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Psychological issues in breast cancer survivors confronted with motherhood: Literature review and a call to action

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Breast cancer is currently the most common cancer among women worldwide; in 15–25% of cases, patients are premenopausal at the time of diagnosis, and 50% of women desire pregnancy after cancer diagnosis. Motherhood after breast cancer involves complex psychological challenges with long-term consequences, though it is safely pursuable with adequate support. The purpose of this mini-review is to analyze the psychological implications surrounding pregnancy and motherhood after breast cancer and promote action in addressing the challenges that might affect women facing these life events.

KEYWORDS

breast cancer, motherhood, pregnancy, psychological symptoms, breastfeeding

Introduction

Breast cancer is currently the most common cancer among women worldwide, with 2.26 million cases recorded in 2020 (WHO, 2022). In 15–25% of cases, patients are premenopausal at the time of diagnosis (De Pedro et al., 2015), in fact approximately 7 to 10% of women diagnosed with breast cancer are younger than 40 years old (Rossi et al., 2019). For women who survive cancer, fertility and reproductive problems are of the utmost importance and almost 50% of young women desire pregnancy after breast cancer diagnosis (Paluch-Shimon et al., 2017).

However, a meta-analysis shows that the pregnancy rate after breast cancer treatment was on average 40% lower than the general population pregnancy rate (Gerstl et al., 2018).

This reflects both the damage to fertility caused by cancer treatments and the concerns of caregivers and patients about a possible negative impact of pregnancy on a woman's prognosis, although there is no evidence for the latter in the literature (Hartman and Eslick, 2016; Condorelli et al., 2021).

The aim of this work is to review the available literature on psychological issues in breast cancer survivors facing motherhood to better manage the unmet needs of this group of patients.

Mood status and health concerns

Accepting cancer diagnosis, undergoing treatments, managing possible side effects, and facing an uncertain future are steps in a stressful process that can result in psychological instability and depression (Dinapoli et al., 2021).

A large percentage of breast cancer patients experience multiple concomitant psychological symptoms during the cancer treatment journey, such as distress, anxiety, cognitive impairment, and sexual dysfunction (Guimond et al., 2019).

A recent study shows that women who develop reproductive problems after anticancer treatment experience more depressive symptoms over time (Nejatisafa et al., 2020).

The dilemma regarding childbirth that young cancer survivors face is not just of a medical nature, it is also influenced by psychological factors.

Pregnancy after breast cancer comes with unique and complex psychological and relational challenges with potential long-term consequences for patients and their families. Women who have had an oncological diagnosis in the past often face uncertainty about the outcome of the disease or the discontinuation of hormone therapy, which causes ambivalent feelings about pregnancy (Alder and Bitzer, 2008; Ives et al., 2016). In fact, the most common experiences include returning to normalcy and recovering from illness, but also being concerned for the health of their children, fearing relapses, and not seeing their children grow up (Gorman et al., 2010; Kuswanto et al., 2018; Faccio et al., 2020). The systematic review of Schmidt et al. (2016) aligns with these results, revealing how pregnant women with a history of breast cancer present gestation concerns to a greater extent than women with other cancer diagnoses. These concerns were primarily associated with fear of recurrence, fear of tumor progression due to pregnancy, and misinterpreting breast changes that they may experience with pregnancy (Schmidt et al., 2016).

In the literature, some studies have demonstrated that negative emotional states elicited by the disease, such as anxiety, anguish, anger, and fatigue, increase during pregnancy (Alder and Bitzer, 2008; Henry et al., 2012; Faccio et al., 2020; Schwab et al., 2021). In contrast, the study by Mascheroni et al. (2019) found that mothers' mood state during the last trimester of pregnancy did not differ between cancer survivors and women in the control sample. However, the same study also found that these women have significantly higher levels of post-traumatic stress disorder (PTSD) symptoms and lower quality of life levels. This evidence suggests that pregnancy after breast cancer represents a moment of vulnerability deserving special attention to prevent negative consequences on parenting (Gorman et al., 2010; Kuswanto et al., 2018).

Cancer survivors are also concerned about potential health problems for their children. One of the most common concerns is that past cancer treatment could lead to having a child with a birth defect or a genetic abnormality (Schover, 2005; Ghaemi et al., 2019).

The advent of genetic testing for hereditary cancer syndromes creates a new set of dilemmas for those who want to become parents. Carrying a deleterious BRCA mutation is associated with an increased lifetime risk of breast and ovarian cancer, so it is often recommended to get pregnant at a young age, followed by

risk-reducing salpingo-oophorectomy. Many BRCA-mutated women are confronted with a true reproductive decision-making dilemma as a consequence of the 50% risk of transmitting the mutated gene to their children. Technologies such as prenatal diagnosis and preimplantation genetic diagnosis, in case of conception through *in vitro* fertilization or intracytoplasmic sperm injection, identify autosomal dominant mutations known to be responsible for hereditary cancer syndromes (Peccatori et al., 2018). The advantage of the preimplantation genetic diagnosis is that only unaffected embryos are transferred, thus avoiding a pregnancy termination if the fetus carries the undesirable genetic mutation. However, only few couples use this test for inherited cancer (Mor et al., 2018; Khouri et al., 2019).

Pregnancy representation

Studies indicate that most cancer survivors have reproductive intentions 3–7 years after diagnosis and that the desire to have children is mainly associated with the desire for parenting before cancer treatment, age, and parity (Armuan et al., 2014). When these intentions are unsatisfied, high levels of emotional suffering are detected, with important consequences for psychological and social well-being (Canada and Schover, 2012; Bártolo et al., 2021). Studies evaluating the effectiveness of fertility-related interventions on patients' mental health have shown that pre-treatment fertility counseling has improved patients' physical and psychosocial quality of life (Meneses and Holland, 2014; Sigismondi et al., 2015; Ter Welle-Butalid et al., 2019).

Several aspects influence the importance that women give to motherhood after breast cancer; one example is having children before the diagnosis. In fact, the priority for these mothers is to protect the children they already have, and a new pregnancy could be considered dangerous for recurrence (Ives, 2009; Hartman and Eslick, 2016). However, this does not mean that women with children before the diagnosis do not wish to achieve a pregnancy after cancer. Indeed, pregnancy after a breast cancer diagnosis seems to represent rebirth, hope, and revenge on life (Ives et al., 2016; Ferrari et al., 2018). Creating or expanding their family means rebuilding a positive dimension with their partner and seizing their chances of redemption from the disease (Crawshaw and Sloper, 2010; Young et al., 2019). A recent study by Hsieh et al. (2018) illustrates a theoretical model according to which cancer and its treatment are considered elements that interrupt a woman's normal life and destroy its balance. Every woman tries to find new meanings in her life during and after cancer; a child could represent the restoration of the original balance.

Another aspect that has only recently been considered is mother–child prenatal interaction (Ferrari et al., 2017; Faccio et al., 2020). Cancer survivors seem to show lower levels of interaction and affiliation with their fetus compared to women without a cancer diagnosis in their life history. Prenatal interaction is fundamental for the future mother–child relationship in the postpartum period and for the development of the child's personality (Graignic-Philippe et al., 2014; Ferrari et al., 2018; Faccio et al., 2020).

Delivery and preparation

Childbirth is considered a stressful life event; between 1 and 6% of women in the first year of birth can suffer from PTSD following a difficult birth experience. In addition to the diagnosed cases, about 30% of women evaluate their experience as traumatic (Soet et al., 2003).

The presence of psychiatric problems before birth and traumatic life events has been associated with symptoms of PTSD after birth in numerous studies (Kennedy and MacDonald, 2002; Cohen et al., 2004; Cigoli et al., 2006; O'Donovan et al., 2014). A cancer diagnosis is considered by the literature as a traumatic event and for this reason a potential risk factor for the development of psychological problems following a complicated birth (Mehnert and Koch, 2007).

The effects of anxiety and stressful life events on women's health during pregnancy and their birth outcomes have been studied. Stress and anxiety may be associated with numerous adverse outcomes such as preeclampsia, prolonged labor, preterm labor, and delivering a low-birth-weight infant (Graignic-Philippe et al., 2014). A negative birth experience could adversely affect postpartum maternal mood, the mother-child bond and breastfeeding (Weisman et al., 2010; Moloney and Gair, 2015; Bell et al., 2019).

Childbirth is a multidimensional life event, and women simultaneously report both negative and positive aspects of childbirth. These include pain, anxiety, and a loss of control, as well as a sense of accomplishment and joy or satisfaction (Waldenström et al., 1996; Van Teijlingen et al., 2003; Hoffmann and Banse, 2021).

Considering the possible consequences of anxiety and distress on childbirth and of negative childbirth experience, a psychological intervention focused on the preparation and assistance to childbirth is recommended. Women should be encouraged to discuss their goals, expectations, and plans for birth. The psychologist can help women cope with difficulties during pregnancy by providing them with information about emotional reactions that are normal or expected and that may signal the need for specific interventions. Finally, women should be encouraged to process their birth experiences shortly after they occur. This opportunity may help them reconcile ambivalent feelings about the childbirth experience (Howarth et al., 2010).

Marital and family support

The decision to have a child is a shared decision for the couple and the support of the partner in determining positive psychological outcomes during the gestational period is extremely important (Webster et al., 2011; Stapleton et al., 2012; Ives et al., 2016). Studies suggest that a supportive partner can be a protective factor against depression during pregnancy and postpartum, with benefits also for the well-being of the baby (Stapleton et al., 2012). Anxiety and depression levels during pregnancy are higher in women with poor family support (Cheng et al., 2016). Moreover, poor social support from friends, family and partners is associated with a woman's lower quality of life (Webster et al., 2011; Lagadec et al., 2018).

The comparison between women without an oncological history and those who have previously had a breast cancer diagnosis highlights that the latter perceive greater support from their

partners and consider them figures who can assume a protective role toward them. The support given by the partner in the evaluation of fertility conservation options at the time of diagnosis and the choice of the method and timing of conception after treatment is also relevant (Faccio et al., 2020).

These results provide the first evidence of the importance of social support for the quality of maternal life during gestation and in the first months after childbirth.

Counseling and interventions to reduce depression and improve quality of life after childbirth should focus on the mother's social support network. Ideally, these interventions should be undertaken during pregnancy following a careful evaluation of the woman's support system (Webster et al., 2011; Lagadec et al., 2018).

According to the literature and clinical experience, psychological counseling should also focus on the exploration of ambivalent and negative emotions that can develop regarding pregnancy and which can be normal in these circumstances. The evaluation and empowerment of coping strategies can help women cope with difficult situations (Florsheim et al., 2012; Kaboli et al., 2017).

Support from a mental health professional can be an important resource because, although relevant, social and family support can also have a negative impact. Family members are often emotionally close to the patient and will have their fears and worries, which might make their support less effective (Ives et al., 2016).

Breastfeeding

Scientific evidence shows that breast milk is the ideal food for both the infant and the mother because of the physical and psychological benefits associated with it (Martin et al., 2016). The use of artificial nutrition and the early cessation of breastfeeding seem to increase the risk of developing certain diseases such as obesity, gastroenteritis, otitis, respiratory infections, and type 1 and type 2 diabetes in children (Bartick et al., 2009; Gianni et al., 2019). From a psychological point of view, breastfeeding is associated with slightly better performance in cognitive development tests than those obtained by artificially breastfed babies (Gartner et al., 2005; Lopez et al., 2021).

Regarding the health of the mother, studies on the benefits of breastfeeding report: a reduction in postpartum bleeding and a faster uterine involution due to the increased concentration of oxytocin; an earlier return to the weight women had before pregnancy (Gartner et al., 2005); and a reduction in the risk of developing breast or uterus cancer and type 2 diabetes (Bartick et al., 2009; Jelly and Choudhary, 2019). A meta-analysis with 27 studies involving 13,907 breast cancer cases suggested that breastfeeding was inversely associated with the risk of breast cancer (Zhou et al., 2015).

Concerning the benefits for psychological health, natural breastfeeding promotes a greater state of general relaxation, positive emotionality, and satisfaction with the care of the baby: women who breastfeed naturally turn out to be calmer, less anxious and stressed than those who feed artificially (Groër, 2005; Krol and Grossmann, 2018).

Breastfeeding also seems to have a fundamental neurobiological role in the formation of a good mother-baby bond: high

concentrations of prolactin and oxytocin are related to a better quality of maternal behavior and post-natal attachment (Levine et al., 2007; Walter et al., 2021).

Currently, there are no reliable epidemiological data regarding breastfeeding after breast cancer. The Society of Obstetricians and Gynecologists of Canada (SOGC) guidelines indicate that women previously treated for breast cancer should be encouraged to breastfeed, as there is no evidence that this practice is risky for the health of the mother or the baby. However, a recent systematic review by Bhurosy et al. (2021) shows that breastfeeding might be challenging among breast cancer survivors. According to the authors, although breastfeeding is possible and the treated breast is able to produce milk, many breast cancer survivors experience other significant challenges such as uncertainty about breastfeeding, lack of support from physicians and family members, lack of access to an International Board-Certified Lactation Consultant (IBCLC), and nipple pain and discomfort. Nonetheless, there are several clinical and social factors associated with safe and possible breastfeeding. Social factors include being motivated to breastfeed and receiving counseling and support from a multidisciplinary team of health professionals, family members or friends. Clinical factors include the use of the contralateral breast, lactation counseling and advice from an IBCLC, frequent feedings and use of galactagogues (Bhurosy et al., 2021).

Studies on healthy women have shown that maternal psychological variables influence the choice of breastfeeding and its duration (O'Brien et al., 2008; De Jager et al., 2014; Dagla et al., 2021). In particular, it has been shown that anxiety, neuroticism as a personality trait and a body image disorder negatively affect the intention to breastfeed: the more they are present, the less the mother is willing to breastfeed (Roth, 2006; Di Mattei et al., 2016).

Body image describes the cognitive, affective, and behavioral aspects of one's body (Cash et al., 2002; Hosseini and Padhy, 2021). Negative body image is common in women who have been diagnosed with breast cancer, particularly as the breast is a symbol of femininity and sexuality in western society (Kolodziejczyk and Pawłowski, 2019). For these women, the breast becomes a potentially lethal sick organ, and for the surviving women who are experiencing pregnancy it may be difficult to re-accept that sick breast as a life-giving and nourishing organ for their baby (Hopwood, 1993; Brown et al., 2015).

The literature has shown that low self-esteem, guilt, and stigma are present in women who are unable to breastfeed (Bresnahan et al., 2020). The difficulties that women with previous breast cancer encounter in breastfeeding can cause a sense of inadequacy compared to their role as mothers because they fear that this will prevent them from building a positive relationship with their baby (Alder and Bitzer, 2008; DiPietro, 2010).

In a qualitative analysis conducted by Gorman et al. (2009), women's fears about breastfeeding after breast cancer emerged significantly. These fears included uncertainties about the possibility of breastfeeding, fear of breastfeeding with one breast and fear of not having enough milk.

Maternal counseling in pregnancy and breastfeeding is essential to prevent negative effects on the mental health of women and children and their bond. The reduced production of milk by the previously affected and irradiated breast, the adequacy of the

quantity and quality of the milk are issues that must be addressed with competence and patience (Azim et al., 2009; Bhurosy et al., 2021).

Denying breast cancer survivors the opportunity to breastfeed remains unjustified in the absence of supporting evidence. Addressing this issue would help increase the perception of a return to normalcy and improve the quality of life of these women (Azim et al., 2010; Bhurosy et al., 2021).

Conclusion

The most recent trends in breast cancer epidemiology show that incidence among women aged 20–49 years is gradually increasing (Ellington et al., 2022); at the same time there is evidence that the age at first pregnancy is increasing as well (Eurostat, 2021).

This calls for action in addressing the issues that might affect women seeking and facing pregnancy after breast cancer diagnosis and treatment, which both represent challenging events for a woman. For this reason, a multidisciplinary approach is recommended since diagnosis, providing women with all the necessary tools to preserve their fertility before starting cancer treatment (Di Mattei et al., 2020, 2021) and providing adequate support throughout the pregnancy and breastfeeding journey afterwards. Receiving adequate information about fertility and the possibility of a safe pregnancy after breast cancer, while feeling supported by a multidisciplinary team including the psychologist, might promote a better adjustment to the disease and increase psychological well-being and quality of life in the long-term. Finally, involving patients' partners is crucial to promote communication and a shared path within the couple.

Author contributions

VEDM, GP, GM, FF, FAP, and MC contributed to conception and design of the manuscript. FF and GP wrote the first draft of the manuscript. PT, MM, ND, and VEDM wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Alder, J., and Bitzer, J. (2008). Psychooncologic care in young women facing cancer and pregnancy. *Recent Results Cancer Res.*, 225–236. doi: 10.1007/978-3-540-71274-9_19
- Armund, G. M., Wettergren, L., Rodriguez-Wallberg, K. A., and Lampic, C. (2014). Desire for children, difficulties achieving a pregnancy, and infertility distress 3 to 7 years after cancer diagnosis. *Support. Care Cancer* 22, 2805–2812. doi: 10.1007/s00520-014-2279-z
- Azim, H. A., Belletini, G., Gelber, S., and Peccatori, F. A. (2009). Breast-feeding after breast cancer: if you wish, madam. *Breast Cancer Res. Treat.* 114, 7–12. doi: 10.1007/s10549-008-9983-7
- Azim, H. A., Belletini, G., Liptrott, S. J., Armeni, M. E., Dell'Acqua, V., Torti, F., et al. (2010). Breastfeeding in breast cancer survivors: pattern, behaviour and effect on breast cancer outcome. *Breast* 19, 527–531. doi: 10.1016/j.breast.2010.05.018
- Bartick, M., Stuebe, A., Shealy, K. R., Walker, M., and Grummer-Strawn, L. M. (2009). Closing the quality gap: promoting evidence-based breastfeeding care in the hospital. *Pediatrics* 124, e793–e802. doi: 10.1542/peds.2009-0430
- Bártolo, A., Santos, I. M., Guimarães, R., Reis, S., and Monteiro, S. (2021). Reproduction-related cognitive processing and distress among young adult women: the role of personal breast cancer history. *Cogn. Process.* 22, 569–578. doi: 10.1007/s10339-021-01026-5
- Bell, A. F., Rubin, L. H., Davis, J. M., Golding, J., Adejumo, O. A., and Carter, C. S. (2019). The birth experience and subsequent maternal caregiving attitudes and behavior: a birth cohort study. *Arch. Womens Ment. Health* 22, 613–620. doi: 10.1007/s00737-018-0921-3
- Bhurosy, T., Niu, Z., and Heckman, C. J. (2021). Breastfeeding is possible: a systematic review on the feasibility and challenges of breastfeeding among breast cancer survivors of reproductive age. *Ann. Surg. Oncol.* 28, 3723–3735. doi: 10.1245/s10434-020-09094-1
- Bresnahan, M., Zhuang, J., Goldbort, J., Bogdan-Lovis, E., Park, S. Y., and Hitt, R. (2020). Made to feel like less of a woman: the experience of stigma for mothers who do not breastfeed. *Breastfeed. Med.* 15, 35–40. doi: 10.1089/bfm.2019.0171
- Brown, A., Rance, J., and Warren, L. (2015). Body image concerns during pregnancy are associated with a shorter breast feeding duration. *Midwifery* 31, 80–89. doi: 10.1016/j.midw.2014.06.003
- Canada, A. L., and Schover, L. R. (2012). The psychosocial impact of interrupted childbearing in long-term female cancer survivors. *Psycho-Oncology* 21, 134–143. doi: 10.1002/pon.1875
- Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., and Whitehead, A. (2002). Beyond body image as a trait: the development and validation of the body image states scale. *Eat. Disord.* 10, 103–113. doi: 10.1080/10640260290081678
- Cheng, E. R., Rifas-Shiman, S. L., Perkins, M. E., Rich-Edwards, J. W., Gillman, M. W., Wright, R., et al. (2016). The influence of antenatal partner support on pregnancy outcomes. *J. Women's Health* 25, 672–679. doi: 10.1089/jwh.2015.5462
- Cigoli, V., Gilli, G., and Saita, E. (2006). Relational factors in psychopathological responses to childbirth. *J. Psychosom. Obstet. Gynecol.* 27, 91–97. doi: 10.1080/01674820600714566
- Cohen, M. M., Ansara, D., Schei, B., Stuckless, N., and Stewart, D. E. (2004). Posttraumatic stress disorder after pregnancy, labor, and delivery. *J. Women's Health* 13, 315–324. doi: 10.1089/154099904323016473
- Condorelli, M., De Vos, M., Lie Fong, S., Autin, C., Delvigne, A., Vanden Meerschaut, F., et al. (2021). Impact of ARTs on oncological outcomes in young breast cancer survivors. *Hum. Reprod.* 36, 381–389. doi: 10.1093/humrep/deaa319
- Crawshaw, M. A., and Sloper, P. (2010). 'Swimming against the tide'—the influence of fertility matters on the transition to adulthood or survivorship following adolescent cancer. *Eur. J. Cancer Care* 19, 610–620. doi: 10.1111/j.1365-2354.2009.01118.x
- Dagla, M., Mrvoljak-Theodoropoulou, I., Karagianni, D., Dagla, C., Sotiropoulou, D., Kontiza, E., et al. (2021). Women's mental health as a factor associated with exclusive breastfeeding and breastfeeding duration: data from a longitudinal study in Greece. *Children* 8:150. doi: 10.3390/children8020150
- De Jager, E., Broadbent, J., Fuller-Tyszkiewicz, M., and Skouteris, H. (2014). The role of psychosocial factors in exclusive breastfeeding to six months postpartum. *Midwifery* 30, 657–666. doi: 10.1016/j.midw.2013.07.008
- De Pedro, M., Otero, B., and Martín, B. (2015). Fertility preservation and breast cancer: a review. *Ecancermedicalscience* 9, 1–20. doi: 10.3332/ecancer.2015.503
- Di Mattei, V. E., Carnelli, L., Bernardi, M., Jongerius, C., Brombin, C., Cugnata, F., et al. (2016). Identification of socio-demographic and psychological factors affecting women's propensity to breastfeed: an Italian cohort. *Front. Psychol.* 7:1872. doi: 10.3389/fpsyg.2016.01872
- Di Mattei, V. E., Perego, G., Rancoita, P. M. V., Taranto, P., Carnelli, L., Mangili, G., et al. (2020). Aspetti psicologici associati alla conservazione della fertilità in oncologia: uno studio esplorativo. *Front. Psicol.* 11:608651. doi: 10.3389/fpsyg.2020.608651
- Di Mattei, V. E., Perego, G., Taranto, P., Rancoita, P. M. V., Maglione, M., Notarianni, L., et al. (2021). Fattori associati ad un'alta motivazione a sottoporsi alla preservazione della fertilità nelle pazienti oncologiche di sesso femminile. *Front. Psicol.* 12:782073. doi: 10.3389/fpsyg.2021.782073
- Dinapoli, L., Colloca, G., Di Capua, B., and Valentini, V. (2021). Aspetti psicologici da considerare nella diagnosi e nel trattamento del cancro al seno. *Rapp. Oncol. Attual.* 23:38. doi: 10.1007/s11912-021-01049-3
- DiPietro, J. A. (2010). Psychological and psychophysiological considerations regarding the maternal–fetal relationship. *Infant Child Dev.* 19, 27–38. doi: 10.1002/icd.651
- Ellington, T. D., Miller, J. W., Henley, S. J., Wilson, R. J., Wu, M., and Richardson, L. C. (2022). Trends in breast cancer incidence, by race, ethnicity, and age among women aged ≥ 20 years—United States, 1999–2018. *Morb. Mortal. Wkly Rep.* 71, 43–47. doi: 10.15585/mmwr.mm7102a2
- Eurostat. (2021). *Women in the EU are having their First Child Later*. Available at: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210224-1> (Accessed December 12, 2022).
- Faccio, F., Mascheroni, E., Ionio, C., Pravettoni, G., Alessandro Peccatori, F., Pisoni, C., et al. (2020). Motherhood during or after breast cancer diagnosis: a qualitative study. *Eur. J. Cancer Care* 29:e13214. doi: 10.1111/ecc.13214
- Ferrari, F., Faccio, F., Peccatori, F., Ionio, C., Mascheroni, E., Liuzzo, A., et al. (2017). Becoming mothers after an oncological diagnosis: an observational longitudinal study about psychological aspects and influence on maternal attachment. *Psycho-Oncology* 26:165.
- Ferrari, F., Faccio, F., Peccatori, F., and Pravettoni, G. (2018). Psychological issues and construction of the mother-child relationship in women with cancer during pregnancy: a perspective on current and future directions. *BMC Psychol.* 6, 1–4. doi: 10.1186/s40359-018-0224-5
- Florsheim, P., Burrow-Sánchez, J. J., Minami, T., McArthur, L., Heavin, S., and Hudak, C. (2012). Young parenthood program: supporting positive paternal engagement through coparenting counseling. *Am. J. Public Health* 102, 1886–1892. doi: 10.2105/AJPH.2012.300902
- Gartner, L. M., Morton, J., Lawrence, R. A., Naylor, A. J., O'Hare, D., Schanler, R. J., et al. (2005). Breastfeeding and the use of human milk. *Pediatrics* 115, 496–506. doi: 10.1542/peds.2004-2491
- Gerstl, B., Sullivan, E., Ives, A., Saunders, C., Wand, H., and Anazodo, A. (2018). Risultati della gravidanza dopo una diagnosi di cancro al seno: una revisione sistematica e una meta-analisi. *Carcinoma Mammario Clin.* 18, e79–e88. doi: 10.1016/j.clbc.2017.06.016
- Ghaemi, S. Z., Keshavarz, Z., Tahmasebi, S., Akrami, M., and Heydari, S. T. (2019). Conflicts women with breast cancer face with: a qualitative study. *J. Fam. Med. Prim. Care* 8, 27–36. doi: 10.4103/jfmpc.jfmpc_272_18
- Gianni, M. L., Bettinelli, M. E., Manfra, P., Sorrentino, G., Bezze, E., Plevani, L., et al. (2019). Breastfeeding difficulties and risk for early breastfeeding cessation. *Nutrients* 11:2266. doi: 10.3390/nu1102266
- Gorman, J. R., Malcarne, V. L., Roesch, S. C., Madlensky, L., and Pierce, J. P. (2010). Depressive symptoms among young breast cancer survivors: the importance of reproductive concerns. *Breast Cancer Res. Treat.* 123, 477–485. doi: 10.1007/s10549-010-0768-4
- Gorman, J. R., Usita, P. M., Madlensky, L., and Pierce, J. P. (2009). A qualitative investigation of breast cancer survivors' experiences with breastfeeding. *J. Cancer Surviv.* 3, 181–191. doi: 10.1007/s11764-009-0089-y
- Graignic-Philippe, R., Dayan, J., Chokron, S., Jacquet, A.-Y., and Tordjman, S. (2014). Effects of prenatal stress on fetal and child development: a critical literature review. *Neurosci. Biobehav. Rev.* 43, 137–162. doi: 10.1016/j.neubiorev.2014.03.022
- Groër, M. W. (2005). Differences between exclusive breastfeeders, formula-feeders, and controls: a study of stress, mood, and endocrine variables. *Biol. Res. Nurs.* 7, 106–117. doi: 10.1177/1099800405280936
- Guimond, A. J., Ivers, H., and Savard, J. (2019). Clusters of psychological symptoms in breast cancer: is there a common psychological mechanism? *Cancer Nurs.* 43, 343–353. doi: 10.1097/NCC.0000000000000705
- Hartman, E. K., and Eslick, G. D. (2016). The prognosis of women diagnosed with breast cancer before, during and after pregnancy: a meta-analysis. *Breast Cancer Res. Treat.* 160, 347–360. doi: 10.1007/s10549-016-3989-3
- Henry, M., Huang, L. N., Sproule, B. J., and Cardonick, E. H. (2012). The psychological impact of a cancer diagnosed during pregnancy: determinants of long-term distress. *Psycho-Oncology* 21, 444–450. doi: 10.1002/pon.1926
- Hoffmann, L., and Banse, R. (2021). Psychological aspects of childbirth: evidence for a birth-related mindset. *Eur. J. Soc. Psychol.* 51, 124–151. doi: 10.1002/ejsp.2719
- Hopwood, P. (1993). The assessment of body image in cancer patients. *Eur. J. Cancer* 29, 276–281. doi: 10.1016/0959-8049(93)90193-J
- Hosseini, S. A., and Padhy, R. K. (2021). *Body Image Distortion*. St. Petersburg, Florida: Stat Pearls Publishing.
- Howarth, A., Swain, N., and Trehan, G. (2010). A review of psychosocial predictors of outcome in labour and childbirth. *N. Z. Coll. Midwives J.* 42, 17–20.
- Hsieh, P., Huang, S., Chien, L., Lee, C., Hsiung, Y., and Tai, C. (2018). Risk–benefit perception of pregnancy among breast cancer survivors. *Eur. J. Cancer Care* 27:e12696. doi: 10.1111/ecc.12696

- Ives, A. (2009). *Breast Cancer and Pregnancy: How does a Concurrent or Subsequent Pregnancy affect Breast Cancer Diagnosis, Management and Outcomes?* Doctoral Thesis.
- Ives, A., Musiello, T., and Saunders, C. (2016). "Psychological and psychosocial care of a pregnant woman with cancer" in *Managing Cancer during Pregnancy*. ed. H. A. Azim (Berlin: Springer), 79–87.
- Jelly, P., and Choudhary, S. (2019). Breastfeeding and breast cancer: a risk reduction strategy. *Int. J. Med. Paediatr. Oncol.* 5, 47–50. doi: 10.18231/j.ijmpo.2019.010
- Kaboli, K. S., Mahmoodi, Z., Tourzani, Z., Tehranizadeh, M., Kabir, K., and Dolatian, M. (2017). The effect of group counseling based on cognitive-behavioral approach on pregnancy-specific stress and anxiety. *Shiraz E Med. J.* 18:278. doi: 10.5812/semj.45231
- Kennedy, H. P., and MacDonald, E. L. (2002). Altered consciousness during childbirth: potential clues to post traumatic stress disorder? *J. Midwifery Womens Health* 47, 380–382. doi: 10.1016/S1526-9523(02)00271-4
- Khoury, O. R., Gerber, D., Smith, J. A., and Boyd, L. R. (2019). Preimplantation genetic diagnosis: What do BRCA mutation carriers think? *J. Clin. Oncol.* 37:1526. doi: 10.1200/JCO.2019.37
- Kolodziejczyk, A., and Pawlowski, T. (2019). Negative body image in breast cancer patients. *Adv. Clin. Exp. Med.* 28, 1137–1142. doi: 10.17219/acem/103626
- Krol, K. M., and Grossmann, T. (2018). Psychological effects of breastfeeding on children and mothers. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitschutz* 61, 977–985. doi: 10.1007/s00103-018-2769-0
- Kuswanto, C. N., Stafford, L., Sharp, J., and Schofield, P. (2018). Psychological distress, role, and identity changes in mothers following a diagnosis of cancer: a systematic review. *Psycho-Oncology* 27, 2700–2708. doi: 10.1002/pon.4904
- Lagadee, N., Steinecker, M., Kapassi, A., Magnier, A. M., Chastang, J., Robert, S., et al. (2018). Factors influencing the quality of life of pregnant women: a systematic review. *BMC Pregnancy Childbirth* 18:455. doi: 10.1186/s12884-018-2087-4
- Levine, A., Zagoory-Sharon, O., Feldman, R., and Weller, A. (2007). Oxytocin during pregnancy and early postpartum: individual patterns and maternal–fetal attachment. *Peptides* 28, 1162–1169. doi: 10.1016/j.peptides.2007.04.016
- Lopez, D. A., Foxe, J. J., Mao, Y., Thompson, W. K., Martin, H. J., and Freedman, E. G. (2021). Breastfeeding duration is associated with domain-specific improvements in cognitive performance in 9–10-year-old children. *Front. Public Health* 9:434. doi: 10.3389/fpubh.2021.657422
- Martin, C. R., Ling, P. R., and Blackburn, G. L. (2016). Review of infant feeding: key features of breast milk and infant formula. *Nutrients* 8:279. doi: 10.3390/nu8050279
- Mascheroni, E., Faccio, F., Bonassi, L., Ionio, C., Peccatori, F. A., Pisoni, C., et al. (2019). Exploring differences in psychological aspects during pregnancy between cancer survivors and women without a history of cancer. *Support. Care Cancer* 28, 2255–2263. doi: 10.1007/s00520-019-05048-w
- Mehnert, A., and Koch, U. (2007). Prevalence of acute and post-traumatic stress disorder and comorbid mental disorders in breast cancer patients during primary cancer care: A prospective study. *Psychooncology* 16, 181–188. doi: 10.1002/pon.1057
- Meneses, K., and Holland, A. C. (2014). Current evidence supporting fertility and pregnancy among young survivors of breast cancer. *J. Obstet. Gynecol. Neonatal Nurs* 43, 374–381. doi: 10.1111/1552-6909.12301
- Moloney, S., and Gair, S. (2015). Empathy and spiritual care in midwifery practice: contributing to women's enhanced birth experiences. *Women Birth* 28, 323–328. doi: 10.1016/j.wombi.2015.04.009
- Mor, P., Brennenstuhl, S., and Metcalfe, K. A. (2018). Uptake of preimplantation genetic diagnosis in female BRCA1 and BRCA2 mutation carriers. *J. Genet. Couns.* 27, 1386–1394. doi: 10.1007/s10897-018-0264-2
- Nejatisafa, A. A., Faccio, F., and Nalini, R. (2020). Psychological aspects of pregnancy and lactation in patients with breast cancer. *Adv. Exp. Med. Biol.* 1252, 199–207. doi: 10.1007/978-3-030-41596-9_28
- O'Brien, M., Buikstra, E., and Hegney, D. (2008). The influence of psychological factors on breastfeeding duration. *J. Adv. Nurs.* 63, 397–408. doi: 10.1111/j.1365-2648.2008.04722.x
- O'Donovan, A., Alcorn, K. L., Patrick, J. C., Creedy, D. K., Dawe, S., and Devilly, G. J. (2014). Predicting posttraumatic stress disorder after childbirth. *Midwifery* 30, 935–941. doi: 10.1016/j.midw.2014.03.011
- Paluch-Shimon, S., Pagani, O., Partridge, A. H., Abulkhair, O., Cardoso, M.-J., Dent, R. A., et al. (2017). ESO-ESMO 3rd international consensus guidelines for breast cancer in young women (BCY3). *Breast* 35, 203–217. doi: 10.1016/j.breast.2017.07.017
- Peccatori, F. A., Mangili, G., Bergamini, A., Filippi, F., Martinelli, F., Ferrari, F., et al. (2018). Fertility preservation in women harboring deleterious BRCA mutations: ready for prime time? *Hum. Reprod.* 33, 181–187. doi: 10.1093/humrep/dex356
- Rossi, L., Mazzara, C., and Pagani, O. (2019). Diagnosis and treatment of breast cancer in Young women. *Curr. Treat. Options in Oncol.* 20:86. doi: 10.1007/s11864-019-0685-7
- Roth, M. (2006). Could body image be a barrier to breastfeeding? A review of the literature. *LEAVEN* 42, 4–7.
- Schmidt, R., Richter, D., Sender, A., and Geue, K. (2016). Motivations for having children after cancer—a systematic review of the literature. *Eur. J. Cancer Care* 25, 6–17. doi: 10.1111/ecc.12276
- Schover, L. R. (2005). Motivation for parenthood after cancer: a review. *J. Nat. Cancer Inst. Monogr.* 2005, 2–5. doi: 10.1093/jncimonographs/lgi010
- Schwab, R., Anic, K., and Hasenburg, A. (2021). Cancer and pregnancy: a comprehensive review. *Cancers* 13:3048. doi: 10.3390/cancers13123048
- Sigismondi, C., Papaleo, E., Viganò, P., Vailati, S., Candiani, M., Ottolina, J., et al. (2015). Fertility preservation in female cancer patients: a single center experience. *Chin. J. Cancer* 34, 56–60. doi: 10.5732/cjc.014.10252
- Soet, J. E., Brack, G. A., and DiIorio, C. (2003). Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth* 30, 36–46. doi: 10.1046/j.1523-536X.2003.00215.x
- Stapleton, L. R. T., Schetter, C. D., Westling, E., Rini, C., Glynn, L. M., Hobel, C. J., et al. (2012). Perceived partner support in pregnancy predicts lower maternal and infant distress. *J. Fam. Psychol.* 26, 453–463. doi: 10.1037/a0028332
- Ter Welle-Butalid, M., Vriens, I., Derhaag, J., Leter, E., de Die-Smulders, C., Smid, M. M., et al. (2019). Counseling young women with early breast cancer on fertility preservation. *J. Assist. Reprod. Genet.* 36, 2593–2604. doi: 10.1007/s10815-019-01615-6
- Van Teijlingen, E. R., Hundley, V., Rennie, A., Graham, W., and Fitzmaurice, A. (2003). Maternity satisfaction studies and their limitations: "what is, must still be best". *Birth* 30, 75–82. doi: 10.1046/j.1523-536X.2003.00224.x
- Waldenström, U., Borg, I., Olsson, B., Sköld, M., and Wall, S. (1996). The childbirth experience: a study of 295 new mothers. *Birth* 23, 144–153. doi: 10.1111/j.1523-536X.1996.tb00475.x
- Walter, M. H., Abele, H., and Plappert, C. F. (2021). The role of oxytocin and the effect of stress during childbirth: neurobiological basics and implications for mother and child. *Front. Endocrinol.* 12:742236. doi: 10.3389/fendo.2021.742236
- Webster, J., Nicholas, C., Velacott, C., Cridland, N., and Fawcett, L. (2011). Quality of life and depression following childbirth: impact of social support. *Midwifery* 27, 745–749. doi: 10.1016/j.midw.2010.05.014
- Weisman, O., Granat, A., Gilboa-Schechtman, E., Singer, M., Gordon, I., Azulay, H., et al. (2010). The experience of labor, maternal perception of the infant, and the mother's postpartum mood in a low-risk community cohort. *Arch. Womens Ment. Health* 13, 505–513. doi: 10.1007/s00737-010-0169-z
- WHO. (2022). *Cancer*. Geneva: World Health Organization. Available at: <https://www.who.int/news-room/fact-sheets/detail/cancer>
- Young, K., Shliakhtsitsava, K., Natarajan, L., Myers, E., Dietz, A. C., Gorman, J. R., et al. (2019). Fertility counseling before cancer treatment and subsequent reproductive concerns among female adolescent and young adult cancer survivors. *Cancer* 125, 980–989. doi: 10.1002/cncr.31862
- Zhou, Y., Chen, J., Li, Q., Huang, W., Lan, H., and Jiang, H. (2015). Association between breastfeeding and breast cancer risk: evidence from a meta-analysis. *Breastfeed. Med.* 10, 175–182. doi: 10.1089/bfm.2014.0141