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

1 **Abstract**

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

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

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

20

21 **Key words:**

22 Assisted reproductive technology

23 Non-donor

24 Parenthood

25 Psychosocial

26 Social support

27 Transition

28

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### 33 **Introduction**

34 Worldwide, an estimated 2.4 million cycles of assisted reproduction (AR), predominantly in  
35 vitro fertilisation (IVF), are performed annually. The trend is increasing and the latest available  
36 data from the UK (2016) showed over 20,000 babies were born following 68,000 cycles  
37 (HFEA, 2018). This accounts for 2-3% of the estimated 775,000 babies born in the UK for the  
38 same year (ONS, 2017). Approximately 14% (2,781) of the babies born from IVF cycles in  
39 2016 involved donor eggs, sperm or both, and while there were an additional 5,500 donor  
40 insemination cycles, this means that the majority of AR cycles use couples' own gametes.

41 There has been continuing interest in whether previously infertile couples who conceive  
42 through AR find the transition to parenthood difficult (Colpin, Demyttenaere &  
43 Vandemeulebroecke, 1995; Sandelowski, 1995; van Balen, Naaktgeboren & Trimbos-Kemper,  
44 1996; Olshansky, 2003). Studies into pregnancy and parenthood following successful donor  
45 AR show that couples who parent after donor AR adapt well to parenthood and may rise to the  
46 challenges of parenthood better than those who conceive spontaneously (Golombok, 2017).  
47 Less attention is given to the overwhelming majority of IVF parents who use their own gametes  
48 and give birth to singletons. Donor IVF transcends the boundaries of what is considered  
49 'natural' procreation and third party assisted conception has been widely studied as particularly  
50 challenging for heterosexual couples (Torr, 2001; van den Akker, Postava & Purewal, 2016).  
51 Existing research utilises mixed samples of donor / non-donor and singleton /multiple births  
52 couples, meaning any differences in their experiences are unclear (Hammarberg et al., 2008).  
53 There are consequently gaps in the non-donor AR parenthood literature which feeds into an  
54 absence of inquiry into gendered relations in non-donor AR parenthood and non-donor fathers'  
55 needs following AR (Culley et al., 2013a).

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

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

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

## 68 **Review question**

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

71

## 72 **Methods**

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

## 78 *Information sources and search strategy*

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

94

95 INSERT DIAGRAM 1 HERE

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

96 INSERT DIAGRAM 2 HERE

97 ***Process for selecting papers***

98 *Eligibility criteria*

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

106 *Screening*

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

115 ***Quality appraisal***

116 A quality assurance tool appropriate for both quantitative and qualitative studies (Shepherd et  
117 al., 2006) was applied to full text papers by OA and HA. Quality variables (Shepherd et al.,  
118 2006) (see Table 2) enabled the reviewers to appraise both types of study equally and avoid  
119 value judgments/biases (Culley et al., 2013b). Table 2 gives each paper's quality assessment  
120 score; selected papers were required to achieve a score of at least four out of seven to be  
121 included (Culley et al., 2013b). Scores were agreed if there were no differences in initial  
122 independent scores following discussion, ensuring a 100% agreement was achieved.

123 ***Data collection process***

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

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

## 128 *Analysis*

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

## 141 **Results**

### 142 *Search, screening and selection results*

143 1,736 papers were screened for relevance (titles, abstract), 1,502 and 26 duplicates were  
144 eliminated. 118 papers were screened against the inclusion/exclusion criteria; 55 full text  
145 papers were selected for further screening and three further articles were added through manual  
146 searching (n=58). Fifty-eight papers were read by [AO, HA]; 39 did not meet the conclusion  
147 criteria] and 19 papers were selected for review. 19 selected papers were screened by all authors  
148 prior to final inclusion in the review.

149 INSERT TABLE 1 HERE

### 150 *Paper characteristics*

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

### 153 *Participants*

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

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

### 165 *Design*

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

### 180 *Quality assessment*

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

186 INSERT TABLE 2 HERE

### 187 **Thematic review: psychosocial factors affecting transition to parenthood**

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

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

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

198 INSERT TABLE 4 HERE

### 199 *Social support*

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

### 217 *Family and marital relationships*

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

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

229         As part of a larger study into the transition from infertility to parenthood, Cairo et al.  
230 (2012) assessed family dynamics among Swiss non-donor AR and SC parents using  
231 observation and self-report questionnaires during the fifth month of pregnancy and nine months  
232 post-partum. Family alliance (defined as a family's ability to work together as a team), marital  
233 satisfaction and parental attachment scores were similar or higher in the non-donor AR sample  
234 compared to the SC group during pregnancy. However, family alliance scores had decreased  
235 in the non-donor AR parents nine months post-partum. There was no evidence that family  
236 alliance could be predicted with prenatal factors (marital relationships and parents' attachment  
237 to the fetus).

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

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

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

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

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

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

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

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

287 A Swedish study of non-donor IVF and SC control group fathers were investigated at  
288 26 weeks gestation and 2 months post-partum (Hjelmstedt & Collins 2008). Fathers'  
289 relationship with their children was tested using personality traits, anxiety, depressive  
290 symptoms, attachment and father-infant relationships. Non-donor AC fathers exhibited more  
291 anxiety and indirect aggression as well as less assertiveness during pregnancy in comparison  
292 with SC fathers. Both groups were equally attached to their children.

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

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

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

### 318 *Parents' emotional well-being*

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

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

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

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## 346 **Discussion**

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

358 Our review has also identified social structures which shape parents' transition: the  
359 cultural context of parenting (Nekkebroeck et al., 2010), employment status of women (Colpin  
360 et al., 1995) and gender differences. However by far the most significant finding was that men's  
361 experiences are under-reported. In their systematic review into psychological and social  
362 functioning in AR parents (non-donor and donor), Hammarberg et al. (2008) conclude that  
363 whilst many issues are shared with couples who conceive spontaneously, anxiety related to the  
364 survival of the fetus, early parenting problems and lower postnatal confidence seem more  
365 prevalent among AR parents and there is conflicting evidence around how AR parents adjust  
366 to pregnancy, childbirth and parenting. They considered that parenthood may be idealized by  
367 AR couples -negatively affecting their adjustment to parenthood and 'the development of a  
368 confident parental identity' (Hammarberg et al., 2008: 395). This resonates with Sandelowski  
369 (1995) and Olshansky (2003) who both describe a pervasive and lingering 'infertile identity'  
370 which affects AR parents beyond pregnancy into parenthood. Our review has shown that  
371 higher numbers of IVF cycles, cause of infertility and a longer wait for pregnancy may  
372 exacerbate this period of transition as shown in McMahon et al., (1997) and Jongbloed-  
373 Pereboom et al., (2012)'s studies.

## 374 ***Methodological issues***

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

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377 donor AR studies available for inclusion and a lack of clarity in identifying non-donor couples  
378 in mixed samples. Our review also showed that few research studies specify non-donor AR  
379 samples with several interconnecting research teams collaborating and frequently using the  
380 same sample over time -which could lead to socially desirable responding - or adding to the  
381 original sample. Apart from Walker et al. (2017), research included here focused on  
382 psychological functioning rather than the complexities of psychosocial support. In the 18  
383 quantitative studies, the most commonly used questionnaires included GHQ, PSI, DAS and  
384 STAI. Multiple scales were used with measurements for attachment/bonding, emotional well-  
385 being, quality of parenting, parental investment in children and marital satisfaction.  
386 Questionnaires were delivered face to face except for one by post (Hahn and DiPietro, 2001).  
387 Relying heavily on self-report questionnaires is problematic because the individual respondent  
388 has a ‘strong bias to present the most favourable impression of themselves to minimise  
389 indications of problems or stress in the parent–child relationship’ (McMahon et al., 2003: 361).  
390 Our review suggests that greater focus on qualitative inquiry could help to off-set some of the  
391 inherent limitations of survey methodologies. Eight studies included either observations  
392 (Colpin et al. 1995; Cairo et al., 2012) or semi-structured interviews (Golombok et al., 1995,  
393 1996; Cook et al., 1997; McMahon et al., 1997, 2003), or both (Gibson et al., 2000).  
394 Observation methods included: observation assessments of mother-child interactions (Gibson  
395 et al., 2000); observations of mother-child interactions using videos and ratings (Colpin et al.,  
396 1995), and observation using pre- or postnatal play scales (Cairo et al., 2000), and all focused  
397 exclusively on mother-child interactions- none on father-child.

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

### 403 ***Practice implications***

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

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

#### 414 ***Suggestions for future research***

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

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

#### 427 **Conclusions**

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

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

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