

Table 1 Reviewed articles

	Authors, Year Title Country	Research design Methods	Sample	Comparison / Control group	Focus	Findings	Theme
1	Barnes et al., 2004 <i>The influence of assisted reproduction on family functioning and development: results from a European study</i> <u>UK, Belgium, Denmark and Sweden.</u>	Quantitative Questionnaires, scales: GHQ, short form PSI, DAS.	Couples, 5 years after birth UK (IVF 156, ICSI 189, SC 163); Belgium (IVF 135, ICSI 190, SC 188); Denmark (IVF 67, ICSI 66, SC 70); Sweden (IVF 66, ICSI 67, SC 67). Totals are UK (n=580), Belgium (n=513), Denmark and Sweden (n=405). A research group in Greece was a collaborator but did not distribute parental questionnaires, and no Greek results are reported in this paper. Personal communication with authors Summer 2017	<u>Yes</u>	Wellbeing and adaption to parental role in parents of ICSI conceived children compared to IVF and SC groups.	Very few differences between the conception type groups with respect to parental well-being. Mothers of ICSI conceived children were more committed to being a parent than the naturally conceived group and reported fewer hostile or aggressive feelings to their children.	Emotional wellbeing
2	Cairo et al., 2012 <i>Family Interactions in IVF families: change over the transition to parenthood</i> <u>Switzerland</u>	Quantitative Structured observation using LTP Questionnaires, scales: DAS, ABQ pre-and postnatal version.	Couples, pregnancy and 9 months after birth 31 IVF 41 SC (reference sample not controls)	<u>Yes</u>	Transition/change from pregnancy to parenthood in IVF families	Family alliance, marital satisfaction and parental attachment scores were similar or higher in the IVF sample than the reference sample during fifth month pregnancy but a decrease in family alliance scores had occurred in the IVF sample when the babies were 9 months. It is concluded that	Relationships

						postnatal support is needed for IVF families.	
3	Colpin et al., 1995 <i>New reproductive technology and the family: The parent-child relationship following in-vitro fertilization</i> <u>Belgium</u> Pilot study for paper 4.	Quantitative Structured observation using Erickson rating scales and translated parental attitudes and emotions scale. Questionnaires, scales: PBI, STAI, ZDS, adapted MMQ.	Couples, 24-30 months after birth 31 IVF 31 SC	<u>Yes</u>	Parent-child relationship and parents psychosocial functioning	No differences found between IVF/SC couples in relation to parent-child relationships or parents psychosocial functioning, including marital relationship. Employed IVF mothers showed less respect for their child's autonomy compared to non-employed IVF mothers and employed comparison mothers.	Relationships
4	Colpin and Soenen., 2002 <i>Parenting and psychosocial development of IVF children: a follow-up study</i> <u>Belgium</u>	Quantitative Questionnaires, scales: Adapted version NCRQ, PSI, QPG, CBCL, TRF (teacher rated).	Couples, 8-9 years after birth 27 IVF 23 SC Same sample as paper 3	<u>Yes</u>	Follow-up study. Parent-child relationship (and children's psychosocial development)	No significant differences found	Relationships
5	Cook et al., 1997 <i>The European study of assisted reproduction families: a comparison of family functioning and child development</i>	Quantitative Same measures as paper 12 (Golombok et al., 1996).	Couples, 4-8 years after birth Bulgaria (20 IVF, 19 DI, 20 Adoptive, 20 SC). UK, Netherlands, Spain, Italy (116 IVF, 111 DI, 115 Adoptive, 120 SC)	<u>Yes</u>	Comparison of family relationships and social and emotional development of children in ART families in East and West European countries	Greater differences in parental adjustment and child behaviour in ART families in Eastern Europe.	Relationships

	<i>between Eastern and Western Europe.</i> <u>UK, the Netherlands, Spain, Italy and Bulgaria</u>		UK, Netherlands, Spain and Italy samples same as Paper 12				
6	Flykt et al., 2009 <i>Prenatal expectations in transition to parenthood: former infertility and family dynamic considerations</i> <u>Finland</u>	Quantitative Questionnaires, scales: Author devised, SFPT, PSI.	Couples, Pregnancy and 12 months after birth 367 ART 378 SC Personal communication with authors Summer 2017	<u>Yes</u>	How prenatal expectations of relationship with child predicts parenting stress in first year	Few differences between ART and SC parents and association between prenatal expectations and subsequent parenting stress similar. Because of long preparation, ART parents may be able to find their parental roles sooner.	Emotional wellbeing
7	Gameiro et al., 2010 <i>Social nesting: Changes in Social Network and Support Across the Transition to Parenthood in Couples That Conceived Spontaneously or Through Assisted Reproductive Technologies</i> <u>Portugal</u>	Quantitative Questionnaires, scales: adapted CNS.	Couples and women Pregnancy and 4 months after birth 22 ART couples, 9 ART women 24 SC couples, 4 SC women Personal communication with authors Summer 2017	<u>Yes</u>	Study into changes in social networks and support across transition to parenthood	Irrespective of type of conception parents turned to their nuclear family perceiving extended family and friends as less important in this context	Social Support
8	Gameiro et al., 2011 a <i>Parental investment in couples who conceived</i>	Quantitative Questionnaires, scales: BSI, translated ENRICH inventory, CNS, PIC.	Couples, Pregnancy and 4 months after birth 39 ART 34 SC	<u>Yes</u>	The study looked at how PIC varies as function of type of	Form of conception or gender did not affect PIC but marital relationship and	Social Support

	<i>spontaneously or with assisted reproductive techniques</i> <u>Portugal</u>		Same sample as Paper 7 Personal communication with authors Summer 2017		conception, gender and other variables	support from friends and family did.	
9	Gameiro <i>et al.</i> , 2011 b <i>Network support and parenting in mothers and fathers who conceived spontaneously or through assisted reproduction</i> <u>Portugal</u>	Quantitative Questionnaires, scales: CNS, translated PSI, translated PIC.	Couples, Pregnancy and 4 months after birth 35 ART 31 SC Same sample as Paper 7 Personal communication with authors Summer 2017	<u>Yes</u>	The study examined the importance of network support and parental stress and investment in the child	No differences in the way ART couples and SC couples adjust to parenthood or care for their children were detected which depend on network support	Social Support
10	Gibson <i>et al.</i> , 2000 <i>The Mother-Child Relationship Following In Vitro Fertilisation (IVF): Infant Attachment, Responsivity, and Maternal Sensitivity</i> <u>Australia</u>	Quantitative Structured observation of mother-child interactions, Emotional Availability Scales Questionnaires, scales: Author devised questionnaire.	Mothers, Pregnancy and 12 months after birth 65 IVF 61 SC	<u>Yes</u>	Nature of the mother-child relationship and adjustment to parenthood	No significant group differences on infant attachment or maternal-child interactions	Gendered experiences
11	Golombok <i>et al.</i> , 1995 ** <i>Families created by the new reproductive technologies: quality of parenting and social and emotional</i>	Quantitative Interviews (mothers) for "quality of parenting" assessed by adapted Quinton&Rutter (1988) technique.	Couples, 4-8 years after birth 41 IVF, 45 DI 43 SC controls 55 Adopted	<u>Yes</u>	Family relationships and social and emotional development of children	Quality of parenting in families conceived by ART superior to that of families with a naturally conceived child	Relationships

	<p><i>development of the children</i></p> <p><u>UK</u></p>	<p>Questionnaires, scales: GRIMS, STAI, BDI, PSI short form.</p> <p>Children's emotions, behaviour and relationships also assessed by Rutter A and B scales (mother/teacher completed), adapted SAT, adapted FRT, PSPCSAYC (children).</p>					
12	<p>Golombok et al., 1996 **</p> <p><i>The European study of assisted reproduction families: family functioning and child development.</i></p> <p><u>UK, the Netherlands, Spain and Italy</u></p>	<p>Quantitative (For measures, see also Golombok et al., 1995).</p>	<p>Couples, 4-8 years after birth UK (41 IVF, 45 DI, 43 SC, 55 Adopted); Spain (26 IVF, 23 DI, 18 SC, 10 Adopt); Italy (19 IVF, 14 DI, 25 SC, 25 Adopt); Netherlands (30 IVF, 29 DI, 26 SC, 25 Adopt). UK sample same as Paper 11</p>	<u>Yes</u>	<p>Family relationships and social and emotional development of children: European comparison</p>	<p>Also showed quality of ART parenting to be superior (greater warmth, interaction, less stress) to SC parents. Quality of parenting and socio-emotional development of children similar in each of four countries studied</p>	<p>Relationships</p>
13	<p>Hahn and DiPietro, 2001</p> <p><i>In Vitro fertilization and the family: Quality of parenting, family functioning and child psychosocial adjustment</i></p> <p><u>Taiwan</u></p>	<p>Quantitative Postal questionnaires, scales: Author devised, PSI, PPS, Family APGAR Index, PCI, CRD, ECBI, (mothers). Author devised, Parent Report, Child-Rearing Practice Report Block, PSBC, SESBI, (Teachers).</p>	<p>Mothers and Teachers, 3-7 years after birth 54 IVF 59 SC</p>	<u>Yes</u>	<p>Associations between IVF and quality of parenting, family functioning and emotional and behavioural adjustment</p>	<p>IVF mothers reported greater protectiveness, including separation anxiety, towards their children but their behaviours were not limiting to child development. Mothers of a single child conceived by IVF reported less stress than other mothers. IVF women reported less satisfaction with aspects of family and marital functioning.</p>	<p>Gendered experiences</p>

14	Hjelmstedt and Collins, 2008 <i>Psychological functioning and predictors of father-infant relationship in IVF fathers and controls</i> <u>Sweden</u>	Quantitative Questionnaires, scales: PFA, FIAI, STAI, KSP, EDPS.	Fathers, Pregnancy and 2 months after birth 53 IVF 36 SC	<u>Yes</u>	To assess if early father-child relationship was relative to the fathers' prenatal relationship with the child, personality traits, anxiety and symptoms of depression	IVF fathers were as attached to their children as the control group but were more anxious and indirectly aggressive and may benefit from emotional support.	Gendered experiences
15	Jongbloed-Pereboom et al., 2012 <i>The impact of IVF/ICSI on parental well-being and anxiety 1 year after childbirth</i> <u>The Netherlands</u>	Quantitative Questionnaires, scales: STAI, GHQ.	Couples, 1 year after birth 113 IVF/ICSI 83 sub fertile SC	<u>Yes</u>	To examine if factors associated with IVF/ICSI affect anxiety and mental health in couples	Although the study did not use baseline data associated with anxiety and mental health, results indicate that IVF/ICSI was not associated with increased anxiety or mental health issues 1 year post-partum	Emotional wellbeing
16	McMahon et al., 1997 <i>Psychosocial adjustment and the quality of the mother-child relationship at four months post-partum after conception by in vitro fertilization</i> <u>Australia</u>	Quantitative Semi structured interviews rated by author devised scale. Questionnaires, scales: STAI, EPDS, DAS, modified SEW, BAP, MSES, NPI, STSI, MPAS, MSAS; videotaped mother-infant interactions.	Mothers, 4 months after birth 65 IVF 62 SC	<u>yes</u>	Psychological adjustment to early motherhood	No differences between the IVF and control groups for mothers on global measures of anxiety, depression or marital satisfaction. IVF 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. Group adjustment difficulties were mostly	Gendered experiences

						accounted for by mothers who underwent repeated treatment cycles.	
17	<p>McMahon et al., 2003 **</p> <p><i>Parents of 5-Year old in vitro fertilization children: Psychological adjustment, parenting stress, and the influence of subsequent in vitro fertilization treatment</i></p> <p><u>Australia</u></p>	<p>Quantitative Semi structured interviews for “current family situation, child health history and subsequent reproductive history” rated by validated scales. Questionnaires, scales: GHQ, STAI, DAS, LCBS, PSI, CECS.</p>	<p>Couples, 5 years after birth 66 IVF 46 SC Same sample as Paper 16 Mixed singleton/twins Group analysis repeated excluding twins (IVF=12, SC=3)</p>	<u>yes</u>	<p>Psychological adjustment and parenting stress of mothers and fathers</p>	<p>IVF mothers reported more external locus of control than other mothers, but no significant group differences for psychological adjustment, parenting stress or emotional control; also when twins were excluded.</p> <p>Demonstrated relationships between number of treatment cycles and psychological adjustment for IVF mothers (included twins)</p>	<p>Emotional wellbeing</p>
18	<p>Nekkebroeck et al., 2010</p> <p><i>International comparison of parenting styles in ICSI, IVF and natural conception families: Results from a European study</i></p> <p><u>UK, Belgium, Denmark and Sweden</u></p>	<p>Quantitative Questionnaires, scales: GHQ, PSI short form, DAS.</p>	<p>Same sample as Paper 1 (Barnes et al., 2004) although authors state further participants added, exact numbers in groups are unknown. Totals are UK (n=510), Belgium (n=512), Denmark and Sweden (n=400)</p> <p>Personal communication with authors Summer 2017</p>	<u>Yes</u>	<p>The study aimed to explore potential cultural impact in different European countries on parenting styles following IVF/ICSI conception</p>	<p>In the UK men and women reported less marital satisfaction compared to the other countries and UK women reported more stress. From a Belgian perspective mothers were committed to their work and fathers were less committed to parenting than those in the UK and the Nordic countries. Women in the Nordic countries expressed less negative feelings towards their children compared to those in the other countries. It is</p>	<p>Gendered experiences</p>

						concluded that cultural differences need to be considered when investigating the wellbeing of ART parents and their children.	
19	Walker et al., 2017 <i>Experiences of physical activity during pregnancy resulting from in vitro fertilisation: an interpretative phenomenological analysis</i> <u>UK</u>	Qualitative Semi-structured interviews and a phenomenological approach (IPA).	Women, pregnancy or 2 years after birth 8 IVF Personal communication with authors Summer 2017	<u>No</u>	The study aimed to explore the experience and decision-making processes related to physical activity for IVF women	Three major themes were developed: 'navigating away from childlessness to motherhood', 'negotiating a safe passage' and 'balancing the challenges of pregnancy with the needs of self'. Physical activity gave a sense of control and was perceived as soothing however there were concerns about safety.	Gendered experiences

ABQ, Antenatal Bonding Questionnaire; BAP, Being a Parent; BDI, Beck Depression Inventory; BSI, BSI-Depression; CBCL, Child Behaviour Checklist; CECS, Courtauld Emotional Control Scale; CNS, Convoy-Network Support ; CRD, Child-Rearing Disagreements scale; DAS, Dyadic Adjustment Scale; ECBI, Eyberg Child Behaviour Inventory; EDPS, Edinburgh Postnatal Depression Scale; FIAI, Father-Infant Attachment Inventory; FRT, Family Relations Test; GHQ, General Health Questionnaire; GRIMS, Golombok Rust Inventory of Marital State; KSP, Karolinska Scales of Personality; LCBS, Locus of Control of Behaviour Scale; LTP, Lausanne Trilogue Play; MMQ, Maudsley Marital Questionnaire; MPAS, Maternal Postnatal Attachment Questionnaire; MSAS, Maternal Separation Anxiety Scale; MSES, Maternal Self-Efficacy Scale; NCRQ, Nijmegen Childrearing Questionnaire; NPI, Neonatal Perception Inventory; PBI, Parental Bonding Instrument; PCI, Primary Communication Inventory; PFA, Paternal Foetal Attachment Scale; PIC, Parental Investment with Child; PPS, Parent Protection Scale; PSBC, Pre-School Behavior Checklist; PSI, Parenting Stress Index; PSPCSAYC, Pictorial Scale of Perceived Competence and Social Acceptance for Young Children; QPG, Questionnaire Parenting Goals; SAT, Separation Anxiety Test; SESBI, Sutter-Eyberg Student Behavior Inventory; SEW, *Self-Esteem as a Woman*; SFPT, Subjective Family Picture Test; STAI, State Trait Anxiety Inventory; STSI, Short Temperament Scale for Infants; TRF, Teacher's Report Form; ZDS, Zung Depression Scale.

** One study (McMahon, Gibson, Leslie, Cohen & Tennant, 2003 see Table 1) sampled twins and singletons but analysed singleton data separately from twin data. Two studies (Golombok, Cook, Bish & Murray, 1995; Golombok, Brewaeys, Cook, Givazzi, Guerra, Mantovani, van Hall, Croisnani & Dexeus, 1996) included four discrete samples of spontaneously conceiving (SC), non-donor IVF, donor insemination (DI) and adoptive parents. The analysis clearly distinguished between non-donor IVF and DI parents. Both McMahon et al. (2003) and Golombok et al. (1995, 1996) were retained in our review.