

Risk perception in pregnancy: context, consequences and clinical implications

Monique Robinson ¹

Craig E. Pennell ²

Neil J. McLean ³

Jessica E. Tearne ^{1,3}

Wendy H. Oddy ¹

John P. Newnham ²

Affiliations:

¹Telethon Kids Institute, The University of Western Australia, Perth Australia

²School of Women's and Infants' Health, The University of Western Australia at King Edward Memorial Hospital, Perth Australia

³School of Psychology, The University of Western Australia, Perth Australia

Corresponding Author:

Dr Monique Robinson

Telethon Kids Institute

PO Box 855, West Perth, WA 6872 Australia

email: monique.robinson@telethonkids.org.au

Phone: +61 8 9489 7913

Fax: +61 8 9489 7700

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Abstract

Despite huge advances in obstetric management and technology have occurred in recent decades, there has not been an accompanying decrease in patients' perception of risk during pregnancy. The aim of this paper is to examine the context of risk perception in pregnancy and what practitioners can do to manage it. The modern pregnancy may induce a heightened perception of risk due to increased prenatal testing and surveillance, medico-legal complexity, fertility treatment and the increasing use of the internet and social media as a source of information. The consequences of an inflated perception of risk during pregnancy include stress, anxiety, and depression, and these issues may have long-lasting implications for patients, their babies, and their families. There are numerous resilience and vulnerability factors that can help care providers identify those who may be predisposed to increased risk perception in pregnancy, and there is a role for both obstetric care providers and psychologists engaged in obstetric settings to manage and reduce risk perception in patients where possible. Ultimately, the medical management of risk during pregnancy can be complex but a thorough understanding of the social and emotional context can assist providers to support their patients through both high- and low-risk pregnancy and birth.

Introduction

There have been huge advances in obstetric medicine and technology in recent decades. Paradoxically, studies show that women's perceptions of risk during pregnancy have not significantly declined over that time (Lee, Ayers, & Holden, 2012). This may be due to the fact that complications can still arise in situations that appeared to carry little or no risk, while conversely, high-risk pregnancies can result in perfectly healthy births (James & Stirrat, 1988). Hence, the perception of risk during pregnancy remains an issue of salience and importance for both pregnant women and obstetric care providers. This paper provides an overview of the context and potential consequences of risk during pregnancy, in addition to a discussion on the clinical implications for both obstetric and psychology care providers. Studies discussed in the paper were chosen on the basis of their relevance for practitioners working towards successful management of risk in pregnancy.

The protective relationship between mother and child is intensified during pregnancy when the fetus is unable to respond to protect itself. The discourse of the 'good' mother who manages or avoids risk, putting her child's needs before her own and protecting her baby from harm, is common in modern Western society (McDonald, Amir, & Davey, 2011). The term 'risk' may refer to actual or perceived medical risk. A pregnant woman is inundated with information in both a medical and social context as to the do's and don'ts of pregnancy, such as quitting smoking and avoiding certain foods (Inskip et al., 2009), and women can find themselves under significant pressure from peers and the community to conform to these expectations of how to behave during pregnancy (Robinson, Pennell, McLean, Oddy, & Newnham, 2011). For example, a study of social norms and prejudice found that pregnant women who drink alcohol ranked tenth in a survey of perceived acceptable targets for

prejudice, a ranking that was higher than negligent parents, men who solicit prostitutes, people who cheat on exams and gang members (Crandall, Eshleman, & O'Brien, 2002).

While much of this pressure may assist women to shift towards lifestyle behaviours that are healthy and beneficial for mother and child, an underlying assumption is that a healthy baby can be guaranteed by following such guidelines. Unfortunately, this means that when complications arise, it can lead to a feeling that the mother is somehow responsible or has done something 'wrong', which can have lasting consequences for maternal and child mental health (Solomon, 2009). The field of the Developmental Origins of Health and Disease (DOHaD) provides a clinical and research framework for understanding the long-term impact of perinatal exposures, including those that result from maternal lifestyle and behaviour in pregnancy, such as diet, exercise and substance use (Gluckman, Hanson, & Beedle, 2007). One important consideration for researchers working in this field is that as we investigate and gain a greater understanding of perinatal risk factors, we may be inadvertently creating the potential for increased perception of perinatal risk (Robinson, Pennell, et al., 2011).

There are numerous elements of the modern pregnancy that may contribute towards an increased perception of risk for pregnant women and their families. Firstly, technological advances in prenatal testing and ultrasound diagnosis have led to risk assessment playing a larger role in routine antenatal care. Particularly for patients receiving private obstetric care, there are now more frequent opportunities for surveillance of the developing fetus, and while this technology may carry significant benefits in assessing the risk status of mother and fetus, such testing can also be a source of undue anxiety for the mother (Lee et al., 2012).

Non-invasive prenatal testing (NIPT) is now commercially available to detect trisomy 21 (Down Syndrome) and other trisomies from cell-free fetal DNA in maternal plasma (Mersy et al., 2013), and while such technology is promising in terms of its excellent sensitivity and specificity in a high-risk population, a recent meta-analysis found the positive predictive value in low-risk populations was mixed (Mersy et al., 2013). With patients having greater exposure to risk information through prenatal screening, it can be challenging for those with little medical knowledge to accurately assess risk amidst complex medical terminology and copious information (Chervenak, McCullough, Sharma, Davis, & Gross, 2008). A reliance on medical technology such as ultrasound imaging and prenatal testing may also diminish a patient's trust in her own instincts and knowledge surrounding pregnancy and birth (Jordan & Murphy, 2009).

Another influence on risk assessment and perception in modern Western society is the contemporary culture of litigation and the resulting "defensive medicine" phenomenon. This is particularly relevant for obstetric practice, with indemnity insurance costs for obstetrics amongst the highest of all medical specialties (Carroll & Buddenbaum, 2007; Studdert et al., 2005). The obstetric community is increasingly risk-averse, as illustrated by an Australian study that found women with medical insurance had a significantly higher rate of elective caesarean section delivery compared with uninsured women, with this difference unexplained by obstetric and demographic factors (O'Leary et al., 2007). Another study found that rates of late preterm induction have increased at a similar rate to increasing insurance premiums, further suggesting a medico-legal influence on obstetric risk management (Murthy, Grobman, Lee, & Holl, 2009).

In addition, around 9% of women worldwide experience infertility (Berg Brigham, Cadier, & Chevreur, 2013), and with increasing use and efficacy of fertility treatment such as IVF, a pregnancy that is so difficult to come by is one where the mother may feel extra motivation to guard against risks to the baby. A recent study found women undergoing fertility treatment had significantly higher anxiety levels than women trying to conceive naturally (Vahratian, Smith, Dorman, & Flynn, 2011), and once pregnant, women who have had fertility treatment also have a heightened perception of risk, increased anxiety, and lower perceived self-efficacy in their ability to manage their pregnancy (Bayrampour, Heaman, Duncan, & Tough, 2012a).

An increasingly important influence on the over-estimation of risk in the modern pregnancy is the use of social networking and the internet as a source of information. A recent Spanish study found that 97.7% of pregnant women had used the internet to access pregnancy-related information, with over a quarter reporting accessing pregnancy-related information on the internet within the past day (Lima-Pereira, Bermudez-Tamayo, & Jasienska, 2012). Despite being viewed with scepticism by clinicians, anecdotal data have a disproportionately powerful influence on the patient (Enkin & Jadad, 1998), and anecdotal data of pregnancy risk proliferate on social media. Much of the online advice is not checked for accuracy and there is the potential for misleading and dangerous information to be circulated. Many women report limiting their online information-seeking to avoid increasing their anxiety regarding pregnancy risks (Bayrampour et al., 2012a), but for those who continue to seek information online, stories of things going wrong in pregnancy and birth are especially salient for pregnant women (Johnson & Tversky, 1983). The popularity of medically-based reality television programs and medical dramas may also be responsible for some inflation of

risk perception in pregnancy; story-lines featuring dramatic emergency situations during childbirth are common and make engaging viewing (Jordan & Murphy, 2009).

All of these factors (prenatal technology, advances in screening, the medico-legal context, infertility, social networking and media influences) may play a role in maintaining amplified risk perception in pregnancy despite low rates of maternal morbidity and mortality in most Western nations. It is important for psychologists and care providers engaged in obstetric settings to be aware of the consequences that may follow a heightened perception of risk in pregnancy, and the aim of the current paper is to examine both the context of risk perception in pregnancy and how practitioners can best manage this with their patients.

Consequences of an increased risk perception in pregnancy

The clearest adverse consequence associated with a heightened or inflated perception of risk in pregnancy is increased stress and maternal anxiety. Both maternal anxiety and the experience of stressful events during pregnancy have the potential to negatively impact multiple domains of offspring development, including the infant's own response to stress (O'Connor, Heron, Golding, Beveridge, & Glover, 2002; Robinson, Mattes, et al., 2011; Yehuda, Halligan, & Bierer, 2002). Stress during pregnancy is also linked to increases in preterm birth, low birthweight and other adverse consequences for the child (Dole et al., 2003; Talge, Neal, & Glover, 2007; Wadhwa, Sandman, & Garite, 2001). In a recent study it was apparent that the stressful life events responsible for these outcomes do not have to be life-changing traumas, but rather stressors present in the daily environment, such as financial, pregnancy and relationship difficulties (Robinson, Mattes, et al., 2011). The mother's experience of such daily stress events significantly increased the later risk of

behavioural problems for offspring who were in utero during the stress exposure (Robinson, Mattes, et al., 2011). This study also found that stress experience during pregnancy was linked to continuing experience of stress in the postnatal period, indicating that the exposure causing stress during pregnancy may not resolve after the birth.

In another study, women who expressed concerns about their unborn child's health were at a greater risk for depressive symptoms during pregnancy (Georgsson Ohman, Grunewald, & Waldenstrom, 2009), and pre- and postnatal depressive symptomatology has been strongly associated with adverse outcomes for children (Federenko & Wadhwa, 2004; Markus & Miller, 2009; Robinson et al., 2008). The importance of an accurate perception of risk in pregnancy is apparent within the controversy associated with prescription of antidepressants to pregnant women, and the need to balance the risk and safety of selective serotonin reuptake inhibitor (SSRI) use and untreated depression. Although findings in the area are inconsistent, it would appear that the absolute risk associated with SSRI use during pregnancy is very small (Byatt, Deligiannidis, & Freeman, 2013). Despite this low absolute risk, individual patient perception of risk due to SSRI use may be high, with one study reporting that up to 87% of women believed antidepressant use during pregnancy increased the risk of congenital malformations (Bonari et al., 2005; Koren & Nordeng, 2012). Such an over-inflated perception of risk could dissuade women from taking SSRI medication and in turn expose their offspring to what may be serious effects of untreated maternal depression (Parry, 2009; Sanz, Gomez-Lopez, & Martinez-Quintas, 2001; Suri & Altshuler, 2009).

Increased risk perception in pregnancy does not just affect the mother, but the family unit as a whole (Robinson, Mattes, et al., 2011). A perception of high risk may lead to heightened

anxiety in the family, and traumatic perinatal experiences can often take time to resolve, with the consequence of continued stress in the postnatal environment of a healthy infant (Sanz et al., 2001; Waldenstrom, 2004). In addition, hospitalisation of the mother during a high risk pregnancy may result in the absence of the mother from the family home for an extended period of time. This can require significant adjustment for the rest of the family, and may be particularly difficult for young children in the home.

Once the child is born, women who have experienced a high-risk pregnancy can have increased difficulties with attachment to the baby (White, McCorry, Scott-Heyes, Dempster, & Manderson, 2008). This can stem from a protective mechanism of detachment to avoid emotional pain in the event of losing the child during the pregnancy, which may require support to resolve. However, while this finding relates to genuine high-risk pregnancies, it reinforces the importance of an accurate perception of risk in pregnancy to avoid difficulties with attachment in women who were low-risk or not at the higher level of risk that they had perceived (White et al., 2008).

There are more serious consequences than those already outlined as well. Studies have shown that a mistaken belief that teratogenic exposure had occurred early in pregnancy (often before the pregnancy is known) could in some circumstances lead women to consider or seek termination of otherwise wanted and healthy pregnancies (Czeizel, 2009; Koren, Bologa, Long, Feldman, & Shear, 1989). Ironically, the focus on prenatal risk and efforts to avoid prenatal risk exposure stemming from overly sensitive risk perception could potentially do more harm than the feared risk itself (Robinson, Pennell, et al., 2011).

One final consequence of a higher risk perception in pregnancy may be deterioration of the patient-provider relationship. Discrepancies in attitudes to risk in pregnancy can potentially result in misjudged and misinterpreted communication between care providers and their pregnant patients (Lee et al., 2012). For some patients, their level of concern well exceeds the objective medical risk, and this can lead to them taking unnecessary precaution throughout their pregnancy (Carolan, 2009; Lee et al., 2012). Alternatively, women who characteristically underestimate risk may not adapt their low perception of risk in the face of complications and may be reluctant to adhere to medical advice or could shun appropriate intervention. Both of these scenarios stem from inaccurate perception of risk and can lead to patients being disengaged from their care provider, with associated challenges for the successful management of the pregnancy.

Factors related to resilience and vulnerability

Given that both genuine high-risk pregnancies and an over-estimation of risk can be difficult to avoid (Robinson, Pennell, et al., 2011), it is important to note that there are many ways in which a heightened perception of risk can be managed and reduced. It is important firstly to evaluate factors related to resilience and vulnerability for a greater perception of risk in pregnancy.

To begin with, the psychological consequences that can accompany a high-risk pregnancy, such as depression, anxiety and low self-esteem, can be managed during the pregnancy and into the postnatal period (Denis, Michaux, & Callahan, 2012). Rates of depression and anxiety for women in high-risk pregnancy were reported in a recent French study to be as high as 58% (Denis et al., 2012).

In terms of over-estimation of risk, it is important even for women in low-risk pregnancies to be screened for depression and anxiety, as healthy, low-risk women can still experience a range of pregnancy-related stress (Lynn, Alderdice, Crealey, & McElnay, 2011). A perception of increased risk has been associated with greater uncertainty, a more external locus of control, greater psychological distress, higher anxiety and lower self-efficacy (Jordan & Murphy, 2009; White et al., 2008). Psychological screening can also assist in identifying those women with pre-existing psychological disorders that may lead to increased risk perception, as women with depressive symptoms during pregnancy may be more likely to over-estimate the risks associated with their pregnancy (Walfisch, Sermer, Matok, Einarson, & Koren, 2011).

Aside from professional psychological support, good physical health and a healthy lifestyle, for example, healthy eating, use of prenatal supplements, and light exercise, can be protective against inflated risk perception in pregnancy (Bayrampour et al., 2012a). Perception of risk may also be influenced by a woman's social support network, relationship status, whether the pregnancy was planned, and employment conditions (Bayrampour et al., 2012a). Social support can mediate the stress experienced by women with high-risk pregnancies and can increase coping (Denis et al., 2012). Therefore it is important that the patient's lifestyle, social network and the context of the pregnancy are taken into account during management of the pregnancy (Bayrampour et al., 2012a; Denis et al., 2012).

Other positive coping strategies to alleviate over-estimation of risk include self-education, reassuring surveillance tests, avoidance of risk information, religious or spiritual beliefs and

focusing on positive aspects of the pregnancy (Bayrampour et al., 2012a). However, this is not always be helpful, as self-education can come with increased worries as already discussed, and the results of surveillance tests may not always be reassuring. In addition, one study found that avoidance-based coping strategies and reliance on spiritual beliefs was associated with increased anxiety during high-risk pregnancy (Denis et al., 2012).

Patient demographics can also predict the level of risk perception in pregnancy. Women of advanced maternal age (>35 years) tend towards a greater perception of risk in pregnancy than younger women, regardless of their actual medical risk (Bayrampour, Heaman, Duncan, & Tough, 2012b). Another study found women who over-estimated the teratogenic risk of common medications during pregnancy tended to be nulliparous, older, and more educated (Nordeng, Ystrom, & Einarson, 2010).

Implications for obstetric care providers

There are many ways in which heightened risk perception in pregnancy can be successfully reduced during management of the pregnancy. A recent study found that many women enter their pregnancies with very little understanding of potential risk and therefore a positive relationship with their obstetric care provider is key (McCoyd, 2013). Some strategies for obstetric care providers are discussed below.

The development of a relationship of trust between obstetric care provider and patient is vital (Solomon, 2009). Face to face recommendations with a warmer, reassuring style tend to be more influential than information presented formally or impersonally (Blasi, Harkness, Ernst, Georgiou, & Kleijnen, 2001; Redelmeier, Rozin, & Kahneman, 1993). Prior research

suggests that the care provider and patient should focus on shared decision-making, (LeBlanc, Kenny, O'Connor, & Legare, 2009) with the optimal model for the patient-provider dyad being one where the provider encourages the patients' ability and motivation to play a role in decision-making and empowers them with regards to their care. A strong patient-provider relationship may also mitigate the threat of litigation, with the patient's perception of an uncaring or poor interpersonal relationship between patient and provider increasing the risk of the provider being sued (Beckman, Markakis, Suchman, & Frankel, 1994; Hickson et al., 1994). While these strategies may be beneficial, the nature of obstetric care and management, particularly in busy public clinics, does not always allow for repeated contact with the same care provider, making the implementation of such a relationship challenging.

It is also vital that care providers clearly understand that a patient may be highly influenced by the risk information that they receive. The provision of information needs to be at a level that the patient is easily able to understand, detailed enough to address the patient's apprehension, and the provider should check for understanding to avoid miscommunication and subsequent problems with accurate risk management (LeBlanc et al., 2009). Care providers should remember that women may be taking a variety of other information into account when determining their perception of risk in pregnancy and unfortunately the factual information is not always the most influential of these (Lee et al., 2012). In particular, women with complicated pregnancies can appraise risk in a manner that is independent of, and sometimes divergent to, their care provider's perception (White et al., 2008).

A label of 'high-risk' during pregnancy, even when warranted, can lead to less positive expectations of birth and a poorer psychological state during pregnancy (Heaman, Beaton,

Gupton, & Sloan, 1992; Stahl & Hundley, 2003). However, a label of high-risk can also be a positive for many women, such as those who have previously experienced complications or trauma such as perinatal loss or preterm birth (O'Brien, Quenby, & Lavender, 2010; Simmons & Goldberg, 2011). Such an identity offers the opportunity for regular assessment and monitoring which can be very reassuring and can relieve anxiety for some women (O'Brien et al., 2010), but again it may lead to increased anxiety and heightened perception of risk for others.

Both pregnant and non-pregnant women have been shown to have difficulty in accurately understanding the presentation of risk information in statistical form, and the provider may wish to check for accurate comprehension, particularly for high-risk pregnancies. One study found that lay women had difficulty appreciating even simple odds such as 1 in 1000, with a tendency to internalise the statistic as meaning "she could be the one" (Getz & Kirkengen, 2003). Another study found that patients were more inclined to accept a treatment that carried associated risk when the emphasis was placed on the chance of survival with the treatment as opposed to the chance of death, even though the risk information was the same (Edwards, Elwyn, & Mulley, 2002).

An example provided by Jordan and Murphy (2009) illustrates the difference in communication of risk information according to absolute and relative risk of uterine rupture during vaginal birth after caesarean section (VBAC). Jordan and Murphy state that the absolute risk of uterine rupture during VBAC for a patient is 0.2%, however the relative risk of uterine rupture during VBAC is 37 times higher compared with a patient with no prior caesarean birth (Jordan & Murphy, 2009). The choice to present this information as a risk of

0.2% or as a 37 times higher risk is likely to influence the patient's perception of risk considerably. It is clear from this example how the communication of risk can be open to misinterpretation or over-estimation by the lay person with little prior understanding of statistics and risk.

Finally, the accurate interpretation of prenatal screening tests is increasingly an issue for contemporary obstetric care providers and their patients. While techniques such as NIPT have thus far proven to have relatively good predictive powers in a high-risk population (Mersy et al., 2013), when such tests are applied to a low-risk population where the disease or disorder prevalence is lower (as is the case with universal screening) their predictive powers deteriorate rapidly (Mersy et al., 2013; Newnham, Patterson, James, Diepeveen, & Reid, 1990). Before the universal implementation of such screening technology, the impact of high false positive rates on providers, patients and the health care system must be carefully evaluated so as not to cause undue concern (Mersy et al., 2013; Newnham et al., 1990).

Implications for psychologists

In addition to these strategies for obstetric care providers, psychologists can be an invaluable resource in the management of risk during pregnancy. What can psychologists do to promote accurate and sensible risk assessment during a time when so many women are especially sensitive to the perception of risk?

Reassurance and management of stress, depression and anxiety during pregnancy are important both for high and low risk women (O'Brien et al., 2010). In consultation with the

patient's care provider, psychologists can assist women to make accurate assessments of risk and help them to take appropriate responsibility for managing these risk factors. It may be useful to encourage increased self-efficacy in pregnancy care and behavioural self-management during pregnancy, potentially through routine antenatal education or where feasible through specialist psychology and psychiatry services within obstetric care settings. High self-efficacy is linked with better parenting, and therefore increases in self-efficacy during pregnancy may also have additional postnatal benefits for the mother and child (Coleman & Karraker, 1998). Validating and affirming a woman's experiential knowledge of pregnancy and birth can also be empowering to counter feelings of being out of control or helpless in the face of potential medical risks (Jordan & Murphy, 2009).

Given studies have shown that a high-risk pregnancy is linked to an external locus of control (i.e. feeling of powerlessness), psychologists could also work towards enhancing a patient's internal locus of control (White et al., 2008). People with an internal locus of control tend to have an increased ability to effect behavioural and/or environmental changes (Denscombe, 1993). In pregnancy, women with an internal locus of control might be more likely to educate themselves, to attempt to provide better prenatal environments for their infants, and to be more aware of changes that occur in their pregnancies (James & Stirrat, 1988). Unfortunately these may also be the women who take on too much responsibility for ensuring a risk-free pregnancy environment and therefore it is important to ensure that an achievable balance exists between perceived risk and control (Robinson, Pennell, et al., 2011).

It is interesting to note a qualitative study that found pregnant women may prefer to use terms other than 'anxiety', (e.g. 'concern') to express their worries during pregnancy (Bayrampour et al., 2012a). Terminology such as anxiety and depression could feel pathologizing or stigmatizing for some women and alternative terms to explain their feelings might be useful to explore.

Psychologists can also help to promote positive appraisal coping skills (White et al., 2008). This can be difficult, as there can be a delicate balance between realistic risk appraisal and challenging the negative or hopeless appraisals of a situation (White et al., 2008). Unsurprisingly, having a poor obstetric history increases a woman's perception of risk in subsequent pregnancies even if the those pregnancies are not deemed as high-risk (Bayrampour et al., 2012a). Women who have a history of preterm birth, perinatal loss or other complications may approach subsequent pregnancies with a feeling of trepidation, fear, hyper-vigilance and inability to relax (O'Brien et al., 2010). Short-term goal setting can be very positive for high-risk patients, as they can often struggle to look long-term for fear of adverse outcomes (O'Brien et al., 2010). Grief management skills can be appropriate for these women, where their grief at the outcome of the prior pregnancy can be addressed. Such patients often also express grief at not being able to 'enjoy' the pregnancy and guilt at not being able to bond with the unborn baby for fear of increasing the pain of a future poor outcome.

In light of the results relating to increased risk for attachment problems following high-risk pregnancy, psychologists can discuss and assess attachment in the context of the woman's perception of risk (White et al., 2008). As a result of the condition that put them at risk

during pregnancy, women with high-risk pregnancies could have a greater likelihood of their infant being admitted to the neonatal intensive care unit after birth and this can raise further maternal concerns about attachment that should be explored (Denis et al., 2012).

In conclusion, psychological management provides an important complement to the medical management of both high and low-risk pregnancies. Many obstetric settings (e.g. clinics, hospitals) already incorporate routine psychological screening into obstetric care, but not all settings provide a platform for psychological management throughout the pregnancy and into the postnatal period. Research suggests that routine screening within the obstetric setting can help to identify future cases of postnatal depression, and hence offer early intervention (Stowe, Hostetter, & Newport, 2005). It is clear from the evidence presented that holistic obstetric care would benefit from the incorporation of psychological expertise, particularly in the management of genuine high-risk pregnancies and for women who may have over-estimated the level of risk they face.

Summary

Ultimately, pregnancy management can be extremely complex, unpredictable and not without risk. The perception of risk in pregnancy could have ongoing negative consequences for pregnant women and their families. Professionals involved in obstetric care, including physicians, midwives, psychologists and other care providers need to be familiar with the issue of risk perception in pregnancy and the ways in which accuracy of risk perception is enhanced in both high and low risk situations. The effective translation of risk information to the patient requires consideration of both medical and psychological parameters, and is embedded within what can be a highly emotional and social context. Given that over-

estimation of risk may have unwanted iatrogenic effects, the challenge is to assist women to adopt a balanced perspective of the actual risks during pregnancy and support them to manage those risks appropriately.

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