraordinary growth in twinning rates in different developed countries must be considered as an important public health issue since twin pregnancies are generally associated with greater risk for both infants and mothers. Twin babies are more fragile, have lower birth weight and born preterm more often than singleton babies. In addition, many of the risks to the mother are also risks to the child-to-be, since they can lead to premature labor, complications or, in the worst cases, fetal death. For these reasons, twin babies are more frequently admitted to neonatal intensive care units (NICUs) and subjected to more prolonged hospitalization with potential negative effects both on infants and parental behavior. Other complications for the mother are gestational diabetes, hypertension, preeclampsia and acute polyhydramnios.

Moreover, twin births can have negative effects on parents' adjustment as well. In fact, although it is possible to identify similarities in pregnancy and parenthood for twin and singleton births, the experience of expecting and parenting twins seems to be very different [4]. The responses to a multiple pregnancy and parenthood by most of the parents may be associated with ambivalence and surprise, even if the pregnancy resulted from infertility treatment [5], as well as with higher levels of anxiety, distress and higher risk of depression in the postpartum period both in the case of twins conceived naturally and in the case of twins conceived with ART [4, 6]. In addition, due to the medical risk associated, twin pregnancies need to be closely monitored [7, 8]. On one hand, this frequent and intensive monitoring could reassure parents, but, on the other, it constantly reminds them that their pregnancies could be associated with serious risks for the babies and the mothers. Different researches tried to evaluate the association between the presence of mood disorders and stress in parents and twin pregnancies. Researchers that focused on parental experience associated to twin pregnancy that occurs both naturally or with ART investigated either the joint experience of mothers and fathers [9–12] or of mothers alone [13–16]. It was observed that the risks usually associated to twin pregnancy lead to higher level of stress [17] and seemed to increase the incidence of depression and anxiety in parents of twins and especially in mothers [6, 9–11, 16, 18]. In addition, it was also observed that the presence of medical risk as well as psychological suffering in mothers during twin pregnancy is generally associated to higher level of fatigue, loss of energy, depressed mood and feelings of worthlessness and guilt [14].

Another important aspect related to the mothers' psychological adjustment during twin pregnancies is related to the building process of the relationship between the mother and the child-to-be [19]. During pregnancy, mothers use to think about their child-to-be, and they start to create representation of themselves as mothers. During twin pregnancies, the mother-to-be has to deal with an identification process with two children at the same time and have to create a mental space that allow her to make representation of both children. These processes include representations of physical and emotional characteristics of two different fetuses and of the interactions between the mother and her future babies, as well as dreams and expectations about both the children-to-be. For these reasons, it is possible to infer that the building process

of this relationship between the mother and the child-to-be may differ among woman who are expecting twins and those who are expecting singleton [19].

2. Medical issues associated to twin pregnancy and twin birth

2.1. Twin pregnancy: fertilization, intrauterine growth and associated fetal risk factors

Twin pregnancy can be the result of multiple ovulations with fertilization of any oocyte by a sperm and in that case we have dizygotic twins (DZ) or a consequence of the fertilization of an oocyte by a sperm with subsequent division of the single zygotes and in this case we will have monozygotic twins (MZ). All DZ pregnancies are dichorionic (two placentas) and diamniotic (two amniotic cavities). MZ pregnancies, in relation to the gestational age in which the division into two embryos occurs, may be dichorionic and diamniotic (about 1/3 of the cases) if the division takes place between the first and the third day of gestation or monochorionic (single placenta) and diamniotic (about 2/3 of cases) if the division takes place between the fourth and the eighth day of gestation. Finally, the division could rarely occur between the ninth and the thirteenth day of gestation, resulting in monochorionic monoamniotic pregnancy (about 1% of the MZ pregnancies). Overall, DZ twins represent 70% of twin pregnancies and MZ twins represent 30% [20, 21]. From the genetic point of view, DZ twins (fraternal twins) can be assimilated to natural brothers, while MZ twins (identical twins) have always been thought to have the same genetic heritage. However, epigenetic alterations and environmental factors may be responsible for different phenotypic expressions at physical, neuropsychological and behavioral levels, in the absence of variations in the genetic sequence.

In twin pregnancies, it is essential to define if twins share or not placenta as soon as possible. Chorionicity determination in the first trimester is almost 100% accurate [20]. The most reliable signs to determine chorionicity are the number of gestational sacs between 7 and 10 weeks of gestation and the presence of lambda sign (a subtle triangular strip of cortical tissue separating the two placenta) between 11 and 14 weeks of gestation [21, 22]. The determination of chorionicity is particularly important from a clinical and prognostic point of view, since monochorionic (MC) twin pregnancies are complicated by an incidence of 10–15% of twin-to-twin transfusion syndrome (TTTS). TTTS is a chronic midtrimester complication of MC twin pregnancies that causes significantly higher perinatal mortality and morbidity rates in monochorionic than in dichorionic twins [23]. MC twins share their placenta and their blood circulation is connected by vascular anastomoses at the placenta surface. Placenta vascular anastomoses allow acute or chronic inter-twin blood transfusions between the circulations of the two fetuses. Imbalanced inter-twin blood flow can lead to a severe complication such as TTTS. In TTTS, imbalanced blood flow from one twin (the donor) to the other twin (the recipient) results in hypovolemia and oligohydramnios in the donor and hypervolemia and polyhydramnios in the recipient twins with transient or persistent right ventricular hypertrophy [24].

Another important issue related to twin pregnancy concerns fetal growth. In single pregnancies, progressive and linear fetal growth is observed until the 37th week of gestation, whereas

in twin pregnancies the overlap is observed with single pregnancy only in the first two trimesters. Recent data from an Italian sample compared the twin birth weight curves with those of single birth ones, indicating differences in 3, 50 and 97^o percentiles, starting from 32 weeks of gestational age and increasing according to gestational age: at 37 weeks, twins' weight differs by about 9% compared to single babies' weight. Similar differences were observed for length, whereas for the cranial circumference differences occur later, around the 36 weeks of gestation [25]. Fetal growth depends on fetal genetic inheritance and on factors related to the uterine-placental development environment that can impair placental circulation with fetal hypoperfusion. The anomalies in placental circulation establish a high risk of fetal hypoxia and reduced amount of nutrients (e.g. glucose and amino acids) essential for fetal growth. In the case of twin pregnancies and in the absence of genetic-metabolic fetal abnormalities, a proper maternal nutritional input is crucial for proper development. From a physiological point of view, twin pregnancy provides, compared to single pregnancy, an estimated weight gain of 3.5 kg higher. Although the weight is different, the feeding regime to follow is similar in both types of pregnancy. Neonatal weight of twins also depends on their zygosity and chorionicity. MZ twins weigh less than DZ twins and MC twins weigh less than dichorionic twins (DC). Intrauterine growth is also negatively influenced by IVF with multiple embryo transfer. Also during TTTS, it is common that the donor twin weighs 25% less than the other twin. Another situation defined as selective intrauterine growth restriction (sIUGR) could lead to a high risk of intrauterine death or extreme prematurity [24, 26].

The presence of discordant anomalies, which occur more frequently in elderly women with twins, is another important risk factor. In fact, it is well documented that, if discordant anomaly is noted, the likelihood of adverse outcomes both for the discordant twin and for the normal twin is increased [27, 28]. Particularly, it was observed that the presence of discordant anomalies is significantly associated with preterm birth, lower birth weight, IUGR and neonatal and infant death. Moreover, it was observed that discordant twins showed higher physiological and behavioral dysregulation [29, 30].

Finally, an additional factor for fetal risk concerns the phenomenon of the "vanishing twin." Early prenatal ultrasound for fetal monitoring has shown that at 8 weeks of gestation the incidence of multiple pregnancies is 3.3–4.5% that spontaneously evolves in single pregnancy in 21–30% of cases, after the reabsorption of an embryo by the placenta or of the other twin. This event is a potential risk factor for the development of complications in the surviving fetus [31]. Data from the Danish nationwide registers have demonstrated that IVF singleton babies born from vanished twin pregnancies had higher rates of small for gestational age (SGA) and term low birth weight (LBW) compared with IVF singleton pregnancies [32]. Furthermore, studies have noted an association with cerebral palsy in IVF children when the number of gestations at delivery was less than the number of embryos transferred compared with pregnancies in which the number of gestations at delivery was the same as the number of embryos transferred [33].

2.2. Twin delivery and perinatal risk factors

In twin pregnancies, antenatal care involves more intensive monitoring and protocols that are usually different to those for a singleton pregnancy. Ultrasound assessment of fetal biometry, anatomy and Doppler velocimetry is used to monthly monitor dichorionic twin pregnancies

[7] while, since risks are significantly higher in monochorionic compared with dichorionic pregnancy [8], antenatal assessment should be scheduled more often, usually every 15 days or less when decided by the gynecologists, in order to prevent adverse perinatal outcomes associated to this type of twin pregnancy.

Moreover, since twin pregnancies are associated with an increase in mortality and morbidity rates, a careful planning of delivery and adequate neonatal care in the delivery room are needed [21]. It has long been recognized that the timing of delivering twins constitutes a significant issue [34]. Despite in high-risk pregnancies there is the temptation to be reassured by increasing gestational age as the potential complications of prematurity, different studies suggest that the offspring of a twin gestation may benefit from delivering prior to their expected date of delivery [35, 36]. Several studies have focused on the “prospective risk of foetal death” to help determine by which gestational age a twin pregnancy should be delivered [37]. For twins, the prospective risk of fetal death appears to be equivalent to that of post-term singletons at about 37–38 weeks of gestation [35, 37]. The prospective risk of fetal death for twins intersects with neonatal death at about 39 week of gestation, showing that it may be reasonable to consider delivery of uncomplicated twins before 40 weeks of gestation [36]. These studies, however, did not address the impact of chorionicity on the decision to deliver a twin pregnancy. Other research focused on this aspect, indicating that in the case of dichorionic and diamniotic twin pregnancies, delivery should be scheduled from 38 weeks, while in uncomplicated monochorionic twins delivery should be scheduled from 36 weeks of gestation [22, 38].

Additionally, obstetrics and gynecologists broadly recognized that the delivery of twins constitutes an area of significant risk [34]. Perinatal mortality is five times higher in twins than in singletons [39]. In fact, the conduct of a twin delivery remains one of the most challenging events in the daily practice of obstetrics [34]. In particular, an important issue related to twin birth is associated with the choice of the mode of delivery. Although approximately 60% of twins are delivered by cesarean section [40], choosing the mode of delivery, spontaneous or cesarean, depends on multiple factors linked to both maternal and fetal characteristics [21]. Spontaneous delivery is generally used when both twins are vertex at the moment of child-birth. However, in this case, ultrasonographic examination is a useful adjunct after delivery of the first twin in order to establish the presentation of the second twin. In fact, after the delivery of the first twin, up to 20% of the second baby spontaneously changes presentation [41]. This emphasizes that, in case of a vaginal delivery in twin pregnancy, it is necessary to monitor all the process since the situation can rapidly change from a relatively low-risk delivery to one fraught with complications for mother and baby [34]. As regards the choice of cesarean delivery, there are few absolute indications to planned cesarean section. It seems that cesarean section without a trial of labor should be performed in cases of monoamniotic twins. The other indications are not dissimilar to those of a singleton pregnancy and include placenta previa and antenatal evidence of significant fetal compromise (e.g. severe selective IUGR) likely to worsen during labor. In addition, Cesarean section is generally the recommended method of delivery in twin gestations when one twin is non-vertex [42].

Twin delivery constitutes a challenge in daily obstetric practice, which becomes even more difficult in cases with preterm birth, the main perinatal risk factors associated with twin pregnancy [43]. Advancement of gestational age is crucial to achieve acceptable fetal growth

rates and better perinatal conditions after birth [44]. Compared to term twin pregnancies, preterm twin pregnancies increase the risk of complications such as neonatal mortality, respiratory distress syndrome (RDS), sepsis, periventricular leukomalacia (PVL) and intraventricular hemorrhage (IVH). In addition, population-based studies from large databases have shown a higher risk of cerebral palsy in twins than in singletons. Studies found different risk profiles in relation to gestational age at birth. In particular, it was found that the presence of one or more of the above complications is present in 30% of moderately preterm infants (born between 32 and 33 + 6 weeks of GA), in 13% of late preterm infants (born between 34 and 36 + 6 weeks of GA) and only in 0.5% of twins born at term [21]. Therefore, all the complicated twin pregnancies have to be managed in tertiary level perinatal centers with both skilled gynecologists and neonatologists in this field.

Finally, another relevant aspect that needs to be taken into account is breastfeeding. Mothers of risk infants, as some twins are, may not have the opportunity to experience breastfeeding. Additionally, also in the case of healthy twins, breastfeeding can result a challenge for mothers. It is documented that a mother's feelings and attitudes on breastfeeding can considerably influence on its initiation [45]. For mothers of twins, breastfeeding may be physically uncomfortable; some of them are not able to establish an adequate milk support for two babies [46]. Moreover, several mothers of twins find that their experience of breastfeeding two children is stressful and fraught. Additionally, Mitra et al. [47] observed that those mothers who were well prepared for the realities of breastfeeding had a more successful experience in terms of its duration. Mothers of twins usually feel ill-prepared for breastfeed their twins and reported a lack of information and support during pregnancy [4, 48].

3. Psychological issues associated with twin pregnancy: the building of prenatal attachment

3.1. What is prenatal attachment?

Research on the mother-infant relationship has its origins in Bowlby's attachment theory [49]. This theory is raised from different disciplines such as ethology, cybernetics, information processing, developmental psychology and psychoanalysis, and it originally focused both on the infant's biological need for a secure early attachment to the mother and on the mother's response [49, 50]. Starting from Bowlby's theory, Mary Ainsworth added to the attachment theory the emotional component, based on the idea that the infant's contribution to the attachment process was more than biological and included baby's affective evaluation of the mother's behaviors [51]. Starting from this theoretical framework, many researches investigated mother-infant attachment during infancy [52], adolescence and adulthood [53–55], focusing both on behavioral and emotional markers to measure attachment.

Attachment has been described as "the innate tendency of children to create privileged affective bonds with at least one adult person (the caregiver) who takes care of them from birth" [50]. The study of how children develop this bond with their caregiver has identified two main

types: secure and insecure [51]. The first would be those children who could use their mother (the caregiver) as a “safe base” that allow the children to explore the environment. These children usually cry at the time of separation, but they are capable to comfort themselves at the time of the reunion with the mother, returning to play. On the other hand, children with insecure attachment explore the environment less and are anxious when a stranger stays with them in the same room, even if the caregiver is near them; moreover, they become anxious also at the moment of separation from their caregiver and they usually cannot be consoled at the moment of the reunion with their caregiver. On the basis of the attachment relationship experienced, children would build a sort of primary mental “representations,” the Internal Working Models (IWMs), that will regulate their peculiar interactive patterns [56]. The IWMs develop from the internalization of recurring interactive experiences between the children and their caregiver and the quality of their organization depends on the quality of care received during childhood. In the secure attachment pattern, IWMs would consist of representing the attachment figure as available to respond positively and consistently to requests for help and comfort, while in insecure attachment patterns, the IWMs would be organized starting from the representation of the caregiver as not available to respond properly at the requests of help and comfort, an attachment figure that is not attuned to the needs of the child, that are usually distant and, sometimes, even hostile. In reality, further studies pointed out that IWMs does not depend exclusively on the quality of the care received, but in a more complex way on the meanings that the caregiver communicate to the child with their behavior and conduct.

While the theory of neonatal attachment places the emphasis on the child, the theory of prenatal attachment emphasized the type of affective investment that parents, and especially mothers, have towards the child-to-be, an investment that begins and developed during the different stages of pregnancy. In fact, it was observed that the very early relationship between the mother and her babies does not start at birth [57], but it was recognized that it begins while the child is still a fetus [58]. With the perception of the fetal movements, the pregnant woman starts a process of psychological separation from the fetus and begins to view herself as a “mother” [59]. In particular, the concept of prenatal attachment is defined as “*the unique relationship that develops between a woman and her fetus*” [60] and “*the emotional tie or bond which normally develops between the pregnant parent and her unborn infant*” [61].

Different studies on prenatal attachment investigated its intensity during different period of gestation. Research that used a longitudinal design demonstrated a significant increase in terms of level of prenatal attachment measures during the entire course of the pregnancy [60, 62–64]. It was observed that immediately after the beginning of pregnancy, the level of prenatal attachment may depend on some situational factors, for example, if the woman has perceived fetal movement or if has seen an ultrasound image of the fetus [63]. It was also found that prenatal attachment develops in an orderly sequential way during the course of pregnancy [57, 58, 65]. In the first trimester, relatively low levels of prenatal attachment were observed, while with the increasing of gestational age, mothers start talking to the fetus, call the child-to-be per name [63] and, in the second and third trimesters, increase “nesting” behaviors. Also in a recent literature review on maternal-fetal attachment, Yarcheski et al. [66] suggested that the magnitude of this relationship is strongest during the third trimester of pregnancy.

Moreover, in recent years, different researches started to deeply investigate prenatal attachment, with particular attention to the link between the nature of this early mother-fetus relationship and the mother's early parenting experiences and attachment style in the postpartum period [67]. In fact, pregnancy could be considered a developmental process in which pregnant women start their transition into parenthood. This process implies different psychological changes and challenges that play an important role in the establishment of a successful parent-child relationship. Different researches showed that prenatal attachment could play an important role in identifying as soon as possible parents who found difficulties in developing a close and positive parent-child interaction during infancy [68].

Other studies focused on the examination of potential risk or protective factors that could influence prenatal attachment. It was observed that fetal movement and increased gestational age were positively related with attachment [62, 64]. There are also pieces of evidence that some demographic variables, such as maternal age and education, may correlate with attachment [19]. Positive correlations have also been found between prenatal attachment and the quality of marital status [58, 61, 68], as well as between prenatal attachment and perceived social support during pregnancy. In addition, other researches identified other situational risk factors that could modify the quality and the intensity of expression of prenatal attachment [63] as loss or stillbirth in a previous pregnancy [69, 70], medical risk during pregnancy [71], physical symptoms [72, 73], depression and anxiety [74] and twin pregnancies [19, 75, 76].

3.2. Prenatal attachment in twin pregnancy: a review of existing literature

Focusing on prenatal attachment in twin pregnancy, it is possible to observe that it may be different from singleton ones [18]. In fact, during a twin pregnancy, the mother-to-be has to deal with an identification process with two babies simultaneously and has to build a space that allows her to make representation of both children. This process includes representations of physical and emotional characteristics of two different fetuses and of the interactions between the mother and her child-to-be, as well as dreams and expectations about both the babies.

Despite previous works on prenatal attachment in mother of twins observed that it may be a risk factor for the development of a close and positive relationship between the mother and the babies, as far as we know, only six studies explored prenatal attachment in twin pregnancies [13, 19, 48, 75–77].

In a descriptive study of 10 women using grounded theory methodology, Van der Zalm observed that the process of prenatal attachment depends on *zygosity*. In particular, in the case of identical twin, mothers used to view their babies as a pair with similar characteristics, while in the case of fraternal twin mothers used to think about their babies as individuals with different characteristics [77].

A second study conducted by Colpin and colleagues aimed to evaluate the quality of prenatal attachment in a sample of 61 mothers expecting twins at the beginning of the last trimester of pregnancy. Higher quality of prenatal attachment was predicted by higher maternal psychosocial well-being and by higher marital satisfaction. However, it was observed that these variables explained only a small portion of variance of the quality of maternal attachment [48].

A third descriptive correlational study by Damato investigated through an online survey the level of prenatal attachment for each twin in a sample of 202 expectant mothers. It was found that the mother experience a significant higher level of prenatal attachment for the twin that later has been born for second. In addition, it was also observed a small but significant correlation between prenatal attachment and both gestational age and fetal movement [75].

The same author conducted two other studies on prenatal attachment during twin pregnancy [19, 76]. In the first study, a predictive correlational descriptive design was used to evaluate the role played by demographic and biological factors, as well as personal resources in predicting the level of prenatal attachment during twin pregnancy in a sample of 241 women expecting twins. It was demonstrated that history of infertility treatment, older age and lower family income predicted lower level of prenatal attachment, while the presence of fetal movement, higher gestational age and higher self-esteem predicted higher level of prenatal attachment. However, it was observed that only a small portion of variance was explained by the predictors considered in the study.

The other study by Damato investigated the influence of prenatal attachment and other relevant perinatal variables such as method of delivery, mother's health and depression, infant birth weight and neonatal intensive care unit (NICU) admission, on postnatal attachment in a sample of 139 mothers of twins. A modest but significant relationship between prenatal and postnatal attachment was observed. Moreover, it was found that also maternal characteristics, such as depression, and the context of the perinatal experience, such as delivery method and the NICU admission of the babies, influence the attachment process [76].

Finally, the most recent study that investigated prenatal attachment during twin pregnancy aimed at exploring the level of prenatal attachment in a sample of 83 expectant mothers during dichorionic pregnancies, uncomplicated monochorionic pregnancies and monochorionic pregnancies complicated by twin-to-twin transfusion syndrome (TTTS). In particular, it was showed that the increase of prenatal attachment in the last trimester of pregnancy, usually described in singleton pregnancies [78], was observed both in dichorionic and uncomplicated monochorionic pregnancies, while this intensification was not observed in pregnancies complicated by TTTS. The fear represented by the high risk associated to TTTS pregnancies, the uncertainty for the pregnancy outcome and the doubt for the health of the fetus seemed to reduce prenatal attachment [13].

3.3. Risk and protective factors for prenatal attachment in twin pregnancy

Starting from the existing literature on prenatal attachment both in singleton and in twin pregnancies and from those studies that investigate possible threat associated to twin pregnancies considering both medical and psychological risks factors, it is possible to suppose and infer which further variables may play a relevant role during twin pregnancy in impairing the building process of prenatal attachment or, on the contrary, in promoting the building of a close positive mother-fetus relationship.

Previous studies showed that the presence of medical risk and the higher prevalence of complication during pregnancy are generally associated to psychological suffering in mothers [14]. It

Multiple Pregnancy - New Challenges was observed that the presence of medical risk may impair the process of the building of representation of the child-to-be as well as the of themselves as mothers [79]. In twin pregnancies, antenatal care involves more intensive monitoring and protocols that are usually different to those for a singleton pregnancy. Ultrasound assessment of fetal biometry, anatomy and Doppler velocimetry is used to monthly monitor dichorionic twin pregnancies [7], while, since risks are significantly higher in monochorionic compared with dichorionic pregnancy [8], antenatal assessment should be scheduled more often in order to prevent adverse perinatal outcomes associated to this type of twin pregnancy. This frequent and intensive monitoring constantly remind to the mother that twin pregnancies could be associated with serious risks for the babies and the mothers [4], such as preterm delivery, low birth weight, IUGR, presence of discordant anomalies, increased risk of mortality and morbidity, preeclampsia, gestational diabetes and placental abruption [80]. When pregnancy is diagnosed as MC twin pregnancy, these could be even amplified for parents. The announcement of monochorionicity and its specific risks influences how parents deal with pregnancy [13]. Morbidity and mortality rates are higher than in DC pregnancies, and parents have to face concepts related to different complications associated with this kind of pregnancies as twin-to-twin transfusion syndrome (TTTS) or severe sIUGR.

As the presence of medical complication during pregnancy, also the loss of a baby in a previous pregnancy may have an impact on maternal well-being as well as on prenatal attachment in the subsequent pregnancy. Fetal loss may represent the breaking of a preexisting attachment bond [61] to someone who would eventually have contributed to the bereaved individual's life [70]. For mothers who experience fetal loss, the sufferance could be linked to their experience of being pregnant and this may worry them in a subsequent pregnancy [81]. As seen before, a concerning factor for fetal risk in twin pregnancy is the phenomenon of the "vanishing twin." This event is not only a potential risk factor for the development of complications in the surviving fetus [31]. In fact, the possible loss of a fetus during pregnancy usually triggers considerable negative feelings and thoughts in mothers, and this may be an obstacle for the building process of the babies' representations.

Moreover, it was also observed that higher level of negative mood states during pregnancy may be an obstacle for prenatal attachment. The risks usually associated to twin pregnancy could lead to higher level of negative mood states in mothers of twins [9–11, 16, 18]. The risks usually associated to twin pregnancy lead to higher level of stress [17] and increased the incidence of depression and anxiety in mothers of twins during pregnancy [6, 9–11, 16, 18]. It was observed that during twin pregnancy 33.3% of mothers-to-be suffer from major depression and experience higher level of stress and greater emotional and social fragilities. Moreover, the presence of medical risk as well as psychological suffering in mothers during twin pregnancy is generally associated to higher level of fatigue, loss of energy and feelings of worthlessness and guilt [14]. Worried, depressed and stressed mothers may not be able to start to create a mental space for the representation of the child-to-be, and this could be a disadvantage for the construction of mother-fetus relationship.

Despite most of the studies focused on risks factors for prenatal attachment, previous works observed that higher level of perceived social support as well as a positive relationship with

the partner positively influences the mother-fetus relationship building during pregnancy [82]. Inevitably, fathers of twins will be more involved than a father of a singleton both during pregnancy and then with the babies' care. The earlier the partner is helped to recognize this need and is positively encouraged and supported to participate, the better. In addition, as previously seen, during pregnancy women are generally more exposed to emotional distress and depressive reactions related not only to the physical and hormonal changes but also to changes in their status, especially. Previous studies on singleton pregnancies indicated that fathers play an important role in helping mothers-to-be facing these difficulties, providing them emotional support, protecting from excessive psychological suffering and, consequently, promoting prenatal attachment [83].

4. Conclusions

Given the current "epidemic of multiple pregnancies" in much of the Western countries, it is surprising that still few studies examined the psychological impact of twin pregnancy and twin birth on parents' experience.

This chapter underlined that twin babies are generally more fragile and more at risks of born preterm and with lower birth than singleton babies. The medical risks associated to twin pregnancies may influence both twins' developmental outcomes [84] and the building of a close and positive mother-child relationship [85]. It was also pointed out that medical risks, usually associated to twin pregnancy, may be linked to negative effects on parents' and especially mothers' experiences.

In particular, it was observed that despite it is possible to identify some similarities to singleton pregnancy, the experience of expecting twins may be very different. Parents and in particular mothers of twins have unique needs and have to face unique challenges. Risks usually associated to twin pregnancy may lead to higher level of stress and negative mood states in parents. In fact, mothers of twins seem to be less psychological adjusted to their pregnancy in terms of lower level of prenatal attachment.

In reviewing the research that investigated prenatal attachment, it was observed that the quality of the relationship established by the mother-to-be with their fetus could be an important diagnostic information to identify as soon as possible women who may have difficulties during the interaction with their babies mostly because prenatal attachment is usually associated to the quality of mother-infant interaction in the postpartum period [68, 76].

Healthcare practitioners should be aware of the unique experience and challenges associated to expecting and parenting twins, which are often underestimated by society and even by other new mothers. In addition, it is known that perinatal period until the first 3 months postpartum has been demonstrated to be the most vulnerable period for mothers of twin [86]. Paying attention to the issues involved in expecting and parenting twins, starting from pregnancy, may support mothers in their transition to motherhood. This may be accomplished by the implementation of target peer support group prenatally and/or postnatally (both during

hospitalization and then after discharge at home), so that women can gain from the experience of others with a similar life event.

Conflict of interest

The authors (Chiara Ionio, Eleonora Mascheroni, Caterina Colombo, Gianluca Lista) 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.

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