

1 *Title*

2 Barriers and facilitators for the inclusion of fertility care in reproductive health policies in
3 Africa: a qualitative evidence synthesis

4 *Running title*

5 Fertility care policymaking in Africa

6 *Authors*

7 Anna Afferri^{1*}, Haddijatou Allen², Andrew Booth¹, Susan Dierickx³, Allan Pacey⁴, and Julie
8 Balen^{1*}

9 *Address*

10 ¹ School of Health and Related Research (ScHARR), University of Sheffield, S14DA,
11 Sheffield, S14DA, United Kingdom

12 ² Medical Research Council, The Gambia Unit, Serekunda, The Gambia

13 ³ Research Center Gender, Diversity and Intersectionality, Vrije Universiteit Brussel, 1050,
14 Belgium

15 ⁴ Department of Oncology and Metabolism, Faculty of Medicine, Dentistry and Health, The
16 Medical School, University of Sheffield, Sheffield, S102RX, United Kingdom

17 * Correspondence address. School of Health and Related Research (ScHARR), University of
18 Sheffield, Sheffield, S14DA, United Kingdom

19 Tel: +44 7415 129 614; E-mail: j.balen@sheffield.ac.uk (JB)

20 Corresponding author [ORCID iD](#): 0000-0002-4736-8465 (JB)

21 First author [ORCID iD](#): 0000-0002-0306-6705 (AA)

22 Prof Allan Pacey [ORCID iD](#) 0000-0002-4387-8871 (AP)

23

24	<i>Table of contents</i>
25	<u>Introduction</u>
26	<u>Methods</u>
27	<u>Search strategy</u>
28	<u>Study selection</u>
29	<u>Quality Assessment</u>
30	<u>Data Extraction</u>
31	<u>Data Synthesis</u>
32	<u>Results</u>
33	<u>Description of included papers</u>
34	<u>Discussion</u>
35	<u>Limitations</u>
36	<u>Priorities for further research</u>
37	<u>Conclusions</u>
38	

39 *Abstract*

40 **BACKGROUND:** Infertility affects over 50 million couples worldwide and impacts people's
41 social and emotional wellbeing. In low and middle-income countries, particularly across
42 Africa, the inclusion of fertility care into reproductive health (RH) policies remains fragmented
43 or non-existent.

44 **OBJECTIVE AND RATIONALE:** This systematic review aims to provide a framework for
45 understanding the inclusion (or lack thereof) of fertility care in RH policies in African settings.
46 It synthesises barriers and facilitators to such inclusion, with a view to uncovering the
47 positioning of fertility care in broader health systems and on the agendas of key stakeholders
48 such as health policymakers and practitioners.

49 **SEARCH METHODS:** A qualitative evidence synthesis was performed, systematically
50 searching papers and grey literature. Searches were conducted in MEDLINE, EMBASE,
51 CINAHL, Web of Science, and Scopus between February and April 2020. No date restrictions
52 were applied. Language was limited to publications written in English and French. Two
53 reviewers independently screened titles and abstracts, and extracted data, applying thematic
54 coding. The quality of the included papers was evaluated using The Joanna Briggs Institute
55 Checklist for Text and Opinion Papers.

56 **OUTCOMES:** The search identified 744 papers, of which 20 were included. Findings were
57 organised under four cross-cutting categories, namely: (i) perceived importance of infertility;
58 (ii) influence of policy context; (iii) resource availability and access; and (vi) perceived quality
59 of care. Across these categories, key barriers to the inclusion of fertility care in RH policies
60 were: limited political commitment, under-recognition of the burden of infertility, and high
61 costs associated with assisted reproductive technologies (ART). Conversely, facilitators
62 comprised specialised training on infertility for healthcare providers, standard procedures for
63 ART safety and guidelines, and North-South / South-South collaborations.

64 **WIDER IMPLICATIONS:** The inclusion of fertility care in African RH policies depends
65 upon factors that include the recognition of infertility as a disease, strong political engagement
66 and proactivity, and affordability of ART through opportunities for partnership with the private
67 sector, which ease costs on the public health system. Further qualitative and quantitative
68 research, including context-specific analysis and in-depth comparative approaches across
69 diverse African countries, will help to delineate differential impacts of local and global factors
70 on fertility care to address this neglected RH issue.

71 **Keywords:** Fertility care, infertility services, reproductive health, health policy, Africa

72

73 Introduction

74 Infertility is an important yet neglected reproductive health issue that significantly
75 impacts upon wellbeing (Gipson *et al.*, 2020). While global prevalence and incidence rates
76 remain unclear, infertility is estimated to affect 15% of reproductive-age couples (Gerrits *et al.*,
77 2017), yet this is likely to be an underestimation. In the Global South, this includes almost 25
78 million couples, with highest proportions in Africa and Southeast Asia (Mascarenhas *et al.*,
79 2012). Infertility in Central Africa is often referred to as “bareness amid plenty” signifying its
80 presence in countries with otherwise high fertility rates (van Balen and Gerrits, 2001). The
81 consequences of infertility can be overwhelming with an array of social, emotional and
82 economic impacts and the burden afflicting couples, and in particular women, is severe
83 (Okonofua *et al.*, 1997; Dierickx *et al.*, 2018; Serour *et al.*, 2019; Dierickx, 2020).

84 In Africa, numerous poverty-related conditions contribute to infertility, including a high
85 prevalence of Sexually Transmitted Infections (STI), unsafe abortions, and poor birth care
86 leading to pregnancy-related sepsis (Tjiam *et al.*, 1986; Sharma *et al.*, 2009). It has been argued
87 that infertility can be avoided through improved sexual and reproductive health education and
88 via the promotion of a healthy lifestyle (FIGO, 2012). Though success rates vary, infertility can
89 be clinically managed with medication and Assisted Reproductive Technology (ART)
90 (Bahadur *et al.*, 2020). The package of interventions aimed to support women and men living
91 with infertility to “...realize their desires associated with reproduction and/or to build a
92 family...” is encompassed in a comprehensive set of activities named “fertility care” that
93 includes fertility awareness, prevention, management, and support (Zegers-Hochschild *et al.*,
94 2017). Infertility services, extend beyond treatments such as cryopreservation of gametes or
95 embryos, *in vitro* fertilization (IVF), and intracytoplasmic sperm injection (ICSI), to comprise
96 diagnostic screening and assessments, all of which are included in the fertility care package.

97 Since the 1994 International Conference on Population and Development (ICPD)
98 recognised reproductive health (RH) as a universal right, increased attention has been directed
99 at the prevention, management, and treatment of infertility (United Nations, 1994). Yet,
100 fertility care remains absent or poorly represented in many RH policies, especially in Africa
101 (Nachtigall, 2006; Ombelet *et al.*, 2008). Following the ICPD recommendations, several
102 authors have noted the benefits of including fertility care in RH policies, however there is little
103 agreement on the policy process of how such inclusion could be implemented and successfully
104 scaled up across different settings (Gerrits and Shaw, 2010; Dierickx *et al.*, 2019; Serour *et al.*,
105 2019).

106 The systematic review of qualitative research (also known as a qualitative evidence
107 synthesis or QES), is an approach aiming to understand, explain, and provide rich
108 interpretations related to health conditions, interventions or policies, bringing together multiple
109 perspectives including contradictory viewpoints (Flemming *et al.*, 2019). Due to its additional
110 utility in retrieving and analysing texts, opinions, and policy documents, this approach is
111 increasingly used in understanding health system decision-making processes, and was therefore
112 selected for this review (Booth *et al.*, 2019). Furthermore, one of the acknowledged functions
113 of QES is to evidence suppositions that are commonly believed but have not been substantiated
114 across multiple studies. By focusing on barriers and facilitators for the inclusion of fertility
115 care into broader RH, this review provides a comprehensive overview of fertility care policy in
116 Africa, thereby broadening and complementing a recent review by Chiware *et al.* (2020) on
117 IVF and other ART in low and middle-income countries (LMIC). A conceptual framework,
118 based in the evidence, is proposed to facilitate a better understanding of the main influences
119 shaping fertility care policy inclusion in African contexts.

120 Methods

121 The protocol for this review was registered on 13 July 2020, and published on
122 PROSPERO, on 14 August 2020 (ID CRD42020175808). The Preferred Reporting Items for
123 Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used for reporting
124 purposes (Moher *et al.*, 2009).

125 Search strategy

126 Published and unpublished papers were retrieved from multiple sources, including
127 direct contact with three authors. The electronic databases searched included MEDLINE,
128 EMBASE (via Ovid), CINAHL (via EBSCO), Web of Science, and Scopus. The PubMed
129 Central website was also searched for completeness. Records identified through Google
130 Scholar were extracted with the dual purpose of checking for citations and searching for
131 relevant documents in the grey literature. A combination of free-text keywords, controlled
132 vocabulary, Boolean operators AND and OR, and subject headings were used in combining: (i)
133 infertility¹; (ii) Africa; (iii) health policy; and (iv) reproductive health. Two lead reviewers (AA
134 and HA) were involved in searching the databases and identifying relevant references and they
135 independently selected relevant papers to be included in the review. The complete search
136 strategy is provided in Supplementary File S1. The PerSPEcTiF framework was used as a
137 question formulation framework as it accommodates context, perspective, time and space
138 within a health system context (Booth *et al.*, 2019). The framework is provided in
139 Supplementary Table S2.

140 Study selection

141 The databases were searched between February and April 2020 with no initial cut-off
142 start date. Papers published in English and French were included. We included literature

¹ Also included in the search were fertility care, fertility service, and other related terms, through use of "explode" or "truncation" tools, MESH, etc. as detailed in Supplementary File S1.

143 reviews, monographs, commentaries, viewpoints and opinion papers that specifically addressed
144 policy related to fertility care in African contexts. Studies that focused on ART were selected if
145 they reflected on barriers and facilitators for inclusion in health services provision. We
146 excluded studies evaluating the prevalence of infertility, the biomedical and traditional
147 treatment of infertility, reproductive health genomics/genetics, and socio-cultural or religious
148 barriers. The complete list of eligibility criteria is summarised in Supplementary Table S3. The
149 lead reviewers screened the papers by title and abstracts and the final selection was based on
150 full text reading. During the study selection phase, the opinion of a third reviewer (JB) was
151 required for a small number of papers. Discrepant results were resolved by discussion until a
152 unanimous decision was reached among all three reviewers. The full list of excluded papers is
153 provided in Supplementary Table S4. Key characteristics of the included papers are available
154 in Supplementary Table S5.

155 [Quality Assessment](#)

156 This review did not focus on the analysis of qualitative studies and therefore a formal
157 approach to quality assessment based on study design was not appropriate. The lead reviewers
158 assessed and validated the quality of the selected papers using the Joanna Briggs Institute
159 Checklist for Text and Opinion (Joanna Briggs Institute, 2017). Six criteria were assessed,
160 notably: (i) the source of opinion or authorship; (ii) the field of expertise of the author; (iii) the
161 relevant population/audience as the central focus of the opinion; (iv) rationale or basis of the
162 opinion; (v) clear reference of the existent literature; and (vi) if any incongruence with the
163 sources was logically defended (McArthur *et al.*, 2015). As specified by the developers of the
164 checklist, the lead reviewers attributed to each paper a criterion and the overall quality of the
165 papers was labelled as “high”, “medium” or “low”. The quality assessment for each included
166 paper is available in Supplementary Table S6.

167 Data Extraction

168 The data was extracted according to characteristics of the selected papers, including
169 information about: (i) the author(s) and date of publication; (ii) the settings of the study; (iii)
170 the data collection method; and (iv) the type of paper. The lead reviewers independently read
171 the selected papers and compiled a matrix indicating factors enabling and/or inhibiting fertility
172 care policy in African health systems including, but not limited to, barriers and facilitators
173 concerning the inclusion of fertility care and services in reproductive health policies, the cost
174 of infertility treatment, public-private partnership (PPP), and training of healthcare providers
175 on infertility management. Data was extracted from the papers in the form of text fragments.
176 Each section of the paper was reviewed, with particular attention to findings and
177 recommendations. Data from the conclusion section of the paper was also extracted and
178 included within this synthesis.

179 Data Synthesis

180 Lead reviewer AA used a thematic synthesis approach consisting of three coding stages
181 and departing from Thomas and Harden method (Thomas and Harden, 2008), each stage
182 allowing themes to be increasingly elaborated. In the first stage, fragments of text were
183 extracted and classified according to meaning and content, inductively and iteratively with an
184 intentionally broad scope. This generated 18 “factors” which were categorised as “barriers” or
185 “facilitators” (Supplementary Table S7). In the second stage, these 18 factors were grouped
186 into eight “themes” (elements of fertility care that might influence policymaking) as detailed in
187 the following section. These themes were subsequently used to identify relevant fragments of
188 text and sentences within and across papers, with the purpose of interpreting rather than simply
189 aggregating information (Barnett-Page and Thomas, 2009). In the third stage, the eight themes
190 were further analysed and clustered into four cross-cutting “categories”, namely: (i) perceived
191 importance of infertility; (ii) influence of policy context; (iii) access and availability of

192 resources; and (iv) perceived quality of care. The three stages of coding are displayed in
193 Supplementary Table S8. Each cross-cutting category included one or more themes and
194 represents the overarching level of coding (Supplementary Figure S9). Factors are described in
195 detail and referenced for transparency in Supplementary Table S10. Finally, a conceptual
196 framework was developed offering a graphical model of factors that enable inclusion of
197 fertility care in RH policies in Africa (Figure 2).

198 Results

199 The search identified 744 references of which 119 were excluded as duplicates and a
200 further 562 were deemed not relevant. A full text review was conducted on 63 documents from
201 which an additional 43 were excluded leaving 20 papers for the final analysis. A PRISMA flow
202 chart (Moher *et al.*, 2009) illustrating the process for the study identification and selection is
203 shown in **Figure 1**.

204 Of the 20 papers included in the QES, six specifically focused on African countries
205 (Ghana, Kenya, Nigeria, Sudan, Tanzania and The Gambia); a further six mentioned African
206 countries and Sub-Saharan Africa in broader terms (e.g., West Africa including Mali, Togo and
207 Senegal). The remaining eight cited LMIC or resource-poor settings more generally without
208 naming specific countries, although referring to Africa. The papers comprised a set of articles,
209 literature reviews, systematic reviews, monographs, commentaries, viewpoints, brief reports,
210 short communications, and opinion pieces. Of all the selected papers, 12 (60%) were rated as
211 high quality, three (15%) as medium/high quality, and five (25%) as medium quality. No
212 studies were discarded based on the quality assessment.

213 Analysis of included papers

214 a. Perceived importance of infertility

215 Theme 1: Perceived importance among policymakers

216 The recognition of infertility as a disease or disability that negatively affects large
217 numbers of women and men is important for appropriate prioritisation within national health
218 agenda and broader policymaking processes. Sharma *et al.* (2009) reported that political
219 willingness and commitment are essential for the consideration of infertility within
220 comprehensive RH. Similarly, international stakeholders' interest in infertility is vital, yet still
221 largely missing in global health (Ombelet, 2011; Gerrits *et al.*, 2017; Dierickx *et al.*, 2019).
222 Equally important in recognising infertility as a RH issue, Serour *et al.* (2019) contend that
223 population-level databases do not accurately report the burden of infertility. In two papers in
224 Nigeria and Sudan, authors suggest that the systematic collection of infertility-related health
225 information is essential for improved resources allocation (Akinloye and Truter, 2011; Khalifa
226 and Ahmed, 2012). Furthermore, recording such infertility-related data would allow for
227 international comparisons and benchmarking in access, efficacy, quality and safety of ART
228 (Serour *et al.*, 2019) and other aspects of fertility care.

229 *“...Infertility should be recognized as a public health issue*
230 *worldwide, including in developing countries; policymakers and*
231 *health staff should give attention to infertility and the needs of*
232 *infertile patients...”*

233 (Ombelet, 2014, pp 2)

234 Theme 2: Perceived importance among society

235 In Sub-Saharan Africa and other resource-constrained settings, infertility is often
236 perceived as a woman's problem, highly stigmatised by societal taboos, and simply not
237 discussed in public spaces (Gerrits and Shaw, 2010; Hammarberg and Kirkman, 2013).

238 Unequal gender norms and relationships were also found to exert an influence on access to, and
239 utilisation of, health services. One study in The Gambia found that women with infertility seek
240 healthcare by themselves, with little participation of the spouse (Dierickx *et al.*, 2019).

241 Nevertheless, infertility is important for men too and as shown in Nigeria and Sudan,
242 male infertility is often wrongly associated with a lack of masculinity and, in consequence, is
243 frequently stigmatised and ignored (Inhorn, 2009; Akinloye and Truter, 2011; Khalifa and
244 Ahmed, 2012). To overcome male-related (and general) misperceptions of infertility, Gerrits *et*
245 *al.* (2017), suggests that health education focussing on the de-stigmatisation of infertility may
246 help sensitise society. Raising awareness of biomedical causes of infertility, the commonality
247 of male factor infertility and the benefits of timing intercourse according to the fertile window
248 is also important (Sharma *et al.*, 2009; Gerrits, 2012).

249 **b. Influence of policy context**

250 **Theme 3: Effects of policies**

251 Several authors maintain that despite the challenges, fertility care needs to be included in
252 national RH policies (van Balen and Gerrits, 2001; Ombelet, 2009). When included, regulation
253 and access to infertility services are legitimised, leading to improved provision in the public
254 and/or private sectors (Sharma *et al.*, 2009; Ombelet, 2014). In contrast, it has been argued that
255 collaborations between local governments, civil society and the research community might not
256 exert sufficient power or influence for the formulation of health policies that include fertility
257 care if international partnerships are not established and maintained (van Balen and Gerrits,
258 2001; Ombelet, 2014). Hörbst (2012) highlights that, in Mali, international donor funding
259 played a key role in influencing infertility policy and governance, though donor dependency is
260 also cited as a barrier in the decision-making process of legislators (Hammarberg and Kirkman,
261 2013). North-South collaborations have arisen over the past decade, exploring new approaches
262 to ART that could be applicable in LMIC. To this effect, both the European Society for Human

263 Reproduction and Embryology (ESHRE) and the Walking Egg Project partnered with African
264 countries to support infertility care (Hammarberg and Kirkman, 2013; Bahamondes and
265 Makuch, 2014; Ombelet, 2014). Some ART clinics in Africa also have established
266 relationships with ART centres in Europe and the USA mainly for training purposes or to
267 purchase second-hand equipment (Gerrits and Shaw, 2010; Hörbst, 2016). Finally, Sharma *et*
268 *al.* (2009) note that the formulation of specific fertility care guidelines is vital to reducing the
269 risks of, and increasing the safety associated with, treatment. Fertility care protocols should
270 follow international standards and be applied uniformly in public and private facilities.

271 **c. Resource availability and access**

272 **Theme 4: Cost of ART**

273 Making infertility care affordable across the African continent is of utmost importance
274 and requires the development of low-cost regimens and techniques (Akande, 2008;
275 Bahamondes and Makuch, 2014; Ombelet, 2014). Asemota and Klatsky (2015) suggests that
276 Intrauterine Insemination (IUI) should be used as a first-line treatment for unexplained
277 infertility. Both IVF and ICSI can be offered at a much lower cost if less expensive methods
278 and laboratory materials are used (Ombelet, 2009). However, the efforts to make ART
279 affordable in LMIC must not be allowed to result in the provision of poor quality care, and
280 safety standards should not be compromised in the pursuit of cost reduction (Ombelet, 2011).

281 *“...Reducing ART cost by all possible means is important to*
282 *increase access to ART in Africa...”*

283 (Serour *et al.*, 2019, pp 3)

284 **Theme 5: Private care**

285 Several authors claim that private actors are important partners in the provision of
286 infertility care in Africa (Okonofua, 1996; Akande, 2008; Akinloye and Truter, 2011; Hörbst,
287 2012; Khalifa and Ahmed, 2012). Indeed, ART is mostly provided by the private sector in

288 many African countries, with some cases of public and private partnership (PPP) (e.g., Nigeria
289 and Egypt) (Akande, 2008; Serour *et al.*, 2019). Yet, the costs associated with many private
290 clinics are generally unaffordable to the majority of those in need, further exacerbating the
291 inequalities in access to treatment (Dyer, 2008). To help alleviate public health financing, and
292 to maximise health resources while keeping equity in mind, there have been calls for major
293 investments by, and a cooperative environment with, the private sector. This may help increase
294 access to infertility services through long-term PPP building (Gerrits, 2012).

295 *“...PPPs can offer services at lower costs that are more*
296 *realistic in developing countries. In addition, PPPs can help*
297 *influence the establishment of standards, regulations and*
298 *policies to safeguard the health of couples undergoing*
299 *treatment...”*

300 *(Akande, 2008, pp 13)*

301 **Theme 6: Referrals**

302 The development of an appropriate referral system between different levels of care –
303 both public-private and traditional-modern – needs to be evaluated during the design of RH
304 policies that account for fertility care (van Balen and Gerrits, 2001). Indeed, appropriate
305 referral is essential in the effective provision of infertility services (Dyer, 2008). Van Balen and
306 Gerrits (2001) further specify that for a comprehensive inclusion of fertility care within RH
307 policies, a concise analysis of the health system structure, including the referral system, must
308 be undertaken. This analysis should include all levels of care and also the informal and private
309 sectors (van Balen and Gerrits, 2001).

310 *“...infertility services should be sensitive to the role of*
311 *traditional health care. Greater collaboration between the two*
312 *health care systems is generally considered desirable as this*

313 *may increase referral of infertile couples to the biomedical*
314 *sector...”*

315 (Dyer, 2008, pp 32)

316 **d. Perceived quality of care**

317 **Theme 7: Drugs, equipment, and supplies**

318 Infertility care requires highly specialised equipment, as well as a variety of supplies
319 and drugs. Yet, as described by Ombelet (2009), not all infertility regimes require expensive
320 drug protocols (i.e., ovulation induction with *Clomiphene Citrate* is more cost-effective). In her
321 qualitative research in West Africa, Hörbst (2012) suggests that using an outsourced laboratory
322 could reduce the cost of infertility treatment because it does not require purchasing of
323 equipment or maintaining experienced staff. Similarly, Khalifa (2012) proposes that fertility
324 clinics can share embryologists and cryo-banking to reduce the cost of procedures (Khalifa and
325 Ahmed, 2012). Yet, providing safe and high-quality infertility services does require the
326 availability of a minimal infrastructure capability (Bahamondes and Makuch, 2014).

327 **Theme 8: Specialised training for health providers**

328 The provision of fertility care entails skilled labour. Several authors described that
329 specific training is necessary to create, improve or maintain the technical abilities of the
330 healthcare providers in managing infertility (Hörbst, 2012; Ombelet, 2014). Infertility training
331 is often undervalued or missed from the medical/allied health educational curricula (van Balen
332 and Gerrits, 2001; Sharma *et al.*, 2009) or Continued Professional Development (CPD). Such
333 training is expensive, and usually requires trainees to travel abroad to learn new techniques
334 (Hammarberg and Kirkman, 2013). Seeking collaboration with international academic clinical
335 specialists – especially embryologists and andrologists – can be explored as a means of
336 developing local capability (Hörbst, 2012), particularly with the recent transition to digital
337 learning brought on by the coronavirus pandemic. Authors highlighted that unregulated

338 practice and lack of professional oversight could lead to a distorted perception of the quality of
339 care and induce a certain level of professional liberty (Gerrits and Shaw, 2010; Hörbst, 2012;
340 Asemota and Klatsky, 2015).

341 *“...Local providers can be trained to provide a basic evaluation*
342 *and guidance or treatment for specific causes of infertility...”*

343 (Asemota and Klatsky, 2015, pp 19)

344 Extending from the above findings, a conceptual framework was created offering a
345 graphical model which could support fertility care policymaking in Africa. Within four
346 categories, a list of items were identified to guide policy actors toward a most wide-ranging
347 analysis of determinants for fertility care policymaking (**Fig. 2**).

348 Discussion

349 This work reviewed and synthesised factors that inhibit or enable the inclusion of
350 fertility care into RH policies in Africa. Findings highlight that policymakers and international
351 stakeholders require urgent information and sensitisation on infertility in order to understand its
352 importance as a biomedical and social condition and as a reproductive health right. Yet their
353 interest in, and commitment to infertility is diminished by the prevailing view that it is a
354 condition without life-threatening consequences and its priority within RH policies remains
355 masked by more high-risk conditions (Gerrits *et al.*, 2017). We argue that this de-prioritisation
356 of infertility is strongly influenced by an absence of systematic recording, storing, and sharing
357 of relevant data. This information gap also negatively influences government responsiveness
358 and the allocation of resources required to address infertility in African countries (Sharma *et*
359 *al.*, 2009; Gerrits and Shaw, 2010; Khalifa and Ahmed, 2012).

360 The limited awareness of infertility among the public and even among some health
361 professionals fuels misinformation, perpetuates myths – for example, that use of contraceptives
362 cause infertility – and amplifies fear, stigma and public reluctance to seek treatment (Asemota
363 and Klatsky, 2015). This is exacerbated by low levels of attention to (in)fertility in health
364 education programmes. Undervaluing interventions that focus on reproductive health education
365 may also impede recognition of early signs and symptoms that could lead to infertility (namely
366 STI) and can delay access to treatment (Dyer, 2008). Holistic approaches to fertility education,
367 awareness and literacy in resources-poor settings can help better inform and sensitise the public
368 (Bahamondes and Makuch, 2014; Dierickx *et al.*, 2019) and should begin in adolescence in
369 order to have an impact on future prospects of fertility (Ombelet, 2009).

370 Raising awareness on infertility and improving reproductive health literacy more broadly
371 is also key to reducing stigma and fostering changes in policy and practice (Dierickx *et al.*,
372 2019). In Turkey, for example, activists from patients' organisations have successfully lobbied

373 for fertility care gaining traction with the government and instigating the formulation of a
374 national infertility policy (Gerrits, 2012). Similarly, in The Gambia, infertility-related NGOs
375 such as Safe Haven raises awareness through public walks and other campaigns, and groups of
376 women with infertility, the *Kanyaleng*, support each other by providing a safe space to release
377 infertility-related social pressure (Dierickx *et al.*, 2019; Dierickx, 2020).

378 Several other factors influence fertility care policy creation, one being dependency on
379 external funds. Donors can steer the policymaking process by exerting political influence in
380 areas concerning public health and social policy. In this regard, the lack of global interest in
381 infertility, from a donor perspective, has resulted in comparatively little attention on the issue
382 (Hörbst, 2012). Similarly, the frequent absence of state subsidies and health insurance schemes
383 contributes to poor access to infertility services among those most in need (Gerrits, 2012;
384 Hörbst, 2012). Access might be facilitated through the adoption of a model of subsidising
385 infertility treatment allowing, for example, 2-3 cycles of treatment funded by the public sector
386 for couples with specific characteristics (women under 40 years of age.; primary infertility,
387 socio-economic status, etc.) (Inhorn and Gürtin, 2012). This model could form a first step
388 towards decreasing inequalities in access to infertility treatment in selected African settings.

389 Yet, the high costs associated with ART remain a major impediment (Chiwere *et al.*,
390 2020). With the aim of decreasing these costs in the Global South, the European Society of
391 Human Reproduction and Embryology (ESHRE) and The Walking Egg Foundation have
392 worked, alongside researchers, to promote more reasonably priced ART (Ombelet, 2013, 2014;
393 Ombelet and Goossens, 2016). Despite promising efforts however, these North-South
394 collaborations remain restricted to few African clinics mainly because of the challenges in
395 allocation of public funding, optimisation of ART techniques, and an absence of fertility care
396 from national health policies (Ombelet and Onofre, 2019). A reduction in the cost of ART,
397 while feasible, may not therefore offer an immediate solution (Ombelet, 2014). To reduce the

398 costs, international donors and other stakeholders such as pharmaceutical organisations, would
399 have to support the longer-term development of low-cost approaches. Such investment requires
400 that donors recognise infertility as a global reproductive health issues of importance in LMIC,
401 including across Africa (Ombelet, 2011).

402 The African Network and Registry for ART (ANARA), established in 2015, is an
403 important South-South collaboration that facilitates, via data sharing, an improved
404 understanding of access to ART in Africa. According to the most recent data, Africa provides
405 only 1 percent of ARTs, worldwide. With 20 African countries in the ANARA network,
406 several including South Africa, Nigeria, Egypt, Sudan and Ghana now systematically report on
407 ART. While Dyer et al. (2019) asserted that the data from these African countries are still little
408 representative of the true utilisation of ART, it is anticipated that ANARA will develop and
409 that ART from data across Africa will become more robust. Even though it is too early to
410 evaluate the impact of the African ART registries, there is good reason to believe that the
411 collection of data on ART utilisation will help strengthen decision and policymaking and could
412 contribute to reducing the burden of infertility in Africa (Botha, Shamley and Dyer, 2018; Dyer
413 and Zegers-Hochschild, 2019; Dyer *et al.*, 2020).

414 Another major barrier to the provision of fertility care is the lack of appropriate
415 infrastructure, equipment and supplies. The organisation of infertility services extends beyond
416 mere technical expertise; it also requires a continuous supply of high-quality laboratory
417 materials (Okonofua, 1996). Yet, not all cases of infertility require costly, high-technology
418 treatments. For example, IUI is far less complex – and cheaper – than IVF and achieves similar
419 live birth success rates (Bahadur *et al.*, 2020). Furthermore, simple procedures such as the
420 intravaginal culture of oocytes (INVO) have considerably reduced the cost of ART and can be
421 performed with minimal equipment investment (Frydman and Ranoux, 2008; Khan *et*

422 *al.*,2013). In this regard, simplification of ART becomes fundamental for the delivery of
423 fertility care within African health systems, both in the public and private sectors.

424 Open and bi-directional communication between the public and private health sectors can
425 facilitate discussion on whether building a public-private partnership is valuable for the
426 provision of infertility services (Akande, 2008; Gerrits, 2012; Hörbst, 2012; Hammarberg and
427 Kirkman, 2013). In countries where the public sector cannot afford laboratory equipment, staff,
428 or expensive therapeutic protocols, partnership with private fertility clinics can add significant
429 value. The public sector would rely on private facilities for supplies and human resources while
430 private fertility clinics would have increase patient flow, allowing medical skills to be
431 maintained. Building on public-private trust also facilitates transparent sharing of data between
432 both sectors (Hörbst, 2012) and referral pathways may be established without losing track of
433 patients (Dyer, 2008; Asemota and Klatsky, 2015).

434 Fertility care embedded in broader RH policies can stimulate the creation of national
435 guidelines and protocols, the gold standard for the provision of high quality services (Sharma
436 *et al.*, 2009). The existence of national regulations ensures that physicians establishing fertility
437 clinics are supported by comprehensive standards (Gerrits and Shaw, 2010; Hammarberg and
438 Kirkman, 2013). The establishment, in early 2020, of the African Federation of Fertility
439 Societies (AFFS) is a remarkable first step toward the creation of national branches of fertility
440 societies, and can be the driving force in bringing together infertility specialists, creating a
441 space where the provision of infertility services is considered safe and of high quality (Gerrits,
442 2012; Asemota and Klatsky, 2015). Finally, the recent creation of the WHO Sexual and
443 Reproductive Health and Rights Policy Portal is giving fertility care policymaking a new
444 impetus, and increase global attention.

445 Moving forward, findings suggest a strong need and timely opportunity for African
446 governments to increase their focus on fertility care and its inclusion in RH policies through

447 South-South and North-South partnerships for technical and financial assistance where
448 required. Contextualised strategies should be developed based on local needs, priorities,
449 resources, and perspectives. African researchers, clinicians, policymakers, and patients must be
450 supported as equal and vested partners in researching and addressing infertility across the
451 continent.

452 **Limitations**

453 The findings of this review must be considered in light of several limitations. Firstly,
454 the QES presents a plethora of factors that potentially influence the inclusion of fertility care in
455 RH policies in African settings. Although these factors reflect the opinions of experts and
456 researchers, they do not fully explain why and how policymakers and practitioners might
457 consider how to apply them when establishing or implementing a RH policy that includes
458 fertility care. Findings therefore cannot be overstated, but they can facilitate an understanding
459 of how approaches differ across contexts and where improvements can be made. An in-depth
460 context-sensitive analysis is needed in countries where fertility care has been included and in
461 those where it has not. Secondly, due to limits in the available literature specifically addressing
462 *policymaking and fertility care* in Africa, it was challenging to trace and identify papers
463 focused on these two themes. To this effect, there is an urgent need for further research in this
464 area. Finally, papers using concepts such as “developing countries or low-resource settings”
465 were included when they appeared to refer to Africa. However, such labels are vague and
466 extend to geographic areas such as Latin America and South Asia that were not specifically
467 targeted in this review. The authors recognise that specific local factors may exert different
468 impact and that context-relevant findings might have been missed or overlooked.

469 **Priorities for further research**

470 Further research is required to contextualise factors and processes that influence the
471 inclusion of fertility care in national reproductive health policies in African countries. While

472 fertility care is receiving increased attention from the WHO, to date it has been prioritised in
473 few African countries (WHO, 2019) and efforts need to be boosted and sustained over time.
474 Multidisciplinary and/or mixed-methods research on fertility care can help better understand
475 infertility in relation to socio-economic, cultural-religious and political determinants. This has
476 the potential to influence the health system in general, and specifically the provision of fertility
477 care through informing development and implementation of locally and nationally appropriate
478 policies. If appropriately contextualised, findings might be relevant to resource-poor regions
479 other than Africa where fertility care also remains scant. Finally, implementation of already
480 included fertility care policies requires further attention through operational research and
481 improved uptake of policy into practice. As a starting point, researchers could compare across
482 countries that have already included fertility care and services in their RH policies and form
483 recommendations for best practices.

484 Conclusions

485 This review reveals that including fertility care in RH policies in Africa recognition of
486 infertility as a disease, strong political commitment, and improved affordability of ART. Civil
487 society leaders and other stakeholders should call for increased attention and awareness
488 concerning infertility. To overcome budget limitations and reduce the cost of equipment,
489 supplies and drugs, African governments could continue to build collaborations with the
490 private sector and seek support from international partners. Human resources, infrastructures
491 and supplies should be further developed and standardised protocols drafted. Infertility is
492 accompanied by strong social and emotional factors affecting the wellbeing of women and
493 men, and addressing the gender dimensions of infertility is one of the foremost tasks required.

494 **Supplementary data**

495 Supplementary data are available at *Human Reproduction Update* online.

496 **S1 File. Search strategy**

497 (DOCX)

498 **S2 Table. PerSPEcTiF Framework**

499 (DOCX)

500 **S3 Table. Inclusion and exclusion criteria**

501 (DOCX)

502 **S4 Table. Characteristics of excluded papers**

503 (DOCX)

504 **S5 Table. Characteristics of included papers**

505 (DOCX)

506 **S6 Table. Quality assessment checklist**

507 (DOCX)

508 **S7 Table. Synthesis of thematic analysis**

509 (DOCX)

510 **S8 Table. Framework for factors, themes and categories**

511 (DOCX)

512 **S9 Figure. Schematic representation of barriers and facilitators associated with each**
513 **category**

514 (DOCX)

515 **S10 Table. Summary of findings. Barriers and facilitators for fertility care in Africa**

516

517

518

519 **Acknowledgements**

520 This study is a part of the PhD thesis of the first author at the School of Health and Related
521 Research (ScHARR), University of Sheffield, UK. We acknowledge continued support from
522 Ms Sainey Ceesay, Founding Executive Director of Safe Haven Foundation, The Gambia.

523

524 **Author's roles**

525 Conceptualisation: Anna Afferri, Julie Balen, Susan Dierickx, Allan Pacey

526 Formal analysis: Anna Afferri & Haddijatou Allen

527 Investigation: Anna Afferri, Haddijatou Allen, Julie Balen

528 Methodology: Anna Afferri & Andrew Booth

529 Writing – original draft: Anna Afferri

530 Writing – review & editing: Anna Afferri, Haddijatou Allen, Julie Balen, Andrew Booth,

531 Susan Dierickx, Allan Pacey

532

533 **Funding**

534 This study was supported by the Research England GCRF - Quality Related Sustainable
535 Partnership Award [161059].

536

537 **Competing interests**

538 None declared.

539 References

- 540 Akande, O. (2008) 'Affordable assisted reproductive technologies in developing countries:
541 Pros and cons', *ESHRE Monographs*, 1(April), pp. 12–14.
- 542 Akinloye, O. and Truter, E. J. (2011) 'A review of management of infertility in Nigeria:
543 Framing the ethics of a national health policy', *International Journal of Women's Health*, 3(1),
544 pp. 265–275. doi: 10.2147/ijwh.s20501.
- 545 Asemota, O. A. and Klatsky, P. (2015) 'Access to infertility care in the developing world: The
546 family promotion gap', *Seminars in Reproductive Medicine*, 33(1), pp. 17–22. doi: 10.1055/s-
547 0034-1395274.
- 548 Bahadur, G. *et al.* (2020) 'Observational retrospective study of UK national success, risks and
549 costs for 319,105 IVF/ICSI and 30,669 IUI treatment cycles', *BMJ Open*, 10(3). doi:
550 10.1136/bmjopen-2019-034566.
- 551 Bahamondes, L. and Makuch, M. Y. (2014) 'Infertility care and the introduction of new
552 reproductive technologies in poor resource settings', *Reproductive Biology and Endocrinology*,
553 12(1), pp. 1–7. doi: 10.1186/1477-7827-12-87.
- 554 van Balen, F.; Gerrits, T. (2001) 'Quality of infertility care in poor-resource areas and the
555 introduction of new reproductive technologies', *Human Reproduction*, 16(2), pp. 215–219. doi:
556 10.1093/humrep/16.2.215.
- 557 Barnett-Page, E. and Thomas, J. (2009) 'Methods for the synthesis of qualitative research: A
558 critical review', *BMC Medical Research Methodology*. doi: 10.1186/1471-2288-9-59.
- 559 Booth, A. *et al.* (2019) 'Formulating questions to explore complex interventions within
560 qualitative evidence synthesis', *BMJ Global Health*, 4(Suppl 1). doi: 10.1136/bmjgh-2018-
561 001107.
- 562 Botha, B., Shamley, D. and Dyer, S. (2018) 'Availability, effectiveness and safety of ART in
563 sub-Saharan Africa: a systematic review', *Human Reproduction Open*, 2018(2), pp. 1–12. doi:
564 10.1093/hropen/hoy003.
- 565 Chiware, T. M. *et al.* (2020) 'IVF and other ART in low- and middle-income countries: a
566 systematic landscape analysis', *Human Reproduction Update*, pp. 1–16. doi:

567 10.1093/humupd/dmaa047.

568 Dierickx, S. *et al.* (2018) “‘I am always crying on the inside’”: A qualitative study on the
569 implications of infertility on women’s lives in urban Gambia’, *Reproductive Health*. doi:
570 10.1186/s12978-018-0596-2.

571 Dierickx, S. *et al.* (2019) ‘The fertile grounds of reproductive activism in the Gambia: A
572 qualitative study of local key stakeholders’ understandings and heterogeneous actions related
573 to infertility’, *PLoS ONE*, 14(12), pp. 1–18. doi: 10.1371/journal.pone.0226079.

574 Dierickx, S. (2020) “‘With the kanyaleng and the help of god, you don’t feel ashamed’”:
575 women experiencing infertility in Casamance, Senegal’, *Culture, Health and Sexuality*. Taylor
576 & Francis, 0(0), pp. 1–16. doi: 10.1080/13691058.2020.1833366.

577 Dyer, S. *et al.* (2020) ‘Assisted reproductive technology in Africa: a 5-year trend analysis from
578 the African Network and Registry for ART’, *Reproductive BioMedicine Online*. Elsevier Ltd,
579 41(4), pp. 604–615. doi: 10.1016/j.rbmo.2020.06.021.

580 Dyer, S. J. (2008) ‘Infertility-related reproductive health knowledge and help-seeking
581 behaviour in African countries’, *ESHRE Monographs*, 1(April), pp. 29–33.

582 Dyer, S. and Zegers-Hochschild, F. (2019) “‘Nobody left behind’”: the role of data registries in
583 assisted reproductive technology’, *Global Reproductive Health*, 4(1), pp. e26–e26. doi:
584 10.1097/grh.0000000000000026.

585 FIGO (2012) ‘The FIGO Fertility Toolbox™’. Available at: <http://www.fertilitytool.com/>.

586 Flemming, K. *et al.* (2019) ‘Qualitative evidence synthesis for complex interventions and
587 guideline development: clarification of the purpose, designs and relevant methods’, *BMJ*
588 *Global Health*. doi: 10.1136/bmjgh-2018-000882.

589 Frydman, R. and Ranoux, C. (2008) ‘INVO: A simple, low cost effective assisted reproductive
590 technology’, *ESHRE Monographs*, 1, pp. 85–89.

591 Gerrits, T. (2012) ‘Biomedical infertility care in low resource countries : Barriers and Access’,
592 *Infertility*, pp. 1–6.

593 Gerrits, T. *et al.* (2017) ‘Infertility in the Global South: Raising awareness and generating

594 insights for policy and practice.’, *Facts, views & vision in ObGyn*, 9(1), pp. 39–44.

595 Gerrits, T. and Shaw, M. (2010) ‘Biomedical infertility care in sub-Saharan Africa: a social
596 science-- review of current practices, experiences and view points.’, *Facts, views & vision in*
597 *ObGyn*, 2(3), pp. 194–207. Available at:
598 <http://www.ncbi.nlm.nih.gov/pubmed/25013712>
599 <http://www.pubmedcentral.nih.gov/article-render.fcgi?artid=PMC4090591>.

600 Gipson, J. D., Bornstein, M. J. and Hindin, M. J. (2020) ‘Infertility: A continually neglected
601 component of sexual and reproductive health and rights’, *Bulletin of the World Health*
602 *Organization*. doi: 10.2471/BLT.20.252049.

603 Hammarberg, K. and Kirkman, M. (2013) ‘Infertility in resource-constrained settings: Moving
604 towards amelioration’, *Reproductive BioMedicine Online*. Reproductive Healthcare Ltd., 26(2),
605 pp. 189–195. doi: 10.1016/j.rbmo.2012.11.009.

606 Hörbst, V. (2012) ““You need someone in a grand boubou” – barriers and means to access
607 ARTs in West Africa’, *Infertility*, 21(21), pp. 46–52.

608 Hörbst, V. (2016) ““You cannot do IVF in Africa as in Europe”: the making of IVF in Mali and
609 Uganda’, *Reproductive Biomedicine and Society Online*. Elsevier B.V., 2, pp. 108–115. doi:
610 10.1016/j.rbms.2016.07.003.

611 Inhorn, M. C. (2009) ‘Right to assisted reproductive technology: Overcoming infertility in low-
612 resource countries’, *International Journal of Gynecology and Obstetrics*, 106(2), pp. 172–174.
613 doi: 10.1016/j.ijgo.2009.03.034.

614 Inhorn, M. and Gürtin, Z. (2012) ‘Infertility and Assisted Reproduction in the Muslim Middle
615 East: Social, Religious, and Resource Considerations’, *Facts, Views, & Vision OBGYN*
616 *Monography*, pp. 24–29. Available at: <http://www.fvvo.be/assets/265/04-Inhornetal.pdf>.

617 Joanna Briggs Institute (2017) ‘Checklist for Text and Opinion’, p. 5. doi:
618 10.1109/ICC.2009.5199139.

619 Khalifa, DS; Ahmed, M. (2012) ‘Reviewing infertility care in Sudan ; socio-cultural , policy
620 and’, *FVV in OBGYN Monograph*, pp. 53–58.

621 Khan, M., Zafar, S. and Syed, S. (2013) ‘Successful intravaginal culture of human embryos for

622 the first time in Pakistan - An experience at the Sindh Institute of Reproductive Medicine,
623 Karachi', *Journal of the Pakistan Medical Association*, 63(5), pp. 630–632.

624 Mascarenhas, M. N. *et al.* (2012) 'National, Regional, and Global Trends in Infertility
625 Prevalence Since 1990: A Systematic Analysis of 277 Health Surveys', *PLoS Medicine*, p.
626 9(12):e1001356. doi: 10.1371/journal.pmed.1001356.

627 McArthur, A. *et al.* (2015) 'Innovations in the systematic review of text and opinion',
628 *International Journal of Evidence-Based Healthcare*. doi: 10.1097/XEB.0000000000000060.

629 Moher D, Liberati A, Tetzlaff J, A. D. (2009) 'PRISMA 2009 Flow Diagram', *The PRISMA*
630 *statement*.

631 Nachtigall, R. D. (2006) 'International disparities in access to infertility services', *Fertility and*
632 *Sterility*, 85(4), pp. 871–875. doi: 10.1016/j.fertnstert.2005.08.066.

633 Okonofua, F. *et al.* (1997) 'The social meaning of infertility in Southwest Nigeria', *Health*
634 *Transition Review*. doi: 10.2307/40652279.

635 Okonofua, F. E. (1996) 'The case against new reproductive technologies in developing
636 countries', *BJOG: An International Journal of Obstetrics and Gynaecology*. doi:
637 10.1111/j.1471-0528.1996.tb09542.x.

638 Ombelet, W. *et al.* (2008) 'Infertility and the provision of infertility medical services in
639 developing countries', *Human Reproduction Update*, 14(6), pp. 605–621. doi:
640 10.1093/humupd/dmn042.

641 Ombelet, W. (2009) 'Reproductive healthcare systems should include accessible infertility
642 diagnosis and treatment: An important challenge for resource-poor countries', *International*
643 *Journal of Gynecology and Obstetrics*, 106(2), pp. 168–171. doi: 10.1016/j.ijgo.2009.03.033.

644 Ombelet, W. (2011) 'Global access to infertility care in developing countries: a case of human
645 rights, equity and social justice.', *Facts, views & vision in ObGyn*, 3(4), pp. 257–66. Available
646 at:
647 <http://www.ncbi.nlm.nih.gov/pubmed/24753875>
648 <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3987469>.

649 Ombelet, W. (2013) 'The Walking Egg Project: Universal access to infertility care - from

650 dream to reality.’, *Facts, views & vision in ObGyn*, 5(2), pp. 161–16175.

651 Ombelet, W. (2014) ‘Is global access to infertility care realistic? the Walking Egg Project’,
652 *Reproductive BioMedicine Online*. Reproductive Healthcare Ltd., 28(3), pp. 267–272. doi:
653 10.1016/j.rbmo.2013.11.013.

654 Ombelet, W. and Goossens, J. (2016) ‘The Walking Egg Project: how to start a TWE centre?’,
655 *Facts, views & vision in ObGyn*, 8(2), pp. 119–124.

656 Ombelet, W. and Onofre, J. (2019) ‘IVF in Africa: what is it all about?’, *Facts, views & vision*
657 *in ObGyn*, 11(1), pp. 65–76. Available at:
658 <http://www.ncbi.nlm.nih.gov/pubmed/31695859>
659 <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC6822948>.

660 Serour, G. *et al.* (2019) ‘The place of ART in Africa’, *Global Reproductive Health*. doi:
661 10.1097/grh.0000000000000027.

662 Sharma, S., Mittal, S. and Aggarwal, P. (2009) ‘Management of infertility in low resource
663 countries’, *BJOG: An International Journal of Obstetrics and Gynaecology*, 116(SUPPL. 1),
664 pp. 71–76. doi: 10.1111/j.1471-0528.2009.02312.x.

665 Thomas, J. and Harden, A. (2008) ‘Methods for the thematic synthesis of qualitative research
666 in systematic reviews’, *BMC Medical Research Methodology*. doi: 10.1186/1471-2288-8-45.

667 Tjiam, K. H., Zeilmaker, G. H. and Alberda Th., A. (1986) ‘Sexually transmitted diseases and
668 infertility’, *Nederlands Tijdschrift voor Geneeskunde*, 130(31), pp. 1403–1406. doi:
669 10.1007/978-94-015-1308-1_48.

670 United Nations (1994) *Report of the International Conference on Population and*
671 *Development, Ageing International*.

672 WHO (2019) *HRP Annual Report 2019*.

673 Zegers-Hochschild, F. *et al.* (2017) ‘The international glossary on infertility and fertility care,
674 2017’, *Human Reproduction*, 32(9), pp. 1786–1801. doi: 10.1093/humrep/dex234.

675