An integrative literature review of psychosocial factors in the transition to parenthood following non-donor assisted reproduction in comparison with spontaneously conceiving couples.

Abstract

An integrative literature review of research into the psychosocial factors which shape the transition to parenthood in couples following non-donor in vitro fertilisation in comparison with spontaneously conceiving couples was undertaken following adapted PRISMA guidelines. Nineteen papers of non-donor IVF and SC mothers and fathers were included in the review.

This is the first review to report on research comparing the transition to parenthood of couples following successful non-donor singleton AR and SC couples. The small number of studies were over reliant on survey methodologies. Differences between groups were reported on a range of psychosocial measures during the transition from pregnancy to parenthood: locus of control, parental adjustment and child behaviour, parental stress, parental investment in the child, self-esteem and self-efficacy, greater levels of protectiveness (separation anxiety) towards child, marital and family functioning, family alliance, marital satisfaction and communication as well anxiety, indirect aggression and less respect for child.

We have conceptualised these differences as three substantive themes which reflect psychosocial factors shaping transition to parenthood in parents after non-donor AR: social support, relationships, and emotional well-being which are in turn intersected by gender differences. These findings have implications for health care professionals' assessment of individual couples' support needs.

Key words:

Assisted reproductive technology

Non-donor

Parenthood

Psychosocial

Social support

Transition

An integrative literature review of psychosocial factors in the transition to parenthood following non-donor assisted reproduction in comparison with spontaneously conceiving couples.

Introduction

Worldwide, an estimated 2.4 million cycles of assisted reproduction (AR), predominantly in vitro fertilisation (IVF), are performed annually. The trend is increasing and the latest available data from the UK (2016) showed over 20,000 babies were born following 68,000 cycles (HFEA, 2018). This accounts for 2-3% of the estimated 775,000 babies born in the UK for the same year (ONS, 2017). Approximately 14% (2,781) of the babies born from IVF cycles in 2016 involved donor eggs, sperm or both, and while there were an additional 5,500 donor insemination cycles, this means that the majority of AR cycles use couples' own gametes.

There has been continuing interest in whether previously infertile couples who conceive through AR find the transition to parenthood difficult (Colpin, Demyttenaere & Vandemeulebroecke, 1995; Sandelowski, 1995; van Balen, Naaktgeboren & Trimbos-Kemper, 1996; Olshansky, 2003). Studies into pregnancy and parenthood following successful donor AR show that couples who parent after donor AR adapt well to parenthood and may rise to the challenges of parenthood better than those who conceive spontaneously (Golombok, 2017). Less attention is given to the overwhelming majority of IVF parents who use their own gametes and give birth to singletons. Donor IVF transcends the boundaries of what is considered 'natural' procreation and third party assisted conception has been widely studied as particularly challenging for heterosexual couples (Torr, 2001; van den Akker, Postava & Purewal, 2016). Existing research utilises mixed samples of donor / non-donor and singleton /multiple births couples, meaning any differences in their experiences are unclear (Hammarberg et al., 2008). There are consequently gaps in the non-donor AR parenthood literature which feeds into an absence of inquiry into gendered relations in non-donor AR parenthood and non-donor fathers' needs following AR (Culley et al., 2013a).

Our review focuses exclusively on psychosocial factors shaping the transition to parenthood for non-donor AR parents. We understand psychosocial as psychological factors (social support, social relationships, emotional wellbeing) embedded in social structures such as gender. We draw on Sandelowski's (1995) conceptualisation of infertile couples' transition to parenthood as similar to and different from fertile couples. Accomplishing a taken-for-granted life transition - their infertility which is theorised as illness work - involves a prolonged transition, identified as being at least partly conducted in a liminal space (Allan, 2007).

Although the phrase 'previously infertile parents who have conceived through non-donor assisted reproduction' is more accurate, for the sake of brevity and following

Hammarberg, Fisher, Wynter (2008), the term 'AR parents or couples' is used in this paper. The aims of the review were to identify psychosocial factors which shape the transition to parenthood after singleton births of men and women after non-donor AR.

Review question

What are the psychosocial factors shaping the transition to parenthood for non-donor AR parents compared to couples who conceive spontaneously?

Methods

An integrative review was used to synthesize the literature (Whittemore & Knafl, 2005; Knafl & Whittemoore, 2017) as we wished to articulate our understanding of the psychosocial in an interdisciplinary sense as well as integrating qualitative and quantitative studies in the results and thematic analysis. Adapted PRISMA principles were adhered to in reporting results congruent with this type of review (Moher, Liberati, Tetzlaff & Altman, 2009).

Information sources and search strategy

A scoping review of the literature (Peterson, Pearce, Ferguson & Langford, 2017) was conducted in July 2017 by two authors, allowing a mapping of the literature before conducting a full search, used a limited set of search terms: non-donor, IVF, ICSI, parent* transition and support* in the search engine Google Scholar and a cross search of databases (Medline, CINAHL, Psychinfo, PsychArticles, Web of Science) (see diagram 1). The scoping review showed that including the search word 'non-donor' was not effective since full articles would still need to be screened to establish non-donor or donor sampling. A focused search was conducted in August 2017 and re-run in January 2018 using an expanded set of search terms: IVF, in vitro fertilisation, assisted reproduction, assisted reproductive technology (ART), assisted conception, intracytoplasmic sperm injection, ICSI, pregn*, parent*, mother, father, transition, support*, need* and psych* via the EBSCO host interface using Medline, CINAHL, Psychinfo, Psycharticles, and Behavioral Sciences Collection. Boolean operators and truncation were used to search for peer reviewed research articles in English available as full text articles. This search resulted in 1,210 peer reviewed articles. Three articles were added through manual searching (see diagram 2).

INSERT DIAGRAM 1 HERE

INSERT DIAGRAM 2 HERE

Process for selecting papers

Eligibility criteria

Inclusion criteria: studies published in English between January 1990 - January 2018 reporting data on discrete samples of previously infertile parents who conceived using non-donor AR (IVF with or without ICSI) where the pregnancy resulted in a singleton birth; studies which focused on pregnancy as well as the transition through birth to parenthood of children ranging from six weeks to 10 years (pre-school) were included. Studies which focused exclusively on pregnancy, or which included donor AR pregnancy, parenthood in specific conditions such as HIV, preimplantation genetic diagnosis (PGD), or surrogacy were all excluded.

Screening

Papers were screened by title and abstract for relevance and duplicates were eliminated by AO and HA; full texts were screened by two authors independently based on inclusion and exclusion criteria; ineligible papers were removed. Discrepancies around inclusions and exclusions were resolved following discussion. Nine authors were contacted to clarify whether their samples were non-donor or included singleton or multiple births (see Table 1). Five of these papers were subsequently included in the review (Barnes et al., 2004; Flykt et al., 2009; Gameiro et al., 2010, 2011a, 2011b; Nekkebroeck et al., 2010; Walker, Mills & Gilchrist, 2017) and four were excluded from the review.

Quality appraisal

A quality assurance tool appropriate for both quantitative and qualitative studies (Shepherd et al., 2006) was applied to full text papers by OA and HA. Quality variables (Shepherd et al., 2006) (see Table 2) enabled the reviewers to appraise both types of study equally and avoid value judgments/biases (Culley et al., 2013b). Table 2 gives each paper's quality assessment score; selected papers were required to achieve a score of at least four out of seven to be included (Culley et al., 2013b). Scores were agreed if there were no differences in initial independent scores following discussion, ensuring a 100% agreement was achieved.

Data collection process

Selected papers were imported into NVivo (QSR International, 2017) in pdf format recording details of each paper: authors; publication date; research setting; research aims; research

design; participants; sample size; recruitment method; data analysis methods; key findings; key themes; and methodological limitations including risk of bias.

Analysis

AO extracted data from each paper to create open codes in stage 1 which were checked by HA (Dixon-Woods, Agarwal, Jones, Young & Sutton, 2005; Braun & Clarke, 2006; Ward, House & Hamer, 2009). Open codes were then collapsed into themes, then higher order categories, or substantive themes (Braun & Clarke, 2006). For example, the codes 'maternal, 'mother, 'women', 'mother-child relationship' were grouped under the theme 'mothers' and the final substantive theme 'gendered experiences'. The resultant framework of substantive themes was discussed and refined by [HA, GM] and the final three substantive themes were agreed and checked subsequently by all co-authors. These themes describe psychosocial factors which shape transition to parenthood for non-donor AR parents. Extracted data were then reorganised according to these themes, which were employed as the framework for the narrative summary. In order to describe paper characteristics, quantitative data on the attributes of papers were collated and counted. These are reported in 'paper characteristics' below and in Table 1.

Results

Search, screening and selection results

1,736 papers were screened for relevance (titles, abstract), 1,502 and 26 duplicates were eliminated. 118 papers were screened against the inclusion/exclusion criteria; 55 full text papers were selected for further screening and three further articles were added through manual searching (n=58). Fifty-eight papers were read by [AO, HA]; 39 did not meet the conclusion criteria] and 19 papers were selected for review. 19 selected papers were screened by all authors prior to final inclusion in the review.

INSERT TABLE 1 HERE

Paper characteristics

Table 1 provides an overview of the heterogeneity of the data using the variables: authors, year, title, country, research design, methods; sample size; focus; findings; theme.

Participants

Sample sizes varied from eight to over 500 participants. McMahon, Ungerer, Tennant & Saunders (1997) and McMahon et al. (2003) used the same sample in a longitudinal study; Golombok et al. (1995; 1996) used a sample in a UK-only study and then included it in a

separate international study. Gameiro, Canavarro, Mouro-Ramos, Boivin & Soares (2010), Gameiro, Canavarro, Boivin, Mouro-Ramos & Soares (2011a) and Gameiro, Mouro-Ramos, Canavarro & Soares (2011b) in three papers from one study used the same sample at different time points with different outcome measures; two other authors (Nekkebroeck, et al., 2010; Barnes et al., 2004) utilised the same sample as each other. Cook et al. (1997) combined an original sample with another from an existing study. Finally, Colpin et al. (1995) and Colpin and Seonen (2002) used the same sample for their pilot and main studies reported separately as two papers.

Design

The majority of the papers (14) recruited couples, four focused solely on mothers and one on fathers. Studies varied in relation to sampling method, size and outcome measures. All 18 quantitative papers used control or comparison groups (See Table 1). Six papers used questionnaires alone (Barnes et al. 2004; Hjelmstedt & Collins 2008; Flykt et al. 2009; Gameiro et al. 2010, 2011a, 2011b; Nekkebroeck et al. 2010; Jongbloed-Pereboom, Middleburg, Heineman, Haadsma &Hadders-Algra, 2012). Ten used multiple methods: questionnaires and data from teacher reports (Hahn & DiPietro 2001; Colpin & Soenen 2002); questionnaires, and structured observations of mother-child interactions (Colpin et al. 1995, Cairo, Darwiche, Tissot, Favez, Germond, Guex, de Routen, Frascarola & Despland, 2012); questionnaires and semi-structured interviews with mothers/fathers (Golombok et al. 1995, 1996; Cook et al, 1997; McMahon et al. 1997, 2003) and questionnaires, semi-structured interviews with mothers and observations of child behaviour (Gibson, Ungerer, McMahon, Leslie & Saunders, 2001). The qualitative study used semi-structured interviews in an interpretative phenomenological analysis study (Walker et al. 2017).

Quality assessment

Quality scores ranged from overall excellent (7/7) to satisfactory (4/7), with no study scoring below 4. The majority of the studies recruited AR and spontaneously conceived (SC) samples from fertility clinics/obstetric hospitals. While methods and instruments were clearly described by all the authors, there was no detail on methodology except in the qualitative paper (Walker et al 2017), and few of the papers described who did the data collection and analysis.

INSERT TABLE 2 HERE

Thematic review: psychosocial factors affecting transition to parenthood

Differences were reported on a range of psychosocial measures which shape the transition from pregnancy to parenthood: locus of control, parental adjustment and child behaviour, parental stress, parental investment in the child, self-esteem and self-efficacy, greater levels of protectiveness (separation anxiety) towards child, marital and family functioning, family alliance, marital satisfaction and communication as well anxiety, indirect aggression and less respect for child (see Table 4). In addition, Walker et al., (2013) found that physical exercise gave IVF mothers a sense of control over their transition to motherhood.

These psychosocial differences at the individual and group level suggest three broader psychosocial themes, i) social support ii) family and marital relationships iii) parents' emotional wellbeing, shape the transition to parenthood for non-donor IVF couples.

INSERT TABLE 4 HERE

Social support

In three related studies, Gameiro et al. reported on one study using a non-donor sample of singleton birth AR parents and an SC control group in Portugal to investigate social support;. Gameiro et al. (2010) measured 'social nesting' (an inward movement socially and emotionally towards family members and away from friends) in AR couples and SC couples. Irrespective of how the children were conceived, the parents in the study turned to their immediate family post-partum, considering extended family and friends less important at this stage, although AR women perceived less support from friends than did SC women. In 2011(a) Gameiro et al. studied parental investment in the child (PIC, a wish to protect and strengthen ties with children and to shape a parental identity) in couples who conceived through ART. AR or SC conception had no bearing on PIC and the association between PIC and satisfaction with marital relationship and network support was similar in both groups. If the marital relationship was under stress in either group, then PIC lessened. In 2011 (b) Gameiro et al. studied emotional and instrumental support from social networks, parenting stress and PIC. No differences between AR and SC couples transition to parenthood or care for their children were found. However, for men in both groups, the emotional support offered by friends was most important as they became parents, and for women regardless of conception practical support from the nuclear family was perceived as the most important.

Family and marital relationships

A European study (Belgium, Denmark/Sweden (Nordic group), United Kingdom) compared the potential cultural impact of parenting styles between non-donor [IVF, ICSI] and SC of

parents with five-year-old children (Barnes et al. 2004). The General Health Questionnaire (GHQ), short form Parental Stress Index (PSI) and Dyadic Adjustment Scale (DAS) were used. No differences were observed for well-being and family functioning. Mothers of ICSI conceived children were more committed to being a parent than the SC group and reported fewer hostile or aggressive feelings to their children. Between country differences showed that Belgian and British mothers were more committed to their work and fathers were less committed to parenting than were those in the Nordic group. Fathers' response rates were lower than mothers across all four countries and response rates for British and Belgian mothers were higher than the Nordic group.

As part of a larger study into the transition from infertility to parenthood, Cairo et al. (2012) assessed family dynamics among Swiss non-donor AR and SC parents using observation and self-report questionnaires during the fifth month of pregnancy and nine months post-partum. Family alliance (defined as a family's ability to work together as a team), marital satisfaction and parental attachment scores were similar or higher in the non-donor AR sample compared to the SC group during pregnancy. However, family alliance scores had decreased in the non-donor AR parents nine months post-partum**.** There was no evidence that family alliance could be predicted with prenatal factors (marital relationships and parents' attachment to the fetus).

Using the same methodology and measures as Golombok et al. (1995, 1996), Cook et al. (1997) compared the original samples from the UK, Netherlands, Spain and Italy (Golombok et al. (1995, 1996) with a sample of families recruited from Bulgaria. They found greater difficulties in parental adjustment, including greater secrecy and uncertainty, and in child behaviour in families from Bulgaria. The authors suggested that specific social contexts may affect outcomes of AR where countries with different traditions and cultural practices are compared.

Parent-child relationships and parents' psychosocial functioning were assessed using questionnaires and observations of mother-child interactions in Belgian families with a 24-30 month old child (Colpin at al. 1995). No significant group effects for parent-child relationships, including behaviour of mother-child, or psychosocial functioning (personality, developmental history and marital relationship) between non-donor AR and SC mothers and fathers were found. Employed non-donor AR mothers showed less acknowledgement of their child's autonomy compared to both unemployed AR mothers and employed SC mothers. No

significant differences between AR and SC groups in terms of parenting or children's psychosocial development at follow up (children's ages 8-9) were reported by Colpin and Seonen (2002).

Flykt et al. (2009) used a later version of the PSI (McMahon et al., 2003) to examine how parental expectations predicted parenting stress in the first year after birth, using Finnish AR and SC couples during pregnancy and when the child was two months and 12 months old. In both groups the association between expectations and subsequent parental stress was similar. Like McMahon et al. (2003), Flykkt et al., found some variations in associations, such as SC mothers reported expectations (measured in pregnancy) for their spouse's autonomy with their child as less good than predicted after the child was born, and there was a shorter duration of high parenting stress levels for a group of AR fathers.

Gibson et al. (2000) reported on mother-child interactions in AR and SC mothers in pregnancy and at 12 months postpartum. No significant between-group differences in infant attachment or mother-child interactions were found. Maternal reports of anxieties about adjustment to parenthood and infant difficulties by the AR group in pregnancy had not translated into negative attachment relationships.

Golombok et al. (1995) collected data on children, aged 4-8 years, their mothers and fathers, using standardized interviews with mothers to measure 'quality of parenting'. The quality of parenting and relationships was superior in families with children conceived by non-donor IVF compared to SC families. Levels of stress associated with parenting (marital state, anxiety and depression) were significantly higher in the SC group. In a larger, international study, Golombok et al. (1996) using the same methods as their 1995 UK study to compare quality of parenting, marital and psychiatric state, child behaviour and emotions between IVF and SC in four countries (UK, Spain, Italy and The Netherlands). Sample sizes varied but no significant cross-country differences relating to quality of parenting and psychosocial development of children between any groups were reported.

Hahn and DiPietro (2001) examined quality of parenting and family functioning using postal questionnaires in non-donor AR mothers of 3-7 year old children in Taiwan. Self-report data were compared with behavioural adjustment scores of the corresponding young children measured by postal questionnaire completed by their teachers, who were blinded to the method of conception. While AR mothers reported greater levels of protectiveness towards their

children, including maternal separation anxiety, the teachers did not perceive that maternal protective behaviours limited appropriate child development; these children were rated as showing fewer behavioural problems. However, AR mothers were significantly less satisfied with family functioning and marital communication than SC mothers.

A Swedish study of non-donor IVF and SC control group fathers were investigated at 26 weeks gestation and 2 months post-partum (Hjelmstedt & Collins 2008). Fathers' relationship with their children was tested using personality traits, anxiety, depressive symptoms, attachment and father-infant relationships. Non-donor AC fathers exhibited more anxiety and indirect aggression as well as less assertiveness during pregnancy in comparison with SC fathers. Both groups were equally attached to their children.

A study on parental well-being and anxiety using Dutch AR (IVF/ICSI) and control group SC couples, showed that non-donor AR couples did not experience increased anxiety or mental health issues one year after birth, although they did not report base line data (Jongbloed-Pereboom et al. 2012). There was an association between a higher number of treatment cycles and female cause for infertility (women) and longer wait for pregnancy (men) with lower anxiety and good mental health.

Using Barnes et al.'s original sample, with additional IVF couples, and using the same measures for between-country comparison, Nekkebroeck et al. (2010) explored potential cultural impacts of different European countries on parenting styles following IVF/ICSI and SC conceptions. Response rates in the Nordic group were consistently good, while the lowest group of responders were Belgian fathers. Belgian ICSI mothers had on average higher anxiety and insomnia than ICSI mothers in the other two countries; British IVF mothers had less anxiety and insomnia than mothers in other countries; Belgian SC fathers had a lower score for social dysfunction than SC fathers in other countries. However, the total GHQ scores for all mothers (SC, IVF, ICSI) showed no significant differences. Total GHQ scores for IVF and ICSI fathers in the UK and Nordic groups had better scores than Belgian fathers. SC and IVF mothers in the UK reported more difficulties and stress with parent–child relationships, while SC and ICSI fathers in the UK described more parent–child dysfunctional interaction and less marital satisfaction. UK mothers across all groups reported higher stress levels than mothers in all groups in other countries. Mothers in the Nordic group expressed less negative feelings towards their children compared to mothers in other countries; although the authors draw

attention to the lower response rate in Belgian non-donor AR fathers. Nekkebreock et al. (2010) conclude that there are some cultural differences in parenting practices/styles both for AR and SC parents. Differences between countries were greater than differences between groups within countries.

Parents' emotional well-being

McMahon et al. (1997) investigated psychological adjustment to early motherhood during the first 4 months postpartum in Australian women. No differences were observed between non-donor IVF mothers and a control SC mothers on anxiety, depression or marital satisfaction. Non-donor AR mothers reported lower self-esteem and maternal self-efficacy, although observations of maternal behaviours did not reveal differences in the quality of interactions with their infants, and early adjustment difficulties were mostly accounted for by mothers who underwent repeated IVF treatment cycles.

McMahon et al. (2003) used self-report measures of psychological adjustment (well-being, anxiety, emotional control and stress), in non-donor AR and SC parents of five year old children in Australia. Normative psychosocial adjustment between groups was confirmed even after the small numbers of twins in both groups were excluded from the analysis. AR mothers had a more external locus of control than other mothers, but not fathers. Mothers with higher numbers of IVF cycles reported more positive marital adjustment, lower parenting stress and lower scores on the Parental Distress and Difficult Child domains of the PSI. Finally, high numbers of IVF treatments also predicted lower (more defensive) scores on the PSI's Defensive Responding domain. These findings were repeated when the singleton data was analysed separately, although the samples were small.

Walker et al. (2017) explored the experiences and decision-making processes related to physical activity in 8 British non-donor pregnant or had given birth within two years AR women as they transitioned to motherhood. They described their experiences of transitioning from a childless woman to a non-donor AR mother as dangerous and unpredictable. All participants perceived infertility to be stigmatising and defining; they felt pressured to move on to a new non-stigmatised identity as mothers. Women worried about being viewed negatively by society and their families and discussed their perceptions of pregnancy and safety concerns in relation to physical activity, and how they consolidated their own needs with those of the child. Physical activity was seen as providing a sense of control, and as soothing although there were concerns around safety.

Discussion

This is the first review to report on research comparing the transition to parenthood following successful non-donor singleton AR and SC couples. Differences for the two groups were reported on a range of quantitative psychosocial measures during the transition from pregnancy to parenthood: locus of control, parental adjustment and child behaviour, parental stress, parental investment in the child, self-esteem and self-efficacy, greater levels of protectiveness (separation anxiety) towards child, marital and family functioning, family alliance, marital satisfaction and communication as well anxiety, indirect aggression and less respect for child (see Table 4); and qualitatively Walker et al., (2013) reported physical exercise gave IVF mothers a sense of control over their transition to motherhood. We have identified three broad themes reflecting the psychosocial differences in this transition: social support, relationships and emotional well-being.

Our review has also identified social structures which shape parents' transition: the cultural context of parenting (Nekkebroeck et al., 2010), employment status of women (Colpin et al., 1995) and gender differences. However by far the most significant finding was that men's experiences are under-reported. In their systematic review into psychological and social functioning in AR parents (non-donor and donor), Hammarberg et al. (2008) conclude that whilst many issues are shared with couples who conceive spontaneously, anxiety related to the survival of the fetus, early parenting problems and lower postnatal confidence seem more prevalent among AR parents and there is conflicting evidence around how AR parents adjust to pregnancy, childbirth and parenting. They considered that parenthood may be idealized by AR couples -negatively affecting their adjustment to parenthood and 'the development of a confident parental identity' (Hammarberg et al., 2008: 395). This resonates with Sandelowski (1995) and Olshansky (2003) who both describe a pervasive and lingering 'infertile identity' which affects AR parents beyond pregnancy into parenthood. Our review has shown that higher numbers of IVF cycles, cause of infertility and a longer wait for pregnancy may exacerbate this period of transition as shown in McMahon et al., (1997) and Jongbloed-Pereboom et al., (2012)'s studies.

Methodological issues

This is the first review to theoretically inform our understanding of the psychosocial factors which shape parenting after AR in non-donor couples. Our search shows there were few non-

donor AR studies available for inclusion and a lack of clarity in identifying non-donor couples in mixed samples. Our review also showed that few research studies specify non-donor AR samples with several interconnecting research teams collaborating and frequently using the same sample over time -which could lead to socially desirable responding - or adding to the original sample. Apart from Walker et al. (2017), research included here focused on psychological functioning rather than the complexities of psychosocial support. In the 18 quantitative studies, the most commonly used questionnaires included GHQ, PSI, DAS and STAI. Multiple scales were used with measurements for attachment/bonding, emotional well-being, quality of parenting, parental investment in children and marital satisfaction. Questionnaires were delivered face to face except for one by post (Hahn and DiPietro, 2001). Relying heavily on self-report questionnaires is problematic because the individual respondent has a 'strong bias to present the most favourable impression of themselves to minimise indications of problems or stress in the parent–child relationship' (McMahon et al., 2003: 361). Our review suggests that greater focus on qualitative inquiry could help to off-set some of the inherent limitations of survey methodologies. Eight studies included either observations (Colpin at al. 1995; Cairo et al., 2012) or semi-structured interviews (Golombok et al., 1995, 1996; Cook et al., 1997; McMahon et al., 1997, 2003), or both (Gibson et al., 2000). Observation methods included: observation assessments of mother-child interactions (Gibson et al., 2000); observations of mother-child interactions using videos and ratings (Colpin et al., 1995), and observation using pre- or postnatal play scales (Cairo et al., 2000), and all focused exclusively on mother-child interactions- none on father-child.

The five interviews studies (Golombok et al., 1995, 1996; Cook et al 1997; Gibson et al., McMahon et al., 2003) only interviewed women, relying on questionnaires to elicit data from men. Even though fathers were included, not all male partners responded (McMahon et al., 2003, Colpin and Seonen, 2002). There was only one paper of non-donor fathers' experiences of the transition to AR parenthood.

Practice implications

Unlike previous work on AR parenting which mixes donor and non-donor samples, our review focused on non-donor conception and psychosocial factors which shape transition to non-donor parenthood. We have shown that the existing research on social support for parents following successful non-donor AR is limited, with only one study (Gameiro et al., 2010, 2011a, 2011b) focused directly on social support. This provides insufficient evidence for health professionals

to base the assessment, planning and delivery of support needs for this group of new parents. Our results have implications for health professionals in primary care including midwives, health visitors, general practitioners and mental health nurses. The findings presented here suggest that non-donor AR parents may require assessment of psychosocial support as they transition through pregnancy and birth into early parenthood, particularly fathers.

Suggestions for future research

Reviewing and evaluating quality across a heterogeneous selection of studies is problematic (Knafl and Whittemoore, 2007) but using Shepherd et al.'s (2006) criteria allowed the application of a more holistic approach to appraisal. Our thematic narrative has clarified the state of the literature in the field and suggested topics for future research, namely the need for research into men's experiences of parenting after non-donor AR and the need for wider and more inclusive methodologies and measures to capture the nuances and complexities of transition to non-donor AR parenthood.

A further area for future research includes an understanding of how setting and location as well as time points at which the data are collected influence both fathers' and mothers' experiences of AR parenthood. Given the small sizes of the samples and the use of the same samples over time, we cannot assume that these studies are representative of a country or culture or of the non-donor AR population.

Conclusions

The support needs of all AR parents go unrecognised in primary care (Torr, 2001). Our review shows that non-donor AR parents may have different needs to donor and SC couples as they transition to parenthood. Our findings suggest that there may be three psychosocial factors which shape the transition to parenthood for non-donor AR couples differently to SC couples.

Further research is needed to determine whether the psychosocial factors we have identified in this review are repeated in empirical work with discrete samples of non-donor AR couples. Qualitative studies would allow practitioners to hear what couples perceive they need and how best to meet those needs as they transition after non-donor AR to parenthood.

References

Allan, H. T. (2007). Liminality and the experience of infertility: the role of the clinic in creating a liminal space. *Nursing Inquiry* 14(2), 132-139

Allan, H. T. (2009).The shaping of organisational routines and the distal patient in assisted reproductive technologies. *Nursing Inquiry*, 16, 241-50.

Barnes, J., Sutcliffe, A.G., Kristoffersen, I., Loft, A., Wennerholm, U., Tarlatzis, B.C., Kantaris, X., Nekkebroeck, J., Hagberg, B.S., Madsen, S.V., Bonduelle, M. (2004). The influence of assisted reproduction on family functioning and children's socio-emotional development: results from a European study. *Human Reproduction*, 19(6), 1480-7.

Braun, V., Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77 - 101.

Braverman, A., Boxert, A.S., Corson, S.L., Coutifaris, C., Hendrix, A. (1998). Characteristics and attitudes of parents of children born with the use of assisted reproductive technology. *Fertility and Sterility*, 70(5), 860-865

Cairo, S., Darwiche, J., Tissot, H., Favez, N., Germond, M., Guex, P., de Routen, Y., Frascarolo, F., Despland, J.N. (2012). Family interactions in IVF families: change over the transition to parenthood. *Journal of Reproductive and Infant Psychology*, 30(1), 5 - 20.

Colpin, H., Demyttenaere, K., Vandemeulebroecke, L. (1995). New Reproductive Technology and the Family: The Parent-Child Relationship Following in vitro Fertilization. *Journal of Child Psychology and Psychiatry*, 36(8), 1429-41

Colpin, H., Seonen, S. (2002). Parenting and psychosocial development of IVF children: a follow-up study. *Human Reproduction*, 17(4), 1116-23.

Cook, R., Vatev, I., Michova, Z., Golombok, S. (1997). The European study of assisted reproduction families: a comparison of family functioning and child development between Eastern and Western Europe. *Journal of Psychosomatic Obstetrics and Gynaecology*, 18(3), 203-212.

Culley, L., Hudson, N., Lohan, M. (2013a). Where are all the men? The marginalization of men in social scientific research on infertilityThe marginalization of men in social scientific research on infertility Reproductive BioMedicine Online, 27(3), 225-235

Culley, L., Law, C., Hudson, N., Denny, E., Mitchell, H., Baumgarten, M., Raine –Fenning, N. (2013b). The social and psychological impact of endometriosis on women's lives: a critical narrative review. *Human Reproduction Update*, 19(6), 625-39.

Dixon-Woods, M., Agarwal, S., Jones, D., Young, B., Sutton, A. (2005). Synthesising qualitative and quantitative evidence: a review of possible methods. *Journal of Health Services Research Policy*, 1, 45-53.

Flykt, M., Lindblom, J., Punamäki, R.L., Poikkeus, P., Repokari, L., Unkila-Kallio, L., Vilska, S., Sinkkonen, J., Tiitinen, A., Almqvist, F., Tulppala, M. (2009). Prenatal expectations in transition to parenthood: former infertility and family dynamic considerations. *Journal of Family Psychology,* 23(6), 779-89.

Gameiro, S., Canavarro, M.C., Moura-Ramos, M., Boivin, J., Soares, I. (2010). Social Nesting: Changes in Social Network and Support Across the Transition to Parenthood in Couples That Conceived Spontaneously or Through Assisted Reproductive Technologies. *Journal of Family Psychology,* 24(2), 175 - 187.

Gameiro, S., Canavarro, M.C., Boivin, J., Moura-Ramos, M., Soares, I., Almeida Santos, T. (2011a). Parental investment in couples who conceived spontaneously or with assisted reproductive techniques. *Human Reproduction,* 26(5), 1128 - 1137.

Gameiro, S., Moura-Ramos, M., Canavarro, M.C., Soares, I. (2011b). Network support and parenting in mothers and fathers who conceived spontaneously or through assisted reproduction. *Journal of Reproductive and Infant Psychology,* 29(2), 170 - 182.

Gibson, F.L., Ungerer, J.A., McMahon, C.A., Leslie, G.I., Saunders, D.M. (2000). The Mother-Child Relationship Following In Vitro Fertilisation (IVF): Infant Attachment, Responsivity, and Maternal Sensitivity. *Journal Child Psychol Psychiatry,* 41(8), 1015–1023

Golombok, S., Cook, R., Bish, A., Murray, C. (1995). Families created by the new reproductive technologies: quality of parenting and social and emotional development of the children. *Child Development,* 66(2), 285-98.

Golombok, S., Brewaeys, A., Cook, R., Giavazzi, M.T., Guerra, D., Mantovani, A., van Hall, E., Crosignani, P.G., Dexeus, S. (1996). The European study of assisted reproduction families: family functioning and child development. *Human Reproduction,* 11(10), 2324-31.

Golombok, S., Lycett, E., MacCallum, F., Jadva, V., Murray, C., Abdalla, H., Jenkins, J., Margara, R., Rust, J. (2004). Parenting infants conceived by gamete donation *Journal of Family Psychology,* 18, 443-452.

Golombok, S., Jadva, V., Lycett, E., Murray, C., MacCallum, F. (2005). Families created by gamete donation: follow-up at age 2, *Human Reproduction,* 20, 286-293.

Golombok, S., Murray, C., Jadva, V., Lycett, E., MacCallum, F., Rust, J. (2006). Non-genetic and non-gestational parenthood: consequences for parent–child relationships and the

psychological well-being of mothers, fathers and children at age 3, H*uman Reproduction*, 21(7): 1918–1924.

Golombok S. (2017) Parenting in new family forms. *Current Opinion in Psychology*, 15, 76-80.

Hahn, C.S., DiPietro, J.A. (2001). In vitro fertilization and the family: quality of parenting, family functioning, and child psychosocial adjustment. *Developmental Psychology,* 37(1), 37-48.

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. H*uman Reproduction Update*, 14(5), 395 - 414.

HFEA Human Fertilisation and Embryology Authority. (2018). *Fertility treatment2014–2016 Trends and figures.* Retrieved 04/12/18 from http://www. hfea.gov.uk/media/2563/hfea-fertility-trends-and-figures-2017-v2.pdf.

Hjelmstedt, A., Collins, A. (2008). Psychological functioning and predictors of father-infant relationship in IVF fathers and controls. *Scandinavian Journal of Caring Sciences,* 22, 72 - 78.

Jongbloed-Pereboom, M., Middelburg, K.J., Heineman, M.J., Bos, A.F., Haadsma, M.L., Hadders-Algra, M. (2012). The impact of IVF/ICSI on parental well-being and anxiety 1 year after childbirth. *Human Reproduction,* 27(8), 2389 - 2395.

Knafl, K., Whittemoore, R. (2017). Top Ten Tips for Undertaking Synthesis Research. R*esearch in Nursing and Health*, 40, 189–193.

McMahon, C.A., Ungerer, J.A., Tennant, C., Saunders, D. (1997). Psychosocial adjustment and the quality of the mother-child relationship at four months postpartum after conception by in vitro fertilization. *Fertility and Sterility*, 68(3), 492-500.

McMahon, C.A., Gibson, F., Leslie, G., Cohen, J., Tennant, C. (2003). Parents of 5-Year old in vitro fertilization children: Psychological adjustment, parenting stress, and the influence of subsequent in vitro fertilization treatment. *Journal of Family Psychology,* 17(3), 361-369.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *British Medical Journal*, 338, b2535.

Nekkebroeck, J., Barnes, J., Bonduelle, M., Wennerholm, U-B., Ponjaert-Kristoffersen, I., Loft, A., Sutcliffe, A.G. (2010). International comparison of parenting styles in ICSI,

IVF and natural conception families: Results from a European study. E*uropean Journal of Developmental Psychology*, 7(3), 329 - 349.

Olshansky, E.F. (2003). A theoretical explanation for previously infertile mothers' vulnerability to depression. *Journal of Nursing Scholarship,* 35(3),263-268.

ONS Office for National Statistics. (2017). Births in England and Wales: 2016. Retrieved from 16/04/19 www.ons.gov.uk/peoplepoulationand community/ birthsdeathsandmarriages/livebirths/bulletins/birthsummarytablesenglandandwales/2016#number-of-live-births-in-the-uk-decreases.

Peterson, J., Pearce, P.F., Ferguson, L.A., Langford, C.A. (2017) Understanding scoping reviews: Definition, purpose, and process. Journal of the American Association of Nurse Practitioners *29* (2017) 12–16

QSR International 2017 Retrieved 06/09/17 from http://www.qsrinternational.com/.

Sandelowski, M. (1995). A Theory of Transition to Parenthood of Infertile Couples. R*esearch In Nursing and Health,* 18(2), 123-132.

Shepherd, J., Harden, A., Rees, R., Brunton, G., Garcia, J., Oliver, S., Oakley, A. (2006). Young people and healthy eating: a systematic review of research on barriers and facilitators. *Health Education Research,* 21 (2), 239–257.

Taubman-Ben-Ari, O., Skvirsky, V., Bar Shua, E., Horowitz, E. (2017). Satisfaction in life among fathers following fertility treatment. *Journal Reproduction Infant Psychology,* 35(4), 334-341

Torr, H. (2001). *The experience of pregnancy and parenthood after assisted conception*. ACeBabes, Nottingham.

van Balen, F., Naaktgeboren, N., Trimbos-Kemper, C.M. (1996). In-vitro fertilization: the experience of treatment, pregnancy and delivery. *Human Reproduction,* 11(l), 95-98.

van den Akker, O., Postavaru, G., Purewal, S. (2016). A systematic review and meta analysis of the psychosocial consequences of twins and multiple births following medically assisted reproduction. *RBMOnline*, 33 (1), 1-14.

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,* http://dx.doi.org/10.1080/02646838.2017.1313968.

Ward, V., House, A., Hamer, S. (2009). Developing a framework for transferring knowledge into action: a thematic analysis of the literature. *J Health Serv Res Policy*, 14(3), 156-64.

Weaver, S.M., Clifford, E., Gordon, A.G. (1993). A follow-up study of successful 'IVF/GIFT' couples: social-emotional well-being and adjustment to parenthood. *Journal of Psychosomatic Obstetrics and Gynaecology*, 14 Special Issue, 5-16

Whittemore, R., Knafl, K. (2005). The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5), 546 - 553.

Acknowledgements