

Couples' Experiences of Pregnancy Resulting from Assisted Reproductive Technologies: A Qualitative Meta-synthesis

Abstract

Background: Across the world, a growing number of couples are directly or indirectly affected by infertility. Advances in assisted reproductive technologies are now enabling many of them to plan to have a child. As pregnancies resulting from assisted reproductive technologies are being experienced by a growing number of couples, it is important to better understand their experiences and the difficulties they encounter during the prenatal period.

Objective: This literature review aims to synthesize the qualitative results of primary studies in order to better understand couples' experiences of pregnancy resulting from assisted reproductive technologies, after having experienced infertility.

Design: A meta-synthesis was conducted in accordance with the guidelines put forth by Sandelowski and Barroso in order to carry out an integrative analysis of the knowledge resulting from qualitative studies on this phenomenon.

Data sources: The literature search was carried out between October and November 2020. Seven electronic databases were searched (CINAHL, Medline, PsycNet, SCOPUS, ScienceDirect, CAIRN, ERUDIT) and 14 eligible articles were selected.

Review methods: The data from the "results" and "findings" sections of each of the articles were synthesized through thematic analysis to examine and summarize the topics found in the articles selected and develop the main themes.

Results: The thematic analysis is structured around four themes to describe and interpret different aspects of the experience of pregnancy resulting from ART, namely: 1) travelling a long and complex journey; 2) moving on with paradoxical emotions; 3) struggling with an emerging identity; and 4) reorganizing relationships. These results shed light on the complex issues faced by couples previously affected by infertility during a pregnancy resulting from assisted reproductive technologies.

Conclusion: The journey of a pregnancy resulting from assisted reproductive technologies must be recognized in order to offer support in line with the challenges faced by couples. This research will allow for a deeper understanding of women's experience, as well as that of their partner's, in a more specific way, and to better understand the impact on family and loved ones.

Key words: Becoming Parents; Infertility; Pregnancy; Reproductive Techniques, Assisted.

What is Already Known

- The use of ART is growing in most industrialized countries.
- Infertile couples who use ART may experience difficulties in the social, marital and financial spheres.
- Women who become pregnant through ART show a higher level of anxiety related to the preservation of pregnancy and fetal safety.

What This Article Adds

- This meta-synthesis provides further evidence of the complex issues facing couples affected by infertility during pregnancy resulting from successful ART.
- The transition from conception, pregnancy and parenthood is much more difficult for women who have become pregnant through ART.
- Relationships with family can be a source of support as well as a source of concern for couples, especially when they fear the stigma surrounding infertility.

Introduction

According to estimates from the World Health Organization, infertility affects at least 48 million couples and 186 million people around the world (WHO, 2020). Infertility is characterized by a couple's inability to conceive after 12 months of regular, unprotected sex (Association des obstétriciens et gynécologues du Québec, 2020, WHO, 2020). The experience of infertility is fraught with many challenges, and sometimes couples have to cope with several losses, the effects of which can lead to significant emotional and psychological distress (Berger, Paul and Henshaw, 2013, James and Singh, 2018, Rooney and Domar, 2018).

Nowadays, assisted reproductive technologies (ART) are proving to be an increasingly accessible way to help couples affected by infertility to conceive (Ranjbar, Warmelink and Gharacheh, 2020). However, undertaking such a process comes with its share of demands and challenges. A recent review of scientific literature has also made it possible to determine that couples who resort to ART are likely to encounter difficulties, notably at the social, marital, and financial level (Hasanbeigi et al., 2017). On the

social front, women and men report experiencing isolation, communication problems, and being confronted with social concerns and pressures related to infertility. At the marital level, the difficulties mentioned include, among other things, concerns related to sexuality and marital conflicts. On the financial level, the main difficulties encountered are related to the cost of assisted reproductive technology treatments and a significant number of couples report facing a financial crisis (Hasanbeigi et al., 2017).

Despite this, the use of ART is growing in most industrialized countries, and there is every indication that this upward trend will continue over the next few years (Ministère de la Santé et des Services Sociaux, 2008). Taking into account this increase, as well as the challenges faced by couples, it is important to consider how potentially traumatic events related to infertility and assisted reproductive treatments (Berger, Paul and Henshaw, 2013, Hasanbeigi et al., 2017) may influence couples' experience of pregnancy and transition to parenthood. Indeed, studies show that women who have benefitted from ART to become pregnant show a higher level of anxiety related to the preservation of the pregnancy and the safety of the fetus (Hammarberg, Fisher and Wynter, 2008). Additionally, with attention focused on pregnancy and "becoming parents," couples may neglect to prepare for the changes and disruptions related to the arrival of a newborn (Gameiro et al., 2010). At the same time, from a medical and social point of view, ART is increasingly seen as normative or even naturalized; that is to say, perceived simply as an alternate means of conceiving (Allan et al., 2019, Franklin, 2013). Thus, although the journey to becoming a parent has its share of challenges, pregnancy achieved by ART is considered low risk by health professionals, and in several countries, the future parents have access to the same follow-up as in the case of natural pregnancies (Ranjbar, Warmelink and Gharacheh, 2020, Warmelink et al., 2016). This idea thus tends to obscure the unique experience of future parents who resort to it while maintaining a perception of accessibility and success, rather than considering ART as the final means of conceiving.

To provide optimal care for those experiencing pregnancies resulting from ART, identifying the difficulties they are experiencing is essential. Little is currently known about the challenges facing couples

during this period, making it difficult for healthcare professionals to offer interventions that meet their specific needs.

The increasing use of ART around the world (Ranjbar, Warmelink and Gharacheh, 2020) as well as the difficulties experienced during pregnancy (Dornelles et al., 2014, Hammarberg, Fisher and Wynter, 2008, Huang et al., 2019) give rise to the importance of better understanding the experience of expecting parents who conceive using these technologies. However, we note that few recent systematic reviews offer a summary of the subject, and that, most of the time, the studies focus only on the experience of the mother. Thus, the aim of this article is to summarize the qualitative results of primary studies, in order to better understand the experience of pregnancy resulting from assisted reproductive technologies in women and men affected by infertility. This literature review can help support the improvement of the care and services offered to them by various healthcare professionals.

Methods

Metasynthesis is a structured method of reviewing qualitative literature, allowing an integrative analysis of knowledge from previous studies on a phenomenon (Walsh and Downe, 2005). It is a rigorous process that aims to expose, describe, and explain the nuances of the results of primary studies carried out on a subject, so as to bring new perspectives and produce stronger results (Walsh and Devane, 2012, Walsh and Downe, 2005). The method used for this metasynthesis follows the steps described by Sandelowski and Barroso (2007): 1) formulation of the research question and problem; 2) identification and systematic selection of articles; 3) evaluation of the quality of articles; 4) data extraction; and 5) production of the data synthesis. Thematic analysis is the approach that was chosen to carry out the analysis and synthesis of the collected data (Braun and Clarke, 2006). The recommendations from *Enhancing Transparency in Reporting the Synthesis of Qualitative Research* (ENTREQ) were used to summarize the qualitative synthesis (Gedda, 2017, Tong et al., 2012).

Research Strategy

The literature search was carried out independently by two reviewers (CR; IL) between the months of October and November 2020, using seven electronic databases, five of which are English-language (CINAHL, Medline, PsycNet, SCOPUS, ScienceDirect) and two of which are French-language (CAIRN, ERUDIT). The research strategy was developed from the research question using the *Population, Context, Outcome* (PCO) method (Butler, Hall and Copnell, 2016). Variants of the keywords were used to tailor the search to the specific characteristics of each database. The search was limited to studies published since 2005 in order to paint a picture of the current context in which pregnancy by assisted reproductive technologies has been experienced. No limit was imposed on the country of origin. The bibliographies of selected articles were searched to identify additional relevant studies that were missed by the electronic search.

A set of keywords and synonyms associated with couples, infertility, pregnancy, as well as qualitative research (including terms from the thesauri of the databases which have them, i.e., MeSH, CINAHL descriptors, APA Thesaurus) were used to locate documents. Boolean operators “or”, “and”, and “W/20” were used to distinguish synonyms, to link search terms, and to narrow the scope of the literature on infertility and pregnancy. The following combination was used in the CINAHL database and was adapted according to the particularities of each of the databases: (Couple* OR Family* OR Parent* OR Father* OR m*n OR Mother* OR Wom*n) AND (Infertil* OR “Reproducti* technique*” OR “Fertilization in vitro” OR “Insemination, artificial”) AND (Pregnan*) AND (Behavior* OR “Parental behavior*” OR attitude* OR “family attitude*” OR “Parental attitude*” OR “Maternal attitude*” OR “Paternal attitude*”).

Eligibility Criteria and Selection of Articles

The studies considered for this metasynthesis had to take into account the following criteria: 1) the sample consisted of parents (mothers and/or fathers) previously monitored for fertility and who experienced a pregnancy resulting from assisted reproductive technologies; 2) the pregnancy period was targeted; 3) data were collected and analysed through a qualitative method; 4) articles were published in English or French

(languages mastered by the reviewers); 5) and had been peer reviewed. Gray literature was not explored during the screening process.

The selection of articles was carried out using an inter-rater agreement aimed at countering possible judgment biases that could occur during selection by a single reviewer (Butler, Hall and Copnell, 2016). The PRISMA diagram (Moher et al., 2009) was used to report on the selection process. The electronic search identified 1,928 articles, to which three articles were added manually after consulting the bibliographies. All of these articles were imported into the EndNote X9 bibliographic management software. After the removal of duplicates, 1,745 articles underwent a primary screening by two independent reviewers (CR; IL). This examination was carried out based on reading the title and abstract, and according to the inclusion and exclusion criteria previously identified. Following this step, 1,711 articles were rejected as they did not meet the eligibility criteria. A total of 34 articles were read in their entirety by two independent examiners (CR; IL). At this stage, 20 articles were excluded since they did not relate to the experience of pregnancy (n = 8), did not report an empirical study (n = 7), focused on other infertility-related issues (n = 3), used a quantitative or mixed methodology with little qualitative data (n = 2), or were focused on another population (n = 1). At the end of the selection process, 14 original articles were included in this metasynthesis as shown in Figure 1.

Quality Assessment

In order to assess the quality of the studies included in this article, the *Critical Appraisal Skills Program* (CASP) (Critical Appraisal Skills Programme, 2018) was used. This instrument, composed of 10 questions, made it possible to examine the research objective statement, the relevance of the qualitative methodology, the sampling method, the collection and analysis of data, the relationship between the researcher and the participants, ethical considerations, clarity of the results statements, and impact of results. Two examiners (CR; IL) independently assessed each article by answering the 10 questions (“yes”, “no”, or “I don’t know”). No articles were excluded as a result of the quality assessment; however, the assessment

provided information on the robustness and thoroughness of the included studies. Table 1 presents a summary of the evaluation of each of the articles.

Data Extraction and Synthesis of Results

The data were first extracted and organized in tabular form by the first author (CR) to examine their relevance to and suitability for the research topic of this metasynthesis. This extraction, which included the country in which the study takes place, the objective of the research, the methodology used, the description of the participants, the sampling method, and the methods of data collection and analysis was then independently verified by a second author (IL). Table 2 presents the characteristics of the 14 studies.

In order to guide the synthesis and analysis of data to answer the research question, the Braun and Clarke (2006) thematic analysis was used. This six-step approach consists, first of all, of: 1) familiarizing oneself with the data, 2) generating the initial codes, 3) looking for themes, 4) revising the obtained themes, 5) defining and naming the themes, and 6) producing the final report. Thus, several readings of each of the 14 selected studies were completed by the first author (CR) in order to become familiar with the data. This in-depth reading enabled the initial codes to be generated inductively by the first author and then validated by a co-author (IL). The software for qualitative data analysis Nvivo 20 was used to bring together the data presented as "results" or "findings" from the included studies and facilitate coding. The different codes were sorted and then grouped into potential themes to capture the important elements within the data related to the research question. A reflective approach was adopted throughout the analysis to increase the integrity and reliability of the results (Finlay, 2002). Consistent with this objective, the authors engaged in the analysis of subjective and intersubjective elements that could influence their interpretation of the data. Thus, the authors (CR, IL, FDM) became aware of the influence of their personal and professional experiences on the themes surrounding pregnancy and the issues of conception and constantly questioned their respective interpretation of the data. Several revisions of the coded excerpts under each of the potential themes made it possible to refine the themes so that each of the themes formed a coherent whole. All data were subsequently reviewed by the first author (CR) and then validated by a co-author (IL) in order to consider

the accuracy of each of the themes in relation to all of the data. In order to increase the validity of the themes, a third author (FDM) performed several readings and re-readings of the data to ensure the integrity and consistency of the coding. Disagreements were discussed among members of the research team until a consensus was reached (Bradley, Curry and Devers, 2007). The final themes and subthemes could thus be named and described. Figure 2 illustrates the relationships between the themes and subthemes emerging from this analysis.

Results

Study Characteristics

The studies included in this metasynthesis involved 199 women and 71 partners from 15 different countries: England (n = 4), Canada (n = 2), Taiwan (n = 2), Australia (n = 1), Borneo (n = 1), Brazil (n = 1), Colombia (n = 1), Spain (n = 1), the United States (n = 1), France (n = 1), Iran (n = 1), Ireland (n = 1), Israel (n = 1), Italy (n = 1), and the Netherlands (n = 1). The majority of the studies used interviews as a method of data collection (n = 8), while others opted for the in-depth interview (n = 5) or online publications (n = 1). Different qualitative approaches were used in the context of these studies, notably phenomenology (n = 5), content analysis (n = 4), grounded theory (n = 3), thematic analysis (n = 1), the interpretive-narrative approach (n = 1), and case studies (n = 1). The quality assessment of the studies indicated that a large majority reported a clear statement of research objectives, used a methodological approach appropriate to those objectives, employed rigorous qualitative data analysis processes, and offered a clear statement of conclusions while highlighting the significant impact of their findings. Two studies did not provide sufficient detail about ethical considerations. In addition, the relationship between the researcher and the participants was not specified in the majority of cases. Information detailing the presentation of each of the studies is set out in Table 2.

Certainty of the review findings

The CerQual approach (Lewin et al., 2015) was used to assess the certainty of the review findings, grading each finding as high, moderate, low, or very low certainty. None of the study results were assessed as high certainty, due to weaknesses in the quality of the studies. Just over half of the findings were rated with moderate certainty because they showed minor concerns with the methodology, relevance, consistency, and adequacy of the data. We also assessed that just under half of the findings were of low certainty due to concerns primarily about the consistency of the results and the adequacy of the data. The evaluations of each finding are presented in Table 3.

Results of the Thematic Analysis

The thematic analysis carried out as part of this metasynthesis is structured around four main themes: 1) travelling a long and complex journey; 2) moving on with paradoxical emotions; 3) struggling with an emerging identity; and 4) reorganizing relationships; as well as five subthemes as presented in Figure 2.

Travelling a Long and Complex Journey

The experience of infertility preceding pregnancy is an important part of the transition to parenthood for these couples. In fact, some describe this period as a long preparation for becoming a parent (Allan et al., 2019, Turgeon, Noël and Bouche-Florin, 2018) strewn with difficulties and uncertainties, thereby affecting their confidence and self-esteem (Crespo and Bestard, 2017). At the same time, the financial burden generated by incomplete coverage of the costs associated with different assisted reproductive treatments added additional stress for the parents, even influencing, in some cases, the choice of treatments (Allan et al., 2019, Ranjbar et al., 2015). The parents also point out how demanding and painful the fertility treatment was emotionally, physically, and mentally (Allan et al., 2019, French, Sharp and Turner, 2015).

Thus, the history of infertility and assisted reproductive treatments was not erased with the onset of pregnancy and tainted the transition to parenthood for both women and men throughout the whole journey (Allan et al., 2019, Crespo and Bestard, 2017, French, Sharp and Turner, 2015, Turgeon, Noël and Bouche-

Florin, 2018). This unique journey, which is particularly long and complex, marked their experience of pregnancy, their identity development, and their relationships with others.

Moving on With Paradoxical Emotions

The period of pregnancy following infertility is characterized by paradoxical emotions where feelings of fragility and hope overlap, and there is the integration of a crisis period within a new beginning as well as a reduction of the experience throughout the pregnancy.

Oscillating Between a Sense of Fragility and Hope

The experience of infertility left parents with a lack of confidence in their ability to conceive and give birth, especially among women who feared their bodies were failing them (Dornelles et al., 2014, French, Sharp and Turner, 2015, Lin, Tsai and Lai, 2013). This feeling ran so deep that women doubted they were actually pregnant even after a positive pregnancy test result (French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Smorti and Smorti, 2012). In addition, the parents, especially the mothers, pointed out that they were preoccupied by a feeling of fragility and vulnerability throughout this pregnancy which they perceived as being at risk (Allan et al., 2019, Crespo and Bestard, 2017, Dornelles et al., 2014, Huang et al., 2019, Lin, Tsai and Lai, 2013, Toscano and Montgomery, 2009). The prenatal period was experienced with anxiety and was described as emotionally difficult by parents (Allan et al., 2019, Crespo and Bestard, 2017, French, Sharp and Turner, 2015, Huang et al., 2019, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018) especially when there were changes in the condition of the mother (vomiting, bleeding) or the fetus (decreased movement) (Dornelles et al., 2014, Huang et al., 2019, Lin, Tsai and Lai, 2013).

For these couples, the pregnancy was characterized by ambivalence of emotions where many fears and uncertainties jostle the hope and joy of becoming parents (Allan et al., 2019, Crespo and Bestard, 2017, French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015). Indeed, after such a long wait to become pregnant, the parents expressed feelings of joy and

excitement (French, Sharp and Turner, 2015, Huang et al., 2019) which were quickly reined in by previous experiences related to infertility, thus fuelling a significant fear of losing the baby during pregnancy, of giving birth prematurely, or even that the baby would not survive at birth (Dornelles et al., 2014, French, Sharp and Turner, 2015, Huang et al., 2019, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018, Warmelink et al., 2016). For some women, these fears were an obstacle to attachment to the fetus (Lin, Tsai and Lai, 2013, Ranjbar et al., 2015) while for others, this feeling of attachment was present even before the implantation of the embryo (Ranjbar et al., 2015).

The significant emotional, physical, and financial investment necessary for their journey fuelled great pressure in mothers and their partners to succeed in this pregnancy that they were not able to achieve on their own (Allan et al., 2019, Crespo and Bestard, 2017, Huang et al., 2019, Lin, Tsai and Lai, 2013, Walker, Mills and Gilchrist, 2017).

Mothers and fathers who conceived thanks to ART say that they felt different from parents who conceived naturally and would like this difference to be recognized (French, Sharp and Turner, 2015, Huang et al., 2019, Toscano and Montgomery, 2009, Warmelink et al., 2016).

Integrating a Life Crisis into a New Beginning

Women were relieved to finally be pregnant (Ranjbar et al., 2015) and the pregnancy was experienced as the end of a nightmare (Smorti and Smorti, 2012). The parents expressed great gratitude both to God (Ranjbar et al., 2015) and to the medical team (Lin, Tsai and Lai, 2013, Toscano and Montgomery, 2009). Despite the feeling of fragility expressed by the parents, they embraced the desire to have a normal pregnancy and to be treated like everyone else (Crespo and Bestard, 2017, French, Sharp and Turner, 2015, Warmelink et al., 2016). Paradoxically, the parents would also have liked to receive special attention from health professionals during this period (French, Sharp and Turner, 2015, Warmelink et al., 2016). This quest for normality was sometimes experienced as a search for a new beginning, opposing in some ways the

medical omnipresence that was necessary to become pregnant (Turgeon, Noël and Bouche-Florin, 2018, Warmelink et al., 2016).

After making it through the infertility crisis, expectant mothers were delighted with the extra attention paid by society to pregnant women. The consideration they felt they received during pregnancy helped to increase their confidence and self-esteem (Ranjbar et al., 2015). In order to ensure a successful pregnancy, mothers changed their lifestyles, including taking time off work, reducing their daily activities, adopting a healthy diet, and taking care of their bodies (Huang et al., 2019, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Walker, Mills and Gilchrist, 2017). Women who rated their pregnancy as stable felt more relaxed and reported taking full advantage of this period (Lin, Tsai and Lai, 2013). Some looked for ways to regain control of their pregnancy experiences by resuming “normal” activities such as exercise (Walker, Mills and Gilchrist, 2017).

Reduction of the Experience

The course of infertility and the long wait to become pregnant seemed to maintain in the future parents the idea that the arrival of the much hoped-for pregnancy could only be positive (Allan et al., 2019, Crespo and Bestard, 2017). However, some of them mentioned having great difficulty letting go and enjoying the pregnancy for fear of failure (French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Smorti and Smorti, 2012, Turgeon, Noël and Bouche-Florin, 2018). During this time, women did not complain about the dramatic changes they had made in their daily lives since becoming pregnant, nor the physical changes and discomfort associated with pregnancy (Ranjbar et al., 2015). They avoided expressing their ambivalence, foul moods, or other negative feelings during the pregnancy for fear of being judged (French, Sharp and Turner, 2015). For some women, it was also difficult to recognize the signs of depression that manifested during the pregnancy that they had wanted so much (Allan et al., 2019). Even after birth, the mothers’ speech presented a more detailed account of their infertile past and assisted reproductive treatments than of childbirth (Toscano and Montgomery, 2009).

Struggling with an Emerging Identity

During pregnancy, women and men seem to struggle with their infertile identity and their emerging identity as pregnant women and future parents. This identity conflict is marked by a gradual integration of their experience of infertility into their identity as well as a transition to parenthood centered on pregnancy.

Integrating Their Experience into Their Identity

Many women have had painful experiences of infertility stigma (Huang et al., 2019, Walker, Mills and Gilchrist, 2017) and this stigma was sometimes maintained after the success of ART when this type of conception was not accepted by their family or their community (Ranjbar et al., 2015, Toscano and Montgomery, 2009). Women coping with infertility and the use of ART embarked on a protracted identity transition where they felt torn between their infertile identity and their emerging identity as pregnant women (Allan et al., 2019, HaCohen, Amir and Wiseman, 2018, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015). The conception of a child linked to them (genetically or not) was also an important element in shaping identity construction (Canneaux, 2020, Crespo and Bestard, 2017, Lin, Tsai and Lai, 2013) and the use of egg donation sometimes gave rise to fear among the pregnant women of not being recognized as mother by the child (Canneaux, 2020).

For some pregnant women, the physical changes inherent in the course of pregnancy and the presence of fetal movements contributed to the slow integration of their status as pregnant women and to the development of their identity as a mother (Lin, Tsai and Lai, 2013). The women managed to find peace and make sense of their reproductive experience, which then became a part of their life story (HaCohen, Amir and Wiseman, 2018, Ranjbar et al., 2015).

For their part, the men seemed to experience this identity transition differently, seeing themselves more as observers of their partner's pregnancy (Allan et al., 2019, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018). The integration of the upcoming arrival of a baby and the construction of the parental identity of the father took place later in the pregnancy (Turgeon, Noël and

Bouche-Florin, 2018). The issues related to egg donation were also different for the future fathers. The men found it easier to disregard the donor and they sometimes felt helpless in the face of their partner's sadness (Canneaux, 2020).

Transitioning to Becoming Parents While Centering on Pregnancy

Women and men described a difficult and anxiety-inducing transition to parenthood, often perceived to be temporary during the course of pregnancy (Allan et al., 2019, French, Sharp and Turner, 2015). Couples found it particularly difficult to consider birth and parenthood for fear of losing the baby (French, Sharp and Turner, 2015). Women also tended to focus more on the current pregnancy than on the adjustment and challenges ahead after birth (Dornelles et al., 2014). For some parents, the challenges of infertility and assisted reproductive treatments made it easier for them to cope with the challenges of having a newborn (Allan et al., 2019) while others felt guilty for finding daily life difficult with this much hoped-for baby (Turgeon, Noël and Bouche-Florin, 2018).

Reorganizing Relationships

Couples, faced with a long period of infertility and the challenges encountered during assisted reproductive treatments, built strong relationships to overcome the difficulties (Allan et al., 2019, Crespo and Bestard, 2017, Turgeon, Noël and Bouche-Florin, 2018). The active presence and support of the partner played an important role in the mothers' experiences (Canneaux, 2020, Lin, Tsai and Lai, 2013, Turgeon, Noël and Bouche-Florin, 2018). For some women whose marital relationships had been strained by infertility, the successful pregnancy gave them a sense of power and security (Ranjbar et al., 2015).

The presence and support of family and in-laws were seen as essential for many couples (Allan et al., 2019, Crespo and Bestard, 2017, Lin, Tsai and Lai, 2013), and a successful pregnancy after years of infertility was experienced as a major family event (Huang et al., 2019). However, in communities where ART remains taboo, women feared being stigmatized by their in-laws and loved ones if they disclosed that they had resorted to it (Ranjbar et al., 2015).

Through their infertility journey and assisted reproductive treatments, men and women developed new friendships with couples who had experienced the same challenges, because they understood each other more easily (Allan et al., 2019). Several of them also sought to help couples experiencing difficulties similar to theirs (Ranjbar et al., 2015) and this mutual support was facilitated by focus groups and virtual communities, which proved to be of great comfort to many (Toscano and Montgomery, 2009, Walker, Mills and Gilchrist, 2017).

Discussion

This systematic review of the literature aimed to synthesize the experience of women and men affected by infertility, during a pregnancy resulting from ART. The results obtained during the analysis demonstrate the extent to which these future parents' infertility experiences, as well as the emotionally painful experiences during assisted reproductive treatments, shape and complicate their journey to parenthood. The results are consistent with those of previous studies examining the psychosocial impacts of infertility, which have indicated that the negative experiences undergone by parents during the period of infertility also accompany them during the onset of pregnancy and continue to play an important role even after the birth of the child (Hammarberg, Fisher and Wynter, 2008, Hjelmstedt et al., 2003, Warmelink et al., 2016). However, a systematic review of women's emotional adaptation to *in vitro* fertilization points out that the negative emotions they feel seem to be closely related to the threat of treatment failure, and that these emotions tend to disappear at the time of pregnancy (Verhaak et al., 2007).

Our results show that the paradoxical emotions expressed by parents who resorted to ART characterize their experience of pregnancy. The joy of finally being pregnant is often hampered by the fear of losing the long-awaited baby, of giving birth prematurely, or that the child will not survive at birth. Similarly, Gameiro et al. (2010) point out that women who have conceived by ART see their pregnancy as more rewarding while also perceiving it as riskier than a natural pregnancy. Another study also argued that

women affected by infertility experienced conflicting feelings of joy and fear when they became pregnant, and that the pregnancy they envisioned as a happy time was likely to turn into a difficult process for them (Boz, Özçetin and Teskereci, 2018).

This metasynthesis shows that infertility represents an unexpected life crisis for couples at the time when they choose to have a child. The end of this long and painful ordeal, marked by the onset of pregnancy, is of great relief for them. For women, the special attention that is paid to them when they become pregnant promotes the improvement of their self-esteem and self-confidence, which had been greatly shaken by their infertility journey. These results are consistent with those of previous studies which reported that self-esteem in women who became pregnant as a result of ART treatments improved as the pregnancy progressed (Cox et al., 2006, Klock and Greenfeld, 2000). In addition, the physical changes in the mother-to-be as well as the changes in life and work habits are generally experienced positively by women who resorted to ART. Similar results were also highlighted by Klock and Greenfeld (2000) who found that pregnant women who resorted to ART are more satisfied with their pregnancy and less concerned about the changes it brings in their daily lives.

Given the hardships they underwent to become pregnant, the women involved in the analyzed studies did not seem to give themselves the right to complain about the discomforts of pregnancy and the difficulties encountered during this period, as well as after the birth. These results are consistent with those of a previous study which found that parents who resorted to ART tend to express their feelings about their experience less, particularly when the feelings are negative (Ulrich et al., 2004).

This review of the qualitative literature allowed for a better understanding of the intimate struggle that takes place, particularly among women, with regard to their identity representation. Infertility, which has long defined an important part of their identity, is an obstacle to the transition to their emerging identity as a future mother. This transition between conception, pregnancy, and parenthood, considered a normal stage in adult development, is indeed much more difficult for women who have resorted to ART (McMahon, 1999). Although the data are more numerous with regard to the experience of mothers, abandoning this

infertility which had become a central element in their lives represents a long-term undertaking for all couples trying to redefine themselves during pregnancy (Sandelowski, Harris and Black, 1992). Focused on pregnancy, expectant parents tend to idealize parenting and lack the preparation to cope after a course of ART (Hammarberg, Fisher and Wynter, 2008). For their part, Boz, Özçetin and Teskereci (2018) identified conflicting results on the acquisition of maternal identity in pregnant women previously affected by infertility. They nevertheless pointed out that the difficulty of transitioning from infertility to pregnancy may be linked to a lower coping capacity in motherhood as well as more symptoms of postpartum depression. However, findings from other studies indicate that the occurrence of postpartum depression in mothers who conceived by ART is not higher than in those who conceived naturally (Amirchaghmaghi et al., 2020, Listijono, Mooney and Chapman, 2014).

According to the results of the metasythesis, the experience for women and men previously affected by infertility of having a pregnancy through ART has repercussions at different levels on their relationship as a couple as well as on their relationships with family and loved ones. Although infertility represents a time of crisis for the couple, many mentioned forming a strong team and some women expressed that the success of the pregnancy helped protect their marriage. In a previous study, Sydsjö et al. (2002) have also identified that, although the period before conception was physically and psychologically demanding, this journey seemed to strengthen the marital relationship. Another study also found that couples who had resorted to ART had better relationships than those who had conceived naturally (Fisher, Hammarberg and Baker, 2008).

Finally, the couples also mentioned how their relationships with their family and loved ones were altered by the challenges they faced in conceiving. Depending on the context, relationships with family can be a source of support as well as a source of concern for expectant parents, particularly when they fear being marked by the stigma surrounding infertility. The desire to share and interact with people who understand their experience led to the development of new relationships with other expectant parents undergoing the same challenges. However, Redshaw, Hockley and Davidson (2007) noted that women expressed concern

about the opinions of others and found it difficult to deal with comments and concerns from family members and loved ones. The repercussions on relationships with family and loved ones seem to have been studied less than those on the couple, which constitutes an innovative element of the preceding study.

Strengths and Limitations

The main strength of this metasynthesis is that it is one of the first qualitative syntheses of studies on the experience of pregnancy through ART, integrating both the experiences of women and that of men affected by infertility. Indeed, although a few systematic reviews on issues related to pregnancy by ART have been published in recent years, these have presented analyses of quantitative studies (Gourounti, 2016, Hammarberg, Fisher and Wynter, 2008) and often focused only on the experience of women. A second strength of this metasynthesis relates to the strategies used to increase the validity of the results throughout each stage of the research (Finfgeld-Connett, 2018). The strategies used included, among others: 1) systematically exploring all the literature on the subject throughout the research strategy; 2) using researchers with difference expertise to examine a sample of several studies, allowing the maximization of triangulation; 3) assessing the quality of the studies included in the analysis; 4) adopting a reflective approach during data analysis; and 5) comparing the results obtained with the existing literature.

Despite the use of a research strategy intending to synthesize experiences of the prenatal period in both women and men who conceived through ART, a majority of studies focused only on the experience of women. In addition, among the studies comprising a sample of future parents (women and partners), men were often under-represented, or the results were presented in such a way as to illustrate their experiences as parents, thus offering little contrast between each person's experience. Thus, although through our own results it was not possible to explore in depth the differences between the lived experiences of the pregnant woman and that of her partner, all data relating to the latter's experience were considered in our analyses. Each finding is presented according to the availability of evidence on mothers, fathers, or both parents.

In addition, certain assisted reproduction techniques such as conception with a sperm or oocytes donor, are likely to raise specific issues affecting the couple's experience. In this sense, the heterogeneity of treatments used by parents across the samples of the different studies analysed may constitute a limitation of this review.

Conclusion

This metasynthesis has made it possible to identify the complex issues that couples affected by infertility face during pregnancy resulting from successful assisted reproductive technologies. The painful experience of infertility and reproductive treatments are not erased by the onset of pregnancy. Although a majority of couples report a strong marital relationship and mutual support, it can be difficult for parents to freely share the feelings and difficulties they have experienced with their family and loved ones. Couples seek to share their experiences of infertility and ART through virtual platforms and through the development of new friendships in order to obtain and offer support.

Implications for nursing and health care professionals

These findings have important implications for nursing practice and that of other health care professionals providing care to couples previously affected by infertility and who have conceived through ART. Indeed, the paradoxical feelings experienced by future parents as well as the issues related to emerging parental identity, noted by this study, highlight the very specific challenges that these couples encounter during pregnancy. To be able to offer them support that aligns with their specific needs, their unique background must first be recognized by practitioners. Thus, it is first important to make professionals aware of the reality experienced by future parents. Then, specific programs could be intended for these couples. For example, adding regular prenatal visits with a nurse early in pregnancy could help reduce parents' worries, especially when fetal movements are not yet noticeable, by providing them with predictable and more frequent access with a healthcare professional. During meetings, the nurse should pay specific attention to the parents' history of infertility and ART when addressing their concerns about the progress of

the pregnancy. Prenatal support focused on the experience of the future parents is likely to facilitate their transition to parenthood.

Further research is needed to better understand the complex journey of couples affected by infertility, as well as their transition to parenthood following successful assisted reproductive technologies. Since most of the research is focused on the experience of the pregnant woman, future studies are needed to deepen the understanding of the partner's experience. In addition, the impact on family and loved ones is the subject of a limited number of studies and requires the attention of researchers. Thus, these recommendations for practice and research are likely to improve care and support during pregnancy for parents who have conceived by assisted reproductive technologies.

Ethical statement

The research presented in this manuscript was approved on June 2nd 2021 by the Université du Québec en Outaouais Research Ethics Committee (protocol number 2022-1823).

Acknowledgements

The authors would like to thank the following granting agencies: the MEES-Universités doctoral scholarship program and that of the Quebec Network on Nursing Intervention Research (RRISIQ), as well as the Quebec Fund for Research in Society and Culture, which funds the Paternity, Family, and Society Team.

Conflict of Interest

The authors declare that they have no conflicts of interest.

References

- Allan, H., Mounce, G., Culley, L., van den Akker, O., Hudson, R., 2019. Transition to parenthood after successful non-donor in vitro fertilisation: The effects of infertility and in vitro fertilisation on previously infertile couples' experiences of early parenthood. *Health* 25 (4), 434-453.
- Amirchaghmaghi, E., Malekzadeh, F., Chehrizi, M., Ezabadi, Z., Sabeti, S., 2020. A Comparison of Postpartum Depression in Mothers Conceived by Assisted Reproductive Technology and Those Naturally Conceived. *International Journal of Fertility & Sterility* 13 (4), 277-281.
- Association des obstétriciens et gynécologues du Québec, 2020. Infertilité.
- Berger, R., Paul, M.S., Henshaw, L.A., 2013. Women's experience of infertility: a multi-systemic perspective. *Journal of International Women's Studies* 14 (1), 54-68.
- Boz, İ., Özçetin, E., Teskereci, G., 2018. Becoming a mother after infertility: A theoretical analysis. *Psikiyatride Guncel Yaklasimler* 10 (4), 496-511.
- Bradley, E.H., Curry, L.A., Devers, K.J., 2007. Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Health Services Research* 42 (4), 1758-1772.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3 (2), 77-101.
- Butler, A., Hall, H., Copnell, B., 2016. A guide to writing a qualitative systematic review protocol to enhance evidence-based practice in nursing and health care. *Worldviews on Evidence-Based Nursing* 13 (3), 241-249.
- Canneaux, M., 2020. Grossesse et don d'ovocytes : remaniements psychiques chez les futurs parents. *Neuropsychiatrie de l'Enfance et de l'Adolescence* 68 (5), 237-243.
- Cox, S.J., Glazebrook, C., Sheard, C., Ndukwe, G., Oates, M., 2006. Maternal self-esteem after successful treatment for infertility. *Fertility and Sterility* 85 (1), 84-89.
- Crespo, E., Bestard, J., 2017. Psychosocial needs of women and their partners after successful assisted reproduction treatment in Barcelona. *Reproductive BioMedicine & Society Online* 3, 90-99.
- Critical Appraisal Skills Programme, 2018. CASP Qualitative Checklist.
- Dornelles, L.M.N., Maccallum, F., Lopes, R.d.C.S., Piccinini, C.A., Passos, E.P., 2014. 'Living each week as unique': maternal fears in assisted reproductive technology pregnancies. *Midwifery* 30 (3), e115-e120.
- Finfgeld-Connett, D., 2018. A guide to qualitative meta-synthesis. Routledge.
- Finlay, L., 2002. "Outing" the researcher: The provenance, process, and practice of reflexivity. *Qualitative health research* 12 (4), 531-545.
- Fisher, J.R.W., Hammarberg, K., Baker, G.H.W., 2008. Antenatal mood and fetal attachment after assisted conception. *Fertility and Sterility* 89 (5), 1103-1112.
- Franklin, S., 2013. Conception through a looking glass: the paradox of IVF. *Reproductive BioMedicine Online* 27 (6), 747-755.
- French, L.R., Sharp, D.J., Turner, K.M., 2015. Antenatal needs of couples following fertility treatment: a qualitative study in primary care. *British Journal of General Practice* 65 (638), e570-e577.
- Gameiro, S., Moura-Ramos, M., Canavarro, M.C., Soares, I., 2010. Psychosocial adjustment during the transition to parenthood of Portuguese couples who conceived spontaneously or through assisted reproductive technologies. *Research in Nursing & Health* 33 (3), 207-220.
- Gedda, M., 2017. Traduction française des lignes directrices ENTREQ pour l'écriture et la lecture des synthèses de recherche qualitative. *Revue Francophone Internationale de Recherche Infirmière* 3 (1), 37-41.
- Gourounti, K., 2016. Psychological stress and adjustment in pregnancy following assisted reproductive technology and spontaneous conception: A systematic review. *Women & Health* 56 (1), 98-118.
- HaCohen, N., Amir, D., Wiseman, H., 2018. Women's narratives of crisis and change: Transitioning from infertility to pregnancy. *Journal of Health Psychology* 23 (5), 720-730.

- Hammarberg, K., Fisher, J.R.W., Wynter, K.H., 2008. Psychological and social aspects of pregnancy, childbirth and early parenting after assisted conception: a systematic review. *Human Reproduction Update* 14 (5), 395-414.
- Hasanbeigi, F., Zandi, M., Vanaki, Z., Kazemnejad, A., 2017. Investigating the problems and needs of infertile patients referring to assisted reproduction centers: a review study. *J Evid Based Care* 7 (3), 54-70.
- Hjelmstedt, A., Widström, A.-M., Wramsby, H., Matthesen, A.-S., Collins, A., 2003. Personality factors and emotional responses to pregnancy among IVF couples in early pregnancy: a comparative study. *Acta Obstetrica et Gynecologica Scandinavica* 82 (2), 152-161.
- Huang, M.-Z., Sun, Y.-C., Gau, M.-L., Puthussery, S., Kao, C.-H., 2019. First-time mothers' experiences of pregnancy and birth following assisted reproductive technology treatment in Taiwan. *Journal of Health, Population & Nutrition* 38 (1), 1-11.
- Huang, M.-Z., Sun, Y.-C., Gau, M.-L., Puthussery, S., Kao, C.-H., 2019. First-time mothers' experiences of pregnancy and birth following assisted reproductive technology treatment in Taiwan. *Journal of Health, Population & Nutrition* 38 (1), N.PAG-N.PAG.
- James, S.S., Singh, A.K., 2018. Grief and bereavement in infertility and involuntary childlessness. *Journal of Psychosocial Research* 13 (2), 297-305.
- Klock, S.C., Greenfeld, D.A., 2000. Psychological status of in vitro fertilization patients during pregnancy: a longitudinal study. *Fertility and Sterility* 73 (6), 1159-1164.
- Lewin, S., Glenton, C., Munthe-Kaas, H., Carlsen, B., Colvin, C.J., Gülmezoglu, M., Noyes, J., Booth, A., Garside, R., Rashidian, A., 2015. Using qualitative evidence in decision making for health and social interventions: an approach to assess confidence in findings from qualitative evidence syntheses (GRADE-CERQual). *PLoS medicine* 12 (10), e1001895.
- Lin, Y.-n., Tsai, Y.-c., Lai, P.-h., 2013. The experience of Taiwanese women achieving post-infertility pregnancy through assisted reproductive treatment. *The Family Journal* 21 (2), 189-197.
- Listijono, D.R., Mooney, S., Chapman, M., 2014. A comparative analysis of postpartum maternal mental health in women following spontaneous or ART conception. *Journal of Psychosomatic Obstetrics & Gynecology* 35 (2), 51-54.
- McMahon, C.A., 1999. Does assisted reproduction make an impact on the identity and self-esteem of infertile women during the transition to parenthood? *Journal of Assisted Reproduction and Genetics* 16 (2), 59.
- Ministère de la Santé et des Services Sociaux, 2008. Politique de périnatalité 2008-2018 : un projet porteur de vie. Ministère de la Santé et des Services Sociaux, Québec.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., Group, P., 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine* 6 (7), e1000097.
- Ranjbar, F., Akhondi, M.-M., Borimnejad, L., Ghaffari, S.-R., Behboodi-Moghadam, Z., 2015. Paradox of Modern Pregnancy: A Phenomenological Study of Women's Lived Experiences from Assisted Pregnancy. *Journal of Pregnancy* 2015, 1-8.
- Ranjbar, F., Akhondi, M.-M., Borimnejad, L., Ghaffari, S.-R., Behboodi-Moghadam, Z., 2015. Paradox of Modern Pregnancy: A Phenomenological Study of Women's Lived Experiences from Assisted Pregnancy. *Journal of Pregnancy* 2015, 543210.
- Ranjbar, F., Warmelink, J.C., Gharacheh, M., 2020. Prenatal attachment in pregnancy following assisted reproductive technology: a literature review. *Journal of Reproductive and Infant Psychology* 38 (1), 86-108.
- Redshaw, M., Hockley, C., Davidson, L.L., 2007. A qualitative study of the experience of treatment for infertility among women who successfully became pregnant. *Human Reproduction* 22 (1), 295-304.
- Rooney, K.L., Domar, A.D., 2018. The relationship between stress and infertility. *Dialogues in Clinical Neuroscience* 20 (1), 41.
- Sandelowski, M., Barroso, J., 2007. Handbook for synthesizing qualitative research. springer publishing company.

- Sandelowski, M., Harris, B.G., Black, B.P., 1992. Relinquishing Infertility: The Work of Pregnancy for Infertile Couples. *Qualitative Health Research* 2 (3), 282-301.
- Smorti, M., Smorti, A., 2012. Transition to Parenthood in Infertile Couples. *Procedia - Social and Behavioral Sciences* 46, 527-531.
- Sydsjö, G., Wadsby, M., Kjellberg, S., Sydsjö, A., 2002. Relationships and parenthood in couples after assisted reproduction and in spontaneous primiparous couples: a prospective long-term follow-up study. *Human Reproduction* 17 (12), 3242-3250.
- Tong, A., Flemming, K., McInnes, E., Oliver, S., Craig, J., 2012. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Medical Research Methodology* 12 (1), 181.
- Toscano, S.E., Montgomery, R.M., 2009. The lived experience of women pregnant (including preconception) post in vitro fertilization through the lens of virtual communities. *Health Care for Women International* 30 (11), 1014-1036.
- Turgeon, M., Noël, R., Bouche-Florin, A., 2018. Transition à la paternité et procréation assistée: Une recherche qualitative exploratoire de type étude de cas. [Transition to fatherhood and assisted procreation: An exploratory qualitative case study.]. *Devenir* 30 (4), 331-356.
- Ulrich, D., Gagel, D.E., Hemmerling, A., Pastor, V.S., Kentenich, H., 2004. Couples becoming parents: something special after IVF? *Journal of Psychosomatic Obstetrics & Gynecology* 25 (2), 99-113.
- Verhaak, C.M., Smeenk, J., Evers, A., Kremer, J.A., Kraaijmaat, F., Braat, D., 2007. Women's emotional adjustment to IVF: a systematic review of 25 years of research. *Human Reproduction Update* 13 (1), 27-36.
- Walker, C., Mills, H., Gilchrist, A., 2017. Experiences of physical activity during pregnancy resulting from in vitro fertilisation: An interpretative phenomenological analysis. *Journal of Reproductive and Infant Psychology* 35 (4), 365-379.
- Walsh, D., Devane, D., 2012. A metasynthesis of midwife-led care. *Qualitative Health Research* 22 (7), 897-910.
- Walsh, D., Downe, S., 2005. Meta-synthesis method for qualitative research: a literature review. *Journal of Advanced Nursing* 50 (2), 204-211.
- Warmelink, J.C., Adema, W., Pranger, A., de Cock, T.P., 2016. Client perspectives of midwifery care in the transition from subfertility to parenthood: A qualitative study in the Netherlands. *Journal of Psychosomatic Obstetrics & Gynecology* 37 (1), 12-20.
- Warmelink, J.C., Meijer, J.M., Mulder, N., Mulder, S., van Lohuizen, M.T., 2016. Perception of the psychosocial aspects of subfertility by parents following successful medically assisted conception: A qualitative study. *Open Journal of Obstetrics and Gynecology* 6 (13), 830-845.
- WHO, 2020. Infertility.
- WHO, 2020. Multiple definitions of infertility.

Tables

Table 1

Quality Appraisal of Included Studies Using the Critical Appraisal Skills Program Qualitative Research Checklist (Critical Appraisal Skills Programme, 2018)

(Author, year)	Items									
	1	2	3	4	5	6	7	8	9	10
(Allan et al., 2019)	√	√	√	√	√	X	√	√	√	√
(Canneaux, 2020)	√	√	√	√	√	X	X	√	X	√
(Crespo & Bestard, 2016)	√	√	√	√	√	X	√	√	√	√
(Dornelles et al., 2014)	√	√	√	√	√	X	√	√	√	√
(French et al., 2015)	√	√	√	√	√	X	X	√	√	√
(HaCohen et al., 2018)	√	√	√	√	√	X	√	√	√	√
(Huang et al., 2019)	√	√	√	√	√	√	√	√	√	√
(Lin et al., 2013)	√	√	√	√	√	X	X	√	√	√
(Ranjbar et al., 2015)	√	√	√	X	√	√	√	√	√	√
(Smorti & Smorti, 2012)	√	√	√	X	√	X	X	√	√	√
(Toscano & Montgomery, 2009)	√	√	√	√	√	X	√	√	√	√

(Turgeon et al., 2018)	√	√	√	X	√	√	√	√	√	√
(Walker et al., 2017)	√	√	√	√	√	√	√	√	√	√
(Warmelink et al., 2016)	√	√	√	√	√	√	√	√	√	√

Note: √ Yes; X – I can't say or no

1. Was there a clear statement of the research objectives?
2. Is a qualitative methodology appropriate?
3. Was the research design appropriate for meeting the objectives of the research?
4. Was the recruitment strategy adapted to the objectives of the research?
5. Was the data collected in a way that permits responding to the research problem?
6. Was the relationship between the researcher and participants duly taken into account?
7. Were ethical issues taken into account?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of conclusions?
10. Does the research make a significant contribution?

Table 2
Characteristics of the qualitative primary studies

Author, year	Country	Journal	Goal of Study	Methods	Sample
Allan et al., 2019	England	Health	To explore the experiences of the transition to early parenthood among infertile heterosexual couples using donor-less IVF. Includes a specific review of men's experiences during this journey.	Unstructured interviews; thematic analysis	n = 16 infertile couples; First child, simple pregnancy; Time since birth: between 3 and 18 months
Canneaux, 2020	France	Neuropsychiatrie de l'enfance et de l'adolescence	To explore the possible peculiarities in the psychological changes in women and men before and during pregnancy, as a result of oocyte donation.	Interviews; content analysis and speech processes; psychodynamic perspective	n = 10 infertile women and 8 men met with separately, who had resorted to egg donation; Age of pregnancy: 7 to 8 months
Crespo & Bestard, 2016	Spain	Reproductive Biomedicine & Society Online	To evaluate the experience of users of assisted reproductive technologies in Spain in a clinical setting, with a focus on their psychosocial needs after successful assisted reproductive treatment, thus contributing to Spain's knowledge of the growing number of writings on care in the context of assisted reproductive treatments.	Repeated semi-structured interviews; sampling by informed choice; content analysis	n = 30 pregnant women; n = 21 partners (20 men and 1 woman); Age of participants: between 29 and 47 years; ART technique used: IVF = 21 couples, Intra-uterine insemination = 2 couples, egg donation = 4 couples, sperm donation = 1 same-sex couple and 1 single woman, embryo donation = 1 couple
Dornelles et al., 2014	Brazil	Midwifery	To explore the fears of women during pregnancy after conception via assisted	Semi-structured interviews; content analysis	n = 19 pregnant women; First pregnancy;

reproductive technologies and comparing these fears to those of women who conceived spontaneously.

Age of pregnancy: 3rd trimester;
 Age of participants: 25 to 44 years;
 Source of infertility: women = 15, men = 2, both partners = 1, undetermined = 1;
 ART technique used: IVF = 15, artificial insemination = 3, gamete donation = 1

French et al., 2015	England	British Journal of General Practice	To explore the prenatal experiences of women and men who have successfully conceived thanks to infertility treatment.	In-depth interviews, thematic analysis by constant comparison	n = 12 pregnant women at 28 weeks and n = 8 male partners First child Age of participants 35 to 39 years Source of infertility: woman = 6 man = 7 woman and man = 2 undetermined = 5
HaCohen et al., 2018	Israel	Journal of Health Psychology	To examine the extent to which infertile women who have become pregnant integrate their past and current state/status into their conception of their identity.	Interviews; narrative interpretive approach; grounded theorization	n = 12 heterosexual married women; First child; Age of pregnancy: 2 nd or 3 rd trimester; Age of participants: 25 to 40 years; Source of infertility: woman = 8, undetermined = 4

Huang et al., 2019	Taiwan	Journal of Health, Population & Nutrition	To explore the experience of pregnancy and the transition to parenthood of first-time mothers after successful assisted reproductive treatment in Taiwan.	In-depth semi-structured interviews; sampling by informed choice; Colaizzi phenomenological analysis	n = 12 first-time mothers; Age of participants: 31 to 36 years; Age of child: 8 to 18 weeks
Lin et al., 2013	Taiwan	The Family Journal: Counseling and Therapy for Couples and Families	To describe the pregnancy experience of Taiwanese women who have undergone at least three cycles of assisted reproductive techniques over a period of more than 3 years.	In-depth interviews; phenomenological analysis	n = 15 infertile women; Age of participants: 31 to 44 years; Average duration of treatments: 5.25 years
Ranjbar et al., 2015	Iran	Journal of Pregnancy	To explore how women make sense of pregnancy resulting from assisted reproductive technologies in the Iranian culture and context.	In-depth interviews; sampling by informed choice; hermeneutical phenomenology	n = 12 infertile women 1 st pregnancy; Simple pregnancy
Smorti & Smorti, 2012	Italy	Procedia - Social and Behavioral Sciences	To explore the psychological processes that develop in infertile couples who have experienced pregnancy through assisted reproductive treatments.	Semi-structured autobiographical interviews	n = 15 couples expecting a first child; Average age of women: 36 years; Average age of men: 38 years; Source of infertility: women = 40%, men = 36%, both partners = 4%, undetermined = 20%
Toscano & Montgomery, 2009	USA, Australia, England, Ireland, Canada, Colombia, Borneo	Health Care for Women International	To explore and describe the lived experiences of pregnancy (including preconception) resulting from IVF; and to identify common themes related to psychological, emotional, and	Electronic publications on the web; phenomenological analysis	n = 26 posts by women after childbirth

			physical health as described in electronic communities.		
Turgeon et al., 2018	Canada	Devenir	To describe and understand the issues of the transition to fatherhood in the context of assisted reproductive technologies (ART).	Case study, longitudinal perspective (4 measurement times); semi-structured interviews; iterative analysis	n = 1 couple; First-time parents
Walker et al., 2017	England	Journal of Reproductive & Infant Psychology	To explore the qualitative experiences and decision-making processes surrounding physical activity (PA) for pregnant women who have undergone IVF treatment.	Semi-structured interviews; sampling by informed choice; interpretative phenomenological analysis	n = 8 women; Age of participants: 24 to 39 years
Warmelink et al., 2016	Netherlands	Journal of Psychosomatic Obstetrics & Gynecology	To explore the obstetric care needs of couples or women who have conceived thanks to a fertility treatment.	In-depth semi-structured interviews; content analysis; constant comparison/grounded theorization	n = 9 women; n = 2 men; Age of female participants: 32 to 38 years; Age of male participants: 32 to 35 years; Source of infertility: woman = 2, man = 4, both partners = 1, undetermined = 2

Table 3

Summary of qualitative findings

Review Finding	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment	Studies Contributing to the Review Finding
Travelling a long and complex journey			
1. The infertility experience is described as a long preparation to become a parent strewn with difficulties and uncertainties, which can affect confidence and self-esteem.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Turgeon, Noël and Bouche-Florin, 2018)
2. The financial burden of incomplete coverage of assisted reproduction treatment costs adds additional stress on parents' shoulders, sometimes influencing treatment choices.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and moderate concerns regarding adequacy of the data.	(Allan et al., 2019, Ranjbar et al., 2015)
3. The experience of fertility treatments is demanding and painful emotionally, physically and mentally.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and adequacy of data.	(Allan et al., 2019, French, Sharp and Turner, 2015)
4. The history of infertility and assisted reproduction treatments is not erased with the start of pregnancy and tints the transition to parenthood in future mothers and fathers.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, French, Sharp and Turner, 2015, Turgeon, Noël and Bouche-Florin, 2018)
Moving on with paradoxical emotions			
Oscillating between a sense of fragility and hope			

5. The experience of infertility has led to a lack of confidence in the parents' ability to conceive and give birth.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Dornelles et al., 2014, French, Sharp and Turner, 2015, Lin, Tsai and Lai, 2013)
6. Women doubted they were actually pregnant even after a positive pregnancy test result.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Smorti and Smorti, 2012)
7. Parents, especially mothers, are inhabited by a sense of fragility and vulnerability throughout the pregnancy which they perceive as being at risk.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Dornelles et al., 2014, Huang et al., 2019, Lin, Tsai and Lai, 2013, Toscano and Montgomery, 2009)
8. The prenatal period is described as anxiety-provoking and emotionally difficult.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Dornelles et al., 2014, French, Sharp and Turner, 2015, Huang et al., 2019, Lin, Tsai and Lai, 2013, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018)
9. Pregnancy is characterized by an ambivalence of emotions where many fears and uncertainties shake the hope and joy of becoming parents.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Lin,

			Tsai and Lai, 2013, Ranjbar et al., 2015)
10. Feelings of joy and excitement are quickly held back, tinted by previous experiences related to infertility and fear of losing the baby or giving birth pre-birth.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Dornelles et al., 2014, French, Sharp and Turner, 2015, Huang et al., 2019, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018, Warmelink et al., 2016)
11. Sometimes fears surrounding the success of the pregnancy dampened attachment to the fetus, while for others, this sense of attachment was present even before the embryo was implanted.	Low confidence	This finding was graded as low confidence because of substantial concerns regarding coherence and adequacy of data.	(Lin, Tsai and Lai, 2013, Ranjbar et al., 2015)
12. The significant emotional, physical and financial investment nurtured in mothers and their partners adds a pressure to succeed in this pregnancy that they have not been able to achieve alone.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Huang et al., 2019, Lin, Tsai and Lai, 2013, Walker, Mills and Gilchrist, 2017)
13. Mothers and fathers who conceived through ART feel different from naturally conceived parents and would like this difference to be recognized.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(French, Sharp and Turner, 2015, Huang et al., 2019, Toscano and Montgomery, 2009, Warmelink et al., 2016)
Integrating a life crisis into a new beginning			
14. Relief of finally being pregnant experienced as the end of a nightmare.	Low confidence	This finding was graded as low confidence because of substantial concerns regarding adequacy of data.	(Ranjbar et al., 2015, Smorti and Smorti, 2012)
15. Feeling of gratitude to God and to the medical team.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding	(Lin, Tsai and Lai, 2013, Ranjbar et al.,

		methodological limitations, relevance, coherence, and adequacy.	2015, Toscano and Montgomery, 2009)
16. Parents want to live a normal pregnancy and be treated like everyone else.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Crespo and Bestard, 2017, French, Sharp and Turner, 2015, Warmelink et al., 2016)
17. Parents would have liked to receive special attention from health professionals during pregnancy.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and adequacy of data.	(French, Sharp and Turner, 2015, Warmelink et al., 2016)
18. The quest for normality is opposed in a way, to the medical omnipresence that was necessary to become pregnant.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and adequacy of data.	(Turgeon, Noël and Bouche-Florin, 2018, Warmelink et al., 2016)
19. The looks and extra attention paid to pregnant women during pregnancy helped to increase their self-esteem and self-confidence.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Ranjbar et al., 2015)
20. Mothers changed their lifestyle habits during pregnancy by taking time off work, reducing daily activities, adopting a healthy diet and taking care of their bodies.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Huang et al., 2019, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015, Walker, Mills and Gilchrist, 2017)
21. Women who considered their pregnancy stable felt more relaxed and enjoyed their pregnancy.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Lin, Tsai and Lai, 2013)
22. Resuming "normal" activities such as physical exercise allowed some mothers to regain control of their pregnancy experience.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Walker, Mills and Gilchrist, 2017)
Reduction of the Experience			
23. The journey of infertility and the long wait to become pregnant fed, for future	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and adequacy of data.	(Allan et al., 2019, Crespo and Bestard, 2017)

parents, the image that pregnancy can only be positive.

24. Some parents reported having a lot of trouble letting go and enjoying pregnancy for fear of failure.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(French, Sharp and Turner, 2015, HaCohen, Amir and Wiseman, 2018, Smorti and Smorti, 2012, Turgeon, Noël and Bouche-Florin, 2018)
25. Women did not complain about changes in their daily lives, physical changes and discomfort related to pregnancy. They avoided expressing ambivalence, foul mood or other negative feelings during pregnancy, for fear of being judged.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and moderate concerns regarding adequacy of the data.	(French, Sharp and Turner, 2015, Ranjbar et al., 2015)
26. When signs of depression appeared during the pregnancy they were difficult to recognize.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Allan et al., 2019)
27. Even after birth, the mothers' speech presented a more detailed account of their infertile past and assisted reproduction treatments than of childbirth.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Toscano and Montgomery, 2009)

Struggling with an emerging identity

Integrating their experience in their identity

28. Many women experienced painful experiences of stigma related to infertility, even after the success of ART.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Huang et al., 2019, Ranjbar et al., 2015, Toscano and Montgomery, 2009, Walker, Mills and Gilchrist, 2017)
29. Women dealing with infertility and the use of ART have embarked on a	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding	(Allan et al., 2019, HaCohen, Amir and

prolonged identity transition where they have felt torn between their infertile identity and their emerging identity as pregnant women.		methodological limitations, relevance, coherence, and adequacy.	Wiseman, 2018, Lin, Tsai and Lai, 2013, Ranjbar et al., 2015)
30. The conception of a child that was, or not, genetically linked to them shaped the parents' identity construction. The use of egg donation sometimes gave rise to a fear, among pregnant women, of not being recognized as a mother by the child.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Canneaux, 2020, Crespo and Bestard, 2017, Lin, Tsai and Lai, 2013)
31. Physical changes in pregnant women and the presence of fetal movements contributed to the development of the mothers' identity.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Lin, Tsai and Lai, 2013)
32. Women managed to find peace and give meaning to their reproductive experience, which then became part of their life history.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(HaCohen, Amir and Wiseman, 2018, Ranjbar et al., 2015)
33. Men seemed to experience this identity transition differently, seeing themselves more as observers of their spouse's pregnancy.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Toscano and Montgomery, 2009, Turgeon, Noël and Bouche-Florin, 2018)
34. The integration of the upcoming arrival of a baby and the construction of the father's parental identity took place later in the pregnancy.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Turgeon, Noël and Bouche-Florin, 2018)
35. The issues related to egg donation were different for future fathers. The men felt that it was easier for them to ignore the donor and they felt somehow helpless in the face of their spouse's sadness.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Canneaux, 2020)

Transitioning to becoming parents while centering on pregnancy			
36. Both women and men described a difficult, anxiety-provoking and often perceived temporary transition to parenthood during pregnancy. They found it difficult to consider birth and parenthood for fear of losing the baby.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and adequacy of data.	(Allan et al., 2019, French, Sharp and Turner, 2015)
37. Women tended to focus on the ongoing pregnancy rather than considering adaptation and the challenges ahead after birth.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Dornelles et al., 2014)
38. The difficulties associated with infertility and assisted reproduction treatment have made it easier for some parents to cope with the challenges that come with the birth of a newborn while others felt guilty about finding this period difficult.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance, coherence, and adequacy of data.	(Allan et al., 2019, Turgeon, Noël and Bouche-Florin, 2018)
Reorganizing relationships			
39. Couples have built a strong relationship to overcome the difficulties of infertility and assisted reproduction treatments.	Moderate confidence	This finding was graded as moderate confidence because of no methodological limitations and minor concerns regarding relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Turgeon, Noël and Bouche-Florin, 2018)
40. Active presence and support of the spouse played an important role in the mothers' experience.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Canneaux, 2020, Lin, Tsai and Lai, 2013, Turgeon, Noël and Bouche-Florin, 2018)
41. For some women, the success of pregnancy has provided a sense of power and security in the face of their marital relationship.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Ranjbar et al., 2015)

42. The presence and support of family and in-laws was considered essential for many couples and the success of a pregnancy after years of infertility was experienced as a major family event.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Allan et al., 2019, Crespo and Bestard, 2017, Huang et al., 2019, Lin, Tsai and Lai, 2013)
43. In communities where ART is taboo, women feared being stigmatized by their in-laws and loved ones if they revealed they resorted to it.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Ranjbar et al., 2015)
44. Men and women developed new friendships with couples who had gone through the same ordeals because they understood each other more easily.	Low confidence	This finding was graded as low confidence because of moderate concerns regarding relevance and substantial concerns regarding adequacy of data.	(Allan et al., 2019)
45. Several couples sought to help those experiencing similar difficulties. Focus groups and virtual communities made it easier to connect and were a comfort to many.	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations, relevance, coherence, and adequacy.	(Ranjbar et al., 2015, Toscano and Montgomery, 2009, Walker, Mills and Gilchrist, 2017)

There are two corrections to this article available on the publisher's website:

Corrigendum to 'Couples' experiences of pregnancy resulting from assisted reproductive technologies: A qualitative meta-synthesis', *International Journal of Nursing Studies Advances* (2022) Article Number: 100059, doi: <https://doi.org/10.1016/j.ijnsa.2023.100118>.

Erratum to 'Couples' experiences of pregnancy resulting from assisted reproductive technologies: A qualitative meta-synthesis', *international journal of nursing studies advances* 4 (2022) article number: 100059, doi: <https://doi.org/10.1016/j.ijnsa.2023.100117>.