ANNEXES
BREAKING THE SILENCE AROUND INFERTILITY

A NARRATIVE REVIEW OF EXISTING PROGRAMMES, PRACTICES AND INTERVENTIONS IN LOW AND LOWER-MIDDLE INCOME COUNTRIES

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ANNEX 1: ACADEMIC DATABASE SEARCH STRINGS

Embase (Ovid)

#1 (in)fertility

infertility/ or female infertility/ or male infertility/ or subfertility/ OR female subfertility/ OR female sterility/ OR childlessness/ OR (childless* OR infertil* OR subfertil* OR sterility OR sub-fertil* OR ((reduced OR problem* OR issue*) ADJ3 fertilit*)).ti,ab,kw.

148.647 hits (July 23th, 2019)

#2 intervention

Intervention study/ OR community program/ OR education program/ OR health program/ OR implementation/ OR policy/ OR (intervention* OR program* OR project* OR campaign* OR workshop* OR training OR initiative).ti,ab,kw. OR case study/ OR pilot/ OR action.ti,ab,kw.

3.945.560 hits (July 23th, 2019)

#3 developing countries

low income country/ OR middle income country/ OR developing country/ OR exp africa/ OR exp caribbean region/ OR exp central america/ OR "gulf of mexico"/ OR latin america/ OR mexico/ OR exp south america/ OR exp asia, central/ OR asia, southeastern/ OR exp asia, western/ OR china/ OR mongolia/ OR oceania/ OR caribbean region/ OR exp indian ocean islands/ OR indonesia/ OR pacific islands/ OR melanesia/ OR micronesia/ OR polynesia/ OR philippines/ OR west indies/ OR cuba/ OR dominica/ OR dominican republic/ OR grenada/ OR haiti/ OR jamaica/ OR "trinidad and tobago"/ OR (global south OR developing countr* OR low income countr* OR middle income countr* OR poor resource area* OR resource poor area* OR afghanistan OR albania OR algeria OR angola OR argentina OR armenia OR azerb* OR bahrain OR bangladesh OR belarus OR belize OR benin OR bhutan OR bolivia OR bosnia OR botswana OR brazil OR bulgaria OR burkina OR burma OR burundi OR cambodia OR cameroon OR africa* OR cabo verde OR cape verde OR chad OR china OR colombia OR comoros OR congo OR costa rica OR cote d'ivoire OR ivory coast OR croatia OR cuba OR djibouti OR dominica OR dominican republic OR ecuador OR egypt OR el salvador OR eritrea OR ethiopia OR fiji OR gabon OR gambia OR georgia OR ghana OR greece OR grenada OR guatemala OR guinea OR guyana OR haiti OR honduras OR india OR indonesia OR iran OR iraq OR jamaica OR jordan OR kazakhstan OR kenya OR kiribati OR korea OR kosovo OR kuwait OR kyrgyz* OR lao OR laos OR lebanon OR lesotho OR liberia OR libya OR macedonia OR madagascar OR malawi OR malaysia OR maldives OR mali OR marshall islands OR mauritius OR mexico OR micronesia OR moldova OR mongolia OR montenegro OR morocco OR mozambique OR myanmar OR namibia OR nauru OR nepal OR nicaragua OR niger OR nigeria OR oman OR pakistan OR palest* OR palau OR panama OR paraguay OR peru OR philippines OR romania OR russia* OR rwanda OR samoa OR "sao

tome and principe" OR saudi arabia OR senegal OR serbia OR seychelles OR sierra leone OR solomon islands OR somalia OR sri lanka OR st* lucia OR sudan OR surinam* OR swaziland OR syria* OR tajikistan OR tanzania OR thailand OR timor OR togo OR tonga OR "trinidad and tobago" OR tunisia OR turkey OR turkmenistan OR tuvalu OR uganda OR ukraine OR united arab emirates OR uzbekistan OR vanuatu OR venezuela OR vietnam OR "vincent and the grenadines" OR west bank OR gaza OR yemen OR zambia OR zimbabwe).ti,ab,kw.

2.385.350 hits (July 23th, 2019)

#4 prevention

prevention/ OR prevention study/ OR maternal welfare/ OR abortion/ OR sexually transmitted disease/ OR female genital mutilation/ OR sexual education/ OR puerperal infection/ OR pelvic inflammatory disease/ OR lifestyle/ OR menstruation/ OR endometriosis/ OR involuntary sterilization/ OR vascular disease/ OR air pollution/ OR (fertility aware* OR maternal health OR STD OR STI OR post-abortion infection OR reproductive health care education OR fibroid* OR ovulation problem* OR forced sterilization OR coerced sterilization OR low sperm count OR low quality sperm OR circulatory problem* OR pesticides OR male circumcision OR environmental pollution OR water pollution OR air pollution OR soil pollution OR chemical pollutants OR environmental contaminants OR reproductive toxicology).ti,ab,kw.

781.490 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #4: 475 results (July 23th, 2019)

#5 destigmatization/involvement of men

(involv* ADJ3 men OR (stigma* OR destigm* OR social impact* OR discrimination OR blam* OR guilt* OR burden* OR shame OR shaming* OR social status* OR masculinit* OR exclusion OR gender OR male infertility OR violence OR maltreatment OR divorce OR non-discrimination OR social acceptance OR motherhood OR ostracism OR childlessness OR social norm* OR cultural norm*)).ti,ab,kw.

1.186.791 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #5: 399 results (July 23th, 2019)

#6 access to care

(infertility care OR infertility treatment OR counseling OR counselling OR health education OR access* OR low cost OR affordab* OR public health OR fertility examination OR fertility screening OR subsidi* OR legislati* OR costs OR training course OR referral OR follow up OR shopping around OR IEC OR information OR infertility diagnosis OR confidentiality OR privacy OR support group OR psycho-social support OR peer support OR poverty).ti,ab,kw.

4.095.966 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #6: 845 results (July 23th, 2019)

468 + 395 + 831 = 1.719

#1 AND #2 AND #3 AND (#4 OR #5 OR #6): 1.271 results (instead of 1.719) [July, 23th, 2019]

Sociological Abstracts (ProQuest)

#1 (in)fertility

ab(infertil* OR subfertil* OR steril* OR childless* OR sub-fertil* OR ((reduced OR problem* OR issue*) NEAR/3 fertil*)) OR su(infertil* OR subfertil* OR steril* OR childless* OR sub-fertil* OR ((reduced OR problem* OR issue*) NEAR/3 fertil*)) OR ti(infertil* OR subfertil* OR steril* OR childless* OR sub-fertil* OR ((reduced OR problem* OR issue*) NEAR/3 fertil*))

4.394 hits (July 23th, 2019)

#2 intervention

ab(implementation OR policy OR intervention* OR program* OR project* OR campaign* OR workshop* OR training OR “case study” OR pilot OR action OR initiative) OR su(implementation OR policy OR intervention* OR program* OR project* OR campaign* OR workshop* OR training OR “case study” OR pilot OR action OR initiative) OR ti(implementation OR policy OR intervention* OR program* OR project* OR campaign* OR workshop* OR training OR “case study” OR pilot OR action OR initiative)

500.514 hits (July 23th, 2019)

#3 developing countries

Anywhere(“global south” OR “developing countr*” OR “low income countr*” OR “middle income countr*” OR “poor resource area*” OR “resource poor area*” OR afghan* OR africa* OR albania* OR algeria* OR angola* OR argentin* OR armenia* OR azerb* OR bahrain OR bangladesh* OR bengali OR belarus* OR belize* OR benin* OR bhutan* OR bolivia* OR bosnia* OR batswana OR botswana OR brazil* OR bulgaria* OR burkina* OR burm* OR burundi* OR cambodia* OR cameroon* OR “cabo verd*” OR “cape verd*” OR caribbean* OR “central America*” OR “central Asia*” OR chad OR chin* OR colombia* OR comoros OR congo* OR “costa rica*” OR “cote d'ivoire” OR “ivory coast” OR ivorian* OR croatia* OR cuba* OR djibouti* OR dominica* OR ecuador* OR egypt* OR salvador* OR eritrea* OR ethiopia* OR fiji* OR gabon* OR gambia* OR georgia* OR ghan* OR greece OR greek OR grenad* OR guatemala* OR guinea* OR “gulf of Mexico” OR guyan* OR haiti* OR hondura* OR india* OR indonesia* OR iran* OR

iraq* OR jamaica* OR jordan* OR kazakh* OR kenya* OR kiribati OR korea* OR kosov* OR kuwait* OR kyrgyz* OR lao OR laos OR laotian OR “latin America*” OR leban* OR lesotho OR basotho OR liberia* OR libya* OR macedonia* OR madagasca* OR malawi OR malaysia* OR maldiv* OR mali* OR “marshall islands” OR mauritius OR melanesia* OR mexic* OR micronesia* OR moldov* OR mongolia* OR montenegr* OR morocc* OR mozambi* OR myanmar OR namibia* OR nauru* OR nepal* OR nicaragua* OR niger* OR oceania* OR oman* OR “pacific island*” OR pakistan* OR palest* OR palau* OR panam* OR paraguay* OR peru* OR philippin* OR polynesia* OR romania* OR russia* OR rwand* OR samoa* OR "sao tome and principe" OR saudi OR senegal* OR serbia* OR seychell* OR “sierra leon*” OR “solomon islands” OR somalia* OR “south America*” OR “southeastern Asia*” OR “sri lanka*” OR “st* lucia” OR sudan* OR surinam* OR swazi* OR syria* OR tajik* OR tanzania* OR thai* OR timor* OR togo* OR tonga* OR "trinidad and tobago" OR tunisia* OR turk* OR turkmen* OR tuvalu* OR ugand* OR ukrain* OR “united arab emirates” OR uzbek* OR vanuatu OR venezuela* OR vietnam* OR "vincent and the grenadines" OR “west bank” OR “west Ind*” OR “western Asia*” OR gaza OR yemen* OR zambia* OR zimbabwe*)

556.230 hits (July 23th, 2019)

#4 prevention

ab(prevention OR maternal OR abortion OR “sexually transmitted disease*” STD OR STI OR “genital mutilation” OR “sexual education” OR “puerperal infection*” OR “pelvic inflammatory diseas*” OR lifestyle OR menstruation OR endometriosis OR sterilization OR “vascular disease*” OR “air pollution” OR “fertility aware*” OR “post-abortion infection” OR “reproductive health care education” OR fibroid* OR “ovulation problem*” OR “low sperm count” OR “low quality sperm” OR “circulatory problem*” OR pesticide* OR “male circumcision” OR pollution OR pollutant* OR contaminants OR “reproductive toxicology”) OR su(prevention OR maternal OR abortion OR “sexually transmitted disease*” STD OR STI OR “genital mutilation” OR “sexual education” OR “puerperal infection*” OR “pelvic inflammatory diseas*” OR lifestyle OR menstruation OR endometriosis OR sterilization OR “vascular disease*” OR “air pollution” OR “fertility aware*” OR “post-abortion infection” OR “reproductive health care education” OR fibroid* OR “ovulation problem*” OR “low sperm count” OR “low quality sperm” OR “circulatory problem*” OR pesticide* OR “male circumcision” OR pollution OR pollutant* OR contaminants OR “reproductive toxicology”) OR ti(prevention OR maternal OR abortion OR “sexually transmitted disease*” STD OR STI OR “genital mutilation” OR “sexual education” OR “puerperal infection*” OR “pelvic inflammatory diseas*” OR lifestyle OR menstruation OR endometriosis OR sterilization OR “vascular disease*” OR “air pollution” OR “fertility aware*” OR “post-abortion infection” OR “reproductive health care education” OR fibroid* OR “ovulation problem*” OR “low sperm count” OR “low quality sperm” OR “circulatory problem*” OR pesticide* OR “male circumcision” OR pollution OR pollutant* OR contaminants OR “reproductive toxicology”)

66.398 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #4: 135 results (July 23th, 2019)

#5 destigmatization/involvement of men

ab(involv* NEAR/3 men OR (stigma* OR destigm* OR "social impact*" OR discrimination OR blam* OR guilt* OR burden* OR shame OR shaming* OR "social status*" OR masculinit* OR exclusion OR gender OR "male infertility" OR violence OR maltreatment OR divorce OR non-discrimination OR "social acceptance" OR motherhood OR ostracism OR childlessness OR "social norm*" OR "cultural norm*")) OR su(involv* NEAR/3 men OR (stigma* OR destigm* OR "social impact*" OR discrimination OR blam* OR guilt* OR burden* OR shame OR shaming* OR "social status*" OR masculinit* OR exclusion OR gender OR "male infertility" OR violence OR maltreatment OR divorce OR non-discrimination OR "social acceptance" OR motherhood OR ostracism OR childlessness OR "social norm*" OR "cultural norm*")) OR ti(involv* NEAR/3 men OR (stigma* OR destigm* OR "social impact*" OR discrimination OR blam* OR guilt* OR burden* OR shame OR shaming* OR "social status*" OR masculinit* OR exclusion OR gender OR "male infertility" OR violence OR maltreatment OR divorce OR non-discrimination OR "social acceptance" OR motherhood OR ostracism OR childlessness OR "social norm*" OR "cultural norm*"))

334.754 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #5: 180 results (July 23th, 2019)

#6 access to care

ab(infertility OR counseling OR counselling OR "health education" OR access* OR "low cost" OR affordab* OR "public health" OR fertility OR subsidi* OR legislati* OR costs OR "training course" OR referral OR "follow up" OR "shopping around" OR IEC OR information OR confidentiality OR privacy OR "support group" OR "psycho-social support" OR "peer support" OR poverty) OR su(infertility OR counseling OR counselling OR "health education" OR access* OR "low cost" OR affordab* OR "public health" OR fertility OR subsidi* OR legislati* OR costs OR "training course" OR referral OR "follow up" OR "shopping around" OR IEC OR information OR confidentiality OR privacy OR "support group" OR "psycho-social support" OR "peer support" OR poverty) OR ti(infertility OR counseling OR counselling OR "health education" OR access* OR "low cost" OR affordab* OR "public health" OR fertility OR subsidi* OR legislati* OR costs OR "training course" OR referral OR "follow up" OR "shopping around" OR IEC OR information OR confidentiality OR privacy OR "support group" OR "psycho-social support" OR "peer support" OR poverty)

275.699 hits (July 23th, 2019)

#1 AND #2 AND #3 AND #6: 325 results (July 23th, 2019)

135 + 180 + 325 = 640

#1 AND #2 AND #3 AND (#4 OR #5 OR #6): 378 results (instead of 640) [July, 23th, 2019]

ANNEX 2: LIST OF KEY INFORMANT INTERVIEWS

Key Informants

Ian Askew and Rajat Khosla, World Health Organisation / Human Reproduction Programme

Manuelle Hurwitz and Yuhsin Huang, International Planned Parenthood Federation

Chelsea Polis, Guttmacher Institute

Bethany Young Holt, IMPT

Roy Farquharson, ESHRE

Willem Ombelet, Walking Egg

Anu Kumar, IPAS

Linda Bennet, University of Melbourne

Hashim Hounkpatin, Medical doctor Benin and Women Deliver Young Leader

Joia Crear Perry, National Birth Equity Collaborative

Sarojini Nadimpally, SAMA-Resource Group for Women and Health, India

Jenny Deschamps, ProFamilia Colombia

Silke Dyer, Groote Schuur Hospital and the University of Cape Town

Jacky Boivin, Cardiff University

Sheryl van der Poel, Ex-WHO, infertility expert

Cynthia Witsenburg, Dimbayaa, Gambia

Celena Nair & Bethan Cobley, Marie Stopes International

Karin Hammarberg, Monash University

Focus Group Discussions

CoP Infertility Jordan

CoP Infertility Burundi

CoP Infertility Bangladesh

ANNEX 3: OVERVIEW OF EXISTING INTERVENTIONS IN INFERTILITY PREVENTION, ACCESS TO QUALITY CARE, DE-STIGMATIZATION AND MALE INVOLVEMENT.

1. PREVENTION OF INFERTILITY

Nr.	References	Country/region	Description
1	Soules (2003) [1] https://www.asrm.org/	United States	One of the biggest and most successful infertility prevention campaigns to date was led by the American Society for Reproductive Medicine (ASRM)[1] in 2001 in the United States. With the assistance of Hauser Group, a strategic communications firm, the campaign targeted men and women between the ages of 18 and 40 and focused on four themes: smoking, body weight, sexually transmitted diseases and reproductive aging (Soules, 2003: p. 295). Because of

			their relatively small budget, the campaign was limited to public service announcement in three cities: New York, Chicago and Seattle (Soules, 2003: p. 296). The campaign entailed the design of four posters that were displayed inside buses, 30 second radio segments, and the creation of a brochure on infertility prevention which could be requested by phone or through their campaign website (Soules, 2003). Neither the ASRM nor Hauser Group had anticipated that their small, self-funded campaign would end up becoming an internationally recognized media campaign receiving coverage from newspapers such as Wall Street Journal, Washing Post and USA Today; magazines such as Newsweek, Time and Cosmopolitan; television shows including the "Today Show", "Oprah" and "60 Minutes", and over five hundred radio stations with an estimated 24,000 airings (Soules, 2003: p. 295). Reflecting upon the success of the infertility prevention campaign, Michael R. Soules – the president of the ASRM at the time of the campaign – contends that this can largely be attributed to the campaign its controversial nature and the debates these sparked during the ensuing media blitz (Soules, 2003: p. 297). The design of the poster was of crucial importance to this, featuring a transposed baby bottle in relation to each of the four medical themes along with statistical texts on the harmful effects of smoking, unhealthy body weight, sexually transmitted infections, and advanced aging on fertility. Based on the media coverage and received responses, the ASRM found that the theme that attracted 99 percent of the earned-media attention was age-related fertility decline (ARFD) (Soules, 2003). Soules found it regrettable that the other three themes were largely ignored, as these are also crucial in preventing infertility, but the success of this theme revealed a great deal about the importance and potential of raising awareness on ARFD.
2	García, Rodrígue z and Vassena (2018) Mahey et al. (2018) [1] http://w ww.fertis tat.com/, https://w ww.yourf ertility.or g.au/, http://my		As pointed out by Mahey et al. (2018), the lack of awareness about fertility potential is a major factor that accounts for the increasing incidence of subfertility worldwide (2018: p. 2). Both for men and women, natural aging processes place a limit to human fertility and therefore an accurate understanding of reproductive facts such as the 'when and how to conceive' is essential for informed fertility decision making and infertility prevention efforts (Mahey et al., 2018). Recent trends of postponing the age at which people have their first child as well as the accelerated development and use of medical technology[1] to overcome such limits, reveal that awareness about ARFD is low and that overconfidence tends to be placed in the potential of assisted reproductive technologies (ARTs) (García, Rodríguez and Vassena, 2018: p. 371; Mahey et al., 2018). Underlining the need to educate people on fertility, García, Rodríguez and Vassena (2018) stipulate that the most effective ways to inform people about age-related fertility decline is through primary health care providers, mass media and social media. The

	fertilitychoices.com/ [2] 'Beat Infertility', 'Infertility Treatment', 'Hidden Secrets of Infertility'		importance of media, in particular the potential of earned media, should not be underestimated. Even with small-budget campaigns, large audiences can be reached. This also applies to websites[1] and apps[2].
3	[1] http://www.fertistat.com/ [2] http://psych.cf.ac.uk/fertilitystudies/projects/		Many of the existing infertility prevention programs, interventions, and initiatives focus on the preservation of fertility through lifestyle choices. Of primary concern are individuals' smoking habits, food consumption, caffeine consumption, drugs intake, body mass index (BMI), stress levels, physical activities (e.g. engagement in sports) and environment. An example of an online tool that was created for the evaluation of such infertility risk factors is FertiStat.[1] Developed by Cardiff University in the United Kingdom[2], FertiStat was designed as a self-administered tool for women to increase awareness and knowledge of risk factors and how these may negatively affect their fertility and ability to achieve a pregnancy (Bayoumi et al., 2018: p. 11). By answering 22 questions related to one's lifestyle and reproductive behavior, FertiStat generates a risk profile for its users and generates a personalized report with fertility guidance and suggested actions (Bayoumi et al., 2018). In doing so, FertiStat has the potential to address fertility care needs and identify interventions specific to individual users' lifestyles. However, it is important to be aware of the context in which infertility prevention tools are created as well as the ones they seek to target. In a study by Bayoumi et al. the cross-cultural comprehensiveness, feasibility and acceptability of FertiStat in resource-poor countries were evaluated (2018). In other words, they assessed whether FertiStat would also be a useful infertility prevention tool for individuals outside of the United Kingdom. Through a survey of international medical expert concerning the comprehensiveness of risks included in the original FertiSTAT, as well as stakeholder meetings to assess the feasibility and acceptability of using an adapted FertiSTAT, Bayoumi et al. found that the use of a tool to improve fertility awareness was accepted and perceived to be feasible but that cross-cultural adaptation of fertility prevention-related measures, content, wording, dissemination and targeted audiences would be required (Bayoumi et al., 2018: p. 10). The available version of FertiStat was, for example, deemed inappropriate for the 'typical client' or user in the Middle East

			(Bayoumi et al., 2018: p. 18). One of the conflicting factors was the wording of questions relating to users' sexual activities. The use of the word 'sexual partner' was deemed inappropriate by some given that sexual relationships should only be entered between husbands and wives, whereas others suggested asking about 'extramarital affairs' instead (Bayoumi et al., 2018: p. 16).
4	Friedman et al. (2010) Nagaoka (2014) Upton (2002)		Part of the difficulty of encouraging use of contraception to avoid STIs and avoid infertility caused by STIs is the fact that in some contexts the use of contraception is seen to be a cause of infertility (instead of something that can protect infertility status), meaning people avoid the use of contraception for this reason (Upton, 2002). However, according to research by Friedman et al. (2010) among young women in the United States, attention paid to infertility is seen as an important motivator to seek screening for chlamydia. This shows that if infertility is explicitly made part of STI/STD screening or prevention, it might increase people's determination to prevent STIs or seek treatment for it. Research on the effects of an educational program aiming to increase fertility awareness in teenage girls in Japan also suggest that making infertility education part of sex education is important to make young people aware of infertility and infertility risks (Nagaoka, 2014).

2. ACCESS TO QUALITY CARE

2.1. SUBTHEME 1: INTERNATIONAL ORGANIZATIONS/INITIATIVES

Nr.	References	Country /region	Description
1	Ombelet (2009b) Ombelet (2011)		One organization that has helped put infertility on the agenda is ESHRE (European Society of Human Reproduction and Embryology). In December 2007 there was an expert meeting organized by the Special Task Force 'developing countries and infertility' of ESHRE in Arusha, Tanzania (Ombelet, 2009b). This led to the Arusha-project, a project with the goal of achieving global access to infertility care, and specifically access in lower-income countries. The Arusha-project led to an expert meeting and the establishment five working groups and five study groups (Ombelet, 2011). The project aims to improve access to treatment, care and education, and for infertility to be connected to existing family planning and maternal care services (Ombelet, 2009b).

2	ESHRE Task Force (2009) Inhorn and Patrizio (2015)		ESHRE has developed guidelines for providing infertility treatment in lower-income countries. As summarized by Inhorn and Patrizio (2015), these include: "(i) increasing attention to infertility prevention, partly through national investments in reproductive health and sex education; (ii) research to improve the cost-effectiveness of infertility diagnosis and treatment, with technologies adapted to local conditions; (iii) modified ovarian stimulation protocols, using simplified and mild stimulation procedures or controlled natural cycles, to reduce the risks of ovarian hyperstimulation syndrome; (iv) single-embryo transfer to reduce multiple pregnancies; (v) efforts by international organizations to fund research and organize infertility diagnosis and treatment training courses in low-resource settings and (vi) support to governments to regulate ART practice by licensing providers, monitoring clinical activities and verifying success rates of low-cost approaches (ESHRE Task Force, 2009)." The first one focuses on prevention, but the latter guidelines are especially important to the topic of 'access to good care'.
3	Adamson (2012) [1] www.fertilitytool.com		One initiative that deals with various aspects of infertility is the FIGO (International Federation of Gynecology and Obstetrics) Fertility Toolbox. This is a tool for providers of women's health care meant to increase accessibility to infertility management and prevention. It is mainly meant for lower-income countries and can be adapted to different environments. The tools in the toolbox deal with putting infertility on the agenda (specifically in lower-income countries where infertility care is often thought not to be a priority), prevention, diagnosis, treatment, overcoming personal and societal barriers to infertility care and referral/termination of treatment (Adamson, 2012). It offers tools for people with fertility issues, for people with a friend or family member who has fertility issues, for healthcare providers, and for policy makers.[1] The toolbox is being developed, reviewed and tested in Chile, India and South Africa in order to improve it (Adamson, 2012).

2.2. SUBTHEME 2: LOW-COST ARTS

Nr.	References	Country/region	Description
1	Aleyamma et al. (2011) Huyser (2008)		Various strategies suggested to cut costs of IVF are: careful patient selection (seeing if IVF is necessary, and using less expensive ARTs if not), simplifying investigative methods, reducing the costs of ovarian stimulation, simplifying the procedures and equipment in the laboratory, and minimizing the complications of IVF (thereby reducing the costs of treating these complications) (Aleyamma et al.,

	Makuch and Bahamondes (2014) Ombelet (2008) Ombelet et al. (2008) Teoh and Maheshwari (2014)		2011; Huyser, 2008; Ombelet et al., 2008b; Teoh and Maheshwari, 2014). Examples of low-cost treatments are the use of the natural cycle, the transfer of a single embryo, simplifying diagnostic procedures, ovarian stimulation protocols, and simplified IVF (Makuch and Bahamondes, 2014; Ombelet, 2008).
2	Cooke et al. (2008) Vayena et al. (2009		The Low Cost IVF Foundation was established independently in 2007. Their goal is/was to encourage low-cost ART possibilities and to demonstrate that it is possible for the material costs of a cycle of IVF to be less than 200 euros (Vayena et al., 2009). The first three steps of the foundation are: 1) to concentrate on couples with infertility who would benefit from ARTs and deliver low-cost programs only to those who cannot afford more expensive services, 2) to take the local context into account for delivering effective treatment, and 3) to publish data and use data to influence health systems (Cooke et al., 2008).
3	Inhorn and Patrizio (2015)		A social movement that aims to help infertile people in lower-income settings, which they frame as 'reproductive justice', is the Low-Cost IVF (LCIVF) Movement. ESHRE supports this movement.
4	Ombelet (2014) Ombelet (2015) Inhorn and Patrizio (2015) Klerkx et al. (2013) Van Blerkom et al. (2014)		The non-profit organization 'Walking Egg Project' aims to make infertility care more widely available and accessible in lower-income countries. It was founded to achieve the goal of achieving global access to infertility care of the Arusha project. One of their aims is to develop low-cost ovarian stimulation protocols for intrauterine insemination and IVF/intracytoplasmic sperm injections, and to reduce the cost of fertility treatments. One way to reduce the costs of fertility treatments is by first starting with simpler treatments than IVF (if possible with the specific infertility diagnosis). When it comes to IVF, the Walking Egg aims to provide $200 IVF in lower-income countries. One initiative of the Walking Egg Project to improve accessibility of infertility care is to simplify the IVF laboratory where egg fertilization takes place. This method is called the 'tWE laboratory method' and was developed by Dr. Ombelet and embryologist Van Blerkom. With this simplified method, the IVF laboratory is reduced to an aluminum heating block containing one pair of test tubes for each embryo. This method avoids the high costs

			of establishing IVF laboratories and the use of high-tech incubation equipment as well as expensive medical gases. It requires only low-cost components and the use of inexpensive chemicals. Costs related to building an IVF laboratory would be decreased by at least 80% when using the tWE lab system, and trials suggest that this low-cost method does not comprise IVF outcomes.
5	Hammarberg and Kirkman (2013) Inhorn and Patrizio (2015)	Based in United States, active in e.g. Mexico, Sudan, Trinidad	An initiative that is part of the Low-Cost IVF (LCIVF) Movement is the North American-based non-profit organization 'Friends of Low-cost IVF' (FLCIVF). The FLCIVF was founded by Prof. Alan Trounson and Karin Hammarberg among others in 2011. They raise money through donations from individuals and charities and they work with IVF clinics willing to donate their services pro bono. The FLCIVF aims to both provide health education around the prevention of infertility and to provide simplified clinical IVF services for a minimal cost (Inhorn and Patrizio, 2015). The charity aims to establish high-quality infertility care in public hospitals, train local medical staff to provide low-cost IVF services and monitor the success rate of low-cost IVF (Hammarberg and Kirkman, 2013). Furthermore, the non-profit organization has also developed a simplified ovarian stimulation protocol without the use of injectable gonadotrophins. This can be used together with simplified IVF techniques. In 2015, programs from the FLCIVF had been successfully implemented in Mexico, and later on in Sudan and Trinidad (Inhorn and Patrizio, 2015).
6	Huyser (2008) [1] https://www.dmagazine.com/publications/d-ceo/2019/january-february/from-north-texas-a-low-tech-fertility-solution-goes-viral/	United States	A solution that is both low-cost and low-tech is the approach to IVF by Kevin and Kathy Doody from the United States. Normally expensive incubators are used to keep the eggs and sperm warm for around a week before doctors place the fertilized egg in the mother's uterus. In this case on the other hand, the women themselves are used as incubators, as their bodies have the correct temperature, pH balance, and oxygen levels necessary for fertilization and embryo growth. Doctors combine the eggs and sperm inside the device called INVOcell (which is about the size of a wine cork and made of clear polystyrene), and this device is then inserted into the patient's vagina. The device stays here for around five days, after which the device is removed and the fertilized egg is placed in the woman's uterus. The FDA approved this technology in 2014. INVOcell reduces the price of IVF a lot (it cuts the IVF expenses in half in the United States). Furthermore, it gives patients more of a sense of control over the process, reduces clinic visits and might lead to missing fewer workdays. According to Kathy Doody, doctors in Hawaii were trained with INVOcell in order to be able to provide it as an option to women having their incubation period during hurricane season (as it would be difficult to visit the clinic or hospital then). INVOcell might thus be a useful way to reduce costs of IVF and offer IVF to people not being able to visit a clinic or hospital as frequently as with IVF normally.[1] Huyser (2008) suggests as well that once

			INVOcell is tested and accepted in high-income countries, this might be a useful low-cost solution for low-income countries as well.
7	[1] https://journalofethics.ama-assn.org/article/lower-quality-clinical-care-ethically-justifiable-patients-residing-areas-infrastructure-deficits/2018-03	Lebanon	Dr. Moussa aims to bring a mobile IVF-ICSI clinic and laboratory to the Beka'a Valley in Lebanon as part of the LCIVF Movement. The Beka'a Valley is an area of Lebanon with limited electricity supply and road access, and many Syrian refugees have come to this part of Lebanon, causing political instability. While Dr. Moussa acknowledges that the success rates of mobile care are lower than those of Beirut-based laboratories, he argues that these lower success rates are better than those patients having no access to IVF-ICSI at all.[1]
8	De Beer et al. (2016) [1] https://bhekisisa.org/article/2018-05-09-should-government-health-schemes-pay-for-infertility-treatment/	South Africa	At the fertility clinic of the Tygerberg Academic Hospital in South Africa, Thabo Matsaseng (Head of the Reproductive Medicine Unit at Stellenbosch University) has initiated offering IVF for less than a quarter of the price of the treatment at most private clinics. He has achieved this by lowering clinic and administration fees, lowering hormone doses (to stimulate ovulation), using local anaesthetic in place of more expensive and complicated general anesthetic and through having optimum utilization of trained personnel (De Beer et al., 2016).[1]
9	Ombelet et al. (2008a) Ombelet		Lowering the costs of infertility care can include using lower-cost ARTs such as IUI for example (Ombelet et al., 2008a; Ombelet et al., 2010). The costs for IUI are low, there are rarely complications, training is easy, and the treatment is less invasive than other ARTs. In case of non-tubal infertility, IUI should be a first-line treatment, according to Ombelet et al. (2008a). Using IVF or ICSI instead of IUI in

	et al. (2010)		these cases is more invasive, more expensive, and comes with more risks. IVF should thus not be seen as the only option of treating infertility (Ombelet et al., 2008a).
10	Christie et al. (2011)	Jamaica	Research in Jamaica suggests that IUI is a cost-effective and safe option for treating subfertility in low-income countries (Christie et al., 2011).
11	Moungala (2015)	Gabon	In Gabon, a study was done into the effectiveness of a low-cost alternative in preparation of semen samples (a simplified sperm swim-up method) for IUI procedures. This method requires limited resources and there are no centrifugation steps needed, but is nevertheless an effective method for preparing semen samples for IUI (Moungala, 2015).
12	Franken (2015)		The study by Franken (2015) shows that lower-cost methods for semen analysis for IUI are possible. Expensive laboratory equipment is not necessary for this simplified procedure, making them accessible to use for clinicians in lower-income countries who have no access to this expensive laboratory equipment. This simplified method only works when there are no female infertility factors at play (Franken, 2015).
13	Asemota and Klatsky (2015) Ombelet and Campo (2007)		Part of lowering the costs of ARTs other than IVF is substituting expensive equipment, simplifying the laboratory processes and finding lower-cost ways of incubation (Asemota and Klatsky, 2015; Ombelet and Campo, 2007).

2.3. SUBTHEME 3: LOWER-TECH TREATMENTS AND LESS 'ADD-ONS'

Nr.	References	Country /region	Description
1	Fleetwood and Campo-Engelstein (2010) [1] https://www.nature.com/news/2008/		Fertility specialists Ombelet and Trounson (Fleetwood and Campo-Engelstein, 2010) argue that ARTs are tailored to higher-income countries that already have high-technology tools and laboratories, but that this does not mean that these high-technology tools and laboratories are necessary for providing IVF. When providing ARTs in lower-income countries that do not already have these tools, these tools do not necessarily need to be present and lower-cost alternatives can be found. Lower prices can also be achieved through cutting down on ovary-stimulating injections and other drug treatments that are the norm in IVF treatments in many higher-income countries. According to fertility specialist Luca Gianaroli

	080312/full/news.2008.668.html (accessed on 19/07/2019).		reducing hormone treatments is not only important to lower the price of IVF, but is also important as hormones increase the chance of having multiple births, which would be more difficult to handle for health care providers in lower-income countries than in higher-income countries.[1]
2	Vayena et al. (2009)	Based in United Kingdom	A charity that aims to encourage health professionals to develop and use simplified ART protocols is the British International Society for Mild Approaches in Assisted Reproduction (ISMAAR). This society was established in 2007. They promote education, training and research on the topic of simplified ARTs and argue that simplified approaches to ARTs furthermore tackle concerns around high costs, multiple birth and long-term health risks for women who undergo treatment (Vayena et al., 2009).
3	[1] https://www.bionews.org.uk/page_134885 Richard Kennedy, president of the International Federation of Fertility Societies		Richard Kennedy, president of the International Federation of Fertility Societies, suggests that one way of reducing costs of fertility care is through removing what he calls 'add-ons'. These are the additional aspects of fertility treatments that do not seem to lead to an increase in pregnancy rates, ranging from antioxidants to endometrial or womb 'scratching' to preimplantation genetic screening, but have nevertheless in many contexts become part of fertility treatments. These 'add-ons' can be laboratory, surgical or pharmacological. Instead of helping the chance for patients to become pregnant, 'add-ons' mainly raise the costs of treatments and thereby decrease the accessibility of them. Furthermore, they sometimes even increase risks to patients. Kennedy therefore suggests that go back to the basics of fertility treatments.[1]

2.4. SUBTHEME 4: ALTERNATIVE AND NATURAL TREATMENTS

Nr.	References	Country /region	Description
1	[1] https://www.straitstimes.com/lifestyle/couples		A possible alternative when medical care is not available, or not accessible for either for financial or ethical reasons (as procreating through medical technologies instead of through sexual intercourse is not in line with some religions) is the use of natural therapies. These can include lifestyle changes (e.g. losing weight, reducing stress, acupuncture), tracking one's menstrual cycle and time of

	-go-for-natural-therapies-instead-of-ivf		ovulation, and taking fertility medications and hormone injections. In Singapore one can sign up for a 'natural fertility programme' at a (private) clinic to achieve pregnancy without ARTs. While this private clinic probably is not low-cost, natural therapies might provide an (albeit not equally effective) alternative for those not able to access medical treatments.[1]
2	Xia et al. (2017) [1] ttps://beingfertileprogram.com/male-factor-infertility-sl		Another suggested way of improving infertility care is through including Chinese medicine as complementary therapy for female infertility. Xia et al. (2017) say that 'A large number of researches have reported that CM [Chinese medicine] could alleviate or even cure female infertility' (p. 249), but that this research and evidence is not in line with those approved by Western medicine. They suggest combining Chinese and Western medicine to treat female infertility. Furthermore, they argue that Chinese medicine might help with the psychological aspect of infertility and its treatment, as 'During the CM treatment, many patients reported feeling hope, confidence and even a sense of responsibility for their treatment' (Xia et al., 2017: p. 249). The Being Fertility Program also suggests Chinese herbal medicine, acupuncture treatments and diet and lifestyle changes as possible solutions for increasing sperm quality and thus treating male infertility.[1] While those solely adhering to Western medicine might not see the use of alternative medicine in treating infertility, it is valuable to take into account that for some people non-Western medicine can help them feel more confident in the treatment of their infertility.
3	Wong et al. (2016) Wong, Chan and Tam (2017)	Hong Kong	A study in Hong Kong tested the use of Traditional Chinese Medicine in reducing anxiety of women waiting for the results of their IVF. Patients who were given a self-help book on bodily exercises and spiritual reflection to practice at home or spiritual stories had decreased anxiety levels compared to the control group.
4	Bai et al. (2019) Hu et al. (2016)	China	Studies state that (self-administered) low-cost mindfulness interventions for women undergoing IVF or ICSI in China helped decrease depression and improve sleep quality (Bai et al., 2019; Hu et al., 2016).
5	Li et al. (2016)	China	Li et al. (2016) studied the effectiveness of a mindfulness-based intervention on women undergoing their first IVF treatment in China. In this study, the mindfulness-based intervention led to higher scores of for example self-compassion and lower scores of emotion regulation difficulties. Not only did this intervention improve participants' quality of life, but it also was linked to higher pregnancy rates in the group undergoing the mindfulness-based intervention (Li et al., 2016).

2.5. SUBTHEME 5: AT-HOME TREATMENTS (DIGITAL DEVICES)

Nr.	References	Country /region	Description
1	[1] https://www.mobihealthnews.com/content/harvard-researchers-develop-low-cost-smartphone-based-male-fertility-test		Researchers from Harvard Medical School have devised a method for testing male infertility that can be done at home with a smartphone and a custom-made 3D-printed case, which is able to magnify sperm and reveal the number of sperm and their motility (being able to detect abnormal sperm samples with 98% accuracy). The tool, consisting of disposable microchip that is made part of the smartphone attachment and activates the camera to turn into a microscope, would cost under $5. The tool makes it possible for men to test their own fertility at home.[1]
2	[1] https://www.exseedhealth.com/		The company ExSeed also provides a method for testing male infertility at home with the use of a smartphone and an additional ExSeed device. They provide not only fertility testing, but also a personalized lifestyle intervention program aimed to change one's fertility status. Clients have access to fertility consultants and get advice on nutrition, exercise and supplements. Their goal is "to empower men to make informed decisions about their health and lifestyle through their own smartphone device".[1]
3	[1] https://www.psfk.com/2019/02/interview-dadi-male-fertility.html	United States	An initiative that according to the founder can “empower men to take control of their fertility” is Dadi. With this service, men receive a kit for $99.99 (which includes a cup and a preservative), which they can use to send their sperm off for testing at a lab. They get a result back within a few days. It educates people about male infertility and aims to normalize the conversation on reproductive health of men and for men to test their fertility in convenient way.[1] While the price is likely too high for many people to access it in low-income countries, a similar lower-cost initiative might be possible to develop in order to involve men more in fertility testing.
4	[1] https://uxdesign.cc/bludiag		A smartphone-related technology aimed at giving insights into female fertility is BluDiagnostics. Their product analyses one's spit sample and provides estradiol and progesterone levels, which are the two major hormones that show a woman’s fertility levels. This

	nostics-a-ux-case-study-df3a7dd54998 [2] https://www.bludiagnostics.com/		means that women can test their hormone levels at home and see certain trends within those levels, without needing needles.[1][2]
5	[1] https://www.raconteur.net/healthcare/femtech-africa	Ghana and 15+ other countries	Grace Health is a company that provides period and fertility tracking via the Facebook Messenger platform. Users of Grace Health can ask questions about their own health and can track and monitor their symptoms, feelings and energy levels in order to track their period and fertility. Grace Health is meant for both those trying to get pregnant and those trying to avoid pregnancy. They started their service in Ghana but have spread to fifteen more countries since their launch.[1]
6	[1] https://www.raconteur.net/healthcare/femtech-africa	Based in Dubai, targeting North Africa and the Middle East	Nabta Health is the first initiative dedicated to targeting women's reproductive health across North Africa and the Middle East. One aspect of Nabta Health is Nabta Cycle; an artificial intelligence-driven period and ovulation tracker. Clients can receive tailored insights into their fertility and book virtual consultations. Furthermore, it includes a Hijri calendar mode and fasting schedule for Ramadan. The goal is not to replace doctors, but rather to empower women to manage ore of their health themselves in addition to visiting doctors.[1]
7	[1] https://edition.cnn.com/2018/05/07/health/china-infertility-intl/index.html	China	Fengkuangzaoren ('Crazy for making babies') is one of the most popular apps in China. Users can track their ovulation and menstruation, and see when the chance to conceive is highest. Furthermore, the app has an algorithm-powered IVF assisting tool. This tool that predicts the total cost and success rate of IVF, and functions as a broker for clients with local and overseas clinics.[1]
8	[1] https://www.yourfertility.org.au/	Australia	The website YourFertility is a national public education program by the Fertility Coalition, funded by the Australian Government Department of Health and the Victorian Government Department of Health and Human Services. On the website, information can be found about fertility and how to improve chances of having a baby (for example related to age, weight and lifestyle).[1]

9	[1] https://techcrunch.com/2019/04/16/kindbody-raises-15m-will-open-a-fertility-bus-with-mobile-testing-assessments/?guccounter=1	United States	An initiative launched in the United States that aims to increase accessibility of fertility testing and treatments in terms of both money and location is Kindbody's 'Fertility Bus'. The mobile clinic offers women a free blood test for the anti-Müllerian hormone (AMH). This does not give concluding information about one's fertility, but can help assess one's ovarian egg reserve. Depending on the test results, Kindbody can then advise women to go their brick-and-mortar clinic and undergo a full fertility assessment for $250. Kindbody's 'fertility bus' is said to be a marketing strategy for their service of egg freezing, for which they charge less than market averages in the United States (namely $6,000 per egg-freezing cycle). While Kindbody's 'fertility bus' has been criticized as "capitalizing off women's fear of infertility", the idea of bringing initial fertility testing to the people instead of people having to go a clinic can be seen as an interesting way to improve accessibility of fertility treatments.[1]
10	[1] https://www.ivf.com.au/fertility-treatment/regional-online-fertility-consult	Australia	In Australia's region New South Wales, patients can have a phone or video consultation with IVFAustralia's fertility specialists. This is particularly for patients who live in remote or rural areas, and aims to reduce travel time and expenses and thereby improve access to fertility care. This is part of 'telehealth'.[1] When physical distance is a barrier to accessing fertility treatment, 'telehealth' might be a useful step to let patients know they can access a fertility specialist without traveling. This does not help with having the treatments themselves, but could help with lowering barriers and being able to ask questions or receive counseling.

2.6. SUBTHEME 6: IMPROVING QUALITY OF FERTILITY CARE

Training

Nr.	References	Country /region	Description
1	[1] https://www.kbc.co.ke/merck-unveils-safe-fertility-training-for-africa/ [2] https://w	Africa, with training in Indonesia, India, Malaysia	One of Merck's More Than A Mother campaign goals is to "improve access to quality and safe fertility care across the African continent".[1] Part of this goal is the clinical and practical training of embryologists and fertility specialists in Asian and African countries, to create local experts on fertility care.[2][3] Merck More Than A Mother therefore provides clinical training on fertility and provides training in Indonesia, India and Malaysia for African embryologists.[4][5] As Minister of State for Health for Uganda, Sarah Opendi, says: "Most sub-Saharan African countries don't have trained embryologists hence providing training will contribute significantly to improve the quality and accessibility to fertility care to couples in Uganda and Africa, so that they can start their families."[6] Next to this, Merck aims to provide education around infertility for healthcare providers. The goal of this is to improve

	ww.africanews.com/2019/04/18/merck-foundation-with-african-minister-of-health-defines-interventions-to-break-infertility-stigma-at-international-federation-of-fertility-societies-iffs-world-congress-in-china/ [3] https://www.businesstoday.in/pti-feed/merck-foundation-partners-with-the-first-lady-of-guinea-to-build-healthcare-capacity-and-break-infertility-stigma-		basic fertility management and make people more aware of prevention of infertility and of male infertility.[2] The Merck More Than A Mother campaign started in Kenya, but has now been introduced in various countries, such as Guinea[3], Burundi, Ghana and Mali, where the first ladies of said countries are ambassadors of Merck More Than A Mother.[7] For some of these countries, such as Uganda, Liberia and Ethiopia, the program has trained the first fertility specialists in those countries.[2] The goal of building cost-effective fertility care capacity and public IVF centers is part of the program.[3] An example of this is the establishment of the first public IVF center in Guinea in partnership with The First Lady of Guinea H.E. Djene Condé. The Merck Foundation will provide training and technical advice to the staff of this clinic.[3] Merck also aims, in collaboration with the International Federation of Fertility Societies, to provide more basic fertility services in public hospitals across Africa, such removing fibroids or treating infections.[8]

	in-the-country/story/356031.html [4] https://www.youtube.com/watch?v=uEla4dAiEZw [5] https://stories.for-africa.com/merck-foundation-partners-strongly-with-malaysia-after-success-stories-in-india-and-indonesia-441fd8a69ec1 [6] https://www.bizcommunity.com/Article/196/342/141890.html [7] https://www.thesierraleonetelegraph.com/merck-foundation-to-		

	help-build-healthcare-capacity-in-senegal/ [8] https://www.klcc.org/post/merck-wants-empower-infertile-women-africa-can-music-videos-help		
2	Hammarberg et al (2018) [1] https://ivfzim.com/	Zimbabwe, Australia, Italy	An initiative to improve infertility care quality is a partnership where health professionals from Zimbabwe asked health professionals with ARTs expertise from Australia and Italy to train and mentor them around ARTs, in order to set up ART service in Harare, Zimbabwe. An obstetrician/gynecologist, a laboratory scientist, and a nurse from Zimbabwe initiated the partnership. They did not have experience with ARTs, but did have experience with infertility care. The health professionals from Zimbabwe, Australia and Italy visited each other's hospitals/clinics and received and provided training there during late 2016 and 2017. The health staff from Zimbabwe acquired some new equipment, and they are currently offering treatments.[1] They try to keep the costs of these as low as possible to make them accessible (Hammarberg et al., 2018). According to Hammarberg et al. "It shows that with dedicated and coordinated mentorship and modest financial support from ART experts in high-income settings, health professionals in low-income settings can deliver safe and affordable ART with successful outcomes." (2018, p. 4). The authors see this type of partnership as rewarding for everyone involved, as it improves fertility care in a lower-income country, but furthermore gives the professionals from higher-income countries insights into the conditions of lower-income countries and might make them think about ways of reducing the costs and improving the accessibility of infertility care and ARTs (Hammarberg et al., 2018).

3	Sundby and Cham (2009)	Gambia, Norway	A partnership program for maternal and reproductive health research more broadly between the Gambia and Norway has existed since 1993, leading to improvement in health care (though specifics on infertility and accessibility are not given) (Sundby and Cham, 2009).
4	Franken and Aneck-Hahn (2008)	Africa, with training in South Africa	The Department of Obstetrics and University of Stellenbosch in South Africa have since 1997 offered five-day hands-on semenology workshops to 87 health care workers from 16 African countries. This way, they offer the chance to learn more about the investigation of male infertility to health care workers from low- and middle-income countries. These workshops are organized in conjunction with the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction. According to the authors "For the first time it has been illustrated that excellent sperm morphology reading skills can be achieved by initial training sessions followed up with a continuous external quality control programme and annual refresher courses" (Franken and Aneck-Hahn, 2008: p. 62). This will not only lead to health care providers in various lower-income countries being more able to provide fertility related diagnoses, but also means that the research capacity of the region gets strengthened (Franken and Aneck-Hahn, 2008).
5	Fawzi (2018) [1] https://www.rcog.org.uk/en/global-network/centre-womens-global-health/our-work/essential-gynaecological-skills/		A program aimed at improving the quality of gynecology care in lower-income countries is the evidence-based structured training program for health care workers 'Essential Gynaecological Skills' of Royal College of Obstetricians and Gynaecologists (Fawzi, 2018). This program has led to an improved understanding of gynecology and changes in practices.[1]
6	Gnoth, Kaulhausen and Marzolf (2013)	Eritrea, Germany	In Eritrea, two one-week intensive training courses for physicians on gynecological endocrinology and reproductive medicine were given at the Orotta National Referral Maternity Hospital in Asmara. The courses were integrated into an existing Ob/Gyn residency program. This was done with the help of Hammer Form, a German NGO. One

			course was on gynecological and reproductive endocrinology and one was on assisted reproductive technologies. The training courses consisted of both hands-on training sessions as well as lectures. Together with German company Gynemed they also prepared ''ready to use' kits for one-step, standardized intrauterine inseminations (IUI). The training courses led to improvement of knowledge and skills related to infertility of these Eritrean physicians (Gnoth, Kaulhausen and Marzolf, 2013).
7	Costa et al. (2014)	Brazil	Nurses could also help in improving infertility care. In Brazil, a study was done to improve patients' self-medication performance with the help of nurses. Educating nurses on helping patients with their daily treatment injection might be a useful way to improve healthcare and reduce patients' anxiety (Costa et al., 2014).
8	Cooke (2015)		The WHO has developed a Rapid Assessment Tool that countries can use to evaluate what resources are required to establish a national infertility management program (Cooke, 2015).

Equipment

Nr.	References	Country /region	Description
1	Omer (2009)	Sudan	Research by Omer (2009) suggests that a new gynecological laparoscopy unit in Omdurman Maternity Hospital in Sudan is a real addition to the improvement of gynecological surgery. As 92% of the use of laparoscopy was for infertility, adding a laparoscopy unit might be valuable to improve fertility treatments.
2	Badejoko et al. (2013)	Nigeria	Research on operative gynecologic laparoscopy as a routine practice in a government hospital in Nigeria shows that, where elective gynecologic laparoscopic surgery was most commonly performed for (tubal-factor) infertility, suggests that laparoscopy can be seen as a more affordable solution to the problem of tubal-factor infertility. Laparoscopy is possible with basic equipment and skilled staff from the country itself, making it a lower-cost alternative to IVF and embryo transfer (Badejoko et al., 2013).
3	Okohue and Okohue (2018)	Nigeria	In Nigeria there was a successful attempt to establish a low-budget hysteroscopy unit. The hysteroscopy unit was not only low-cost, but was also specifically catered to lower-income settings and for example took frequent power surges into consideration and therefore included a back-up portable, handheld LED light source. Despite being low-cost, the hysteroscopy unit works well, and thus suggests that it is possible to replace expensive equipment with lower-cost innovative alternatives in low-income countries (Okohue and Okohue, 2018).

4	Orhue et al. (2012)	Nigeria	The University of Benin Teaching Hospital infertility management program in Nigeria was implemented with a grant of the WHO. This IVF program was established within a conventional infertility program at a university hospital. This grant helped in creating both a unit for IVF and covering the training for the staff at the clinic. The program shows that having an infertility unit and providing IVF is possible in a low-income country such as Nigeria. The pregnancy outcomes of the IVF treatments were similar to the rest of the world. Part of the program's way to save costs is batching. With batching, the menstrual cycles of patients in a specific batch (consisting of about 30 couples) are made to begin within 4 to 5 days of one another. This way, multiple patients can be treated at the same time, making purchasing fresh drugs in bulk possible, making having low staff possible and making inviting an experienced consultant embryologist for the week of treatments possible (Orhue et al., 2012).

Health records

Nr.	References	Country /region	Description
1	Coetsee, Kruger and Vine (2014)	South Africa	In South Africa steps have been made to design and introduce a user-friendly electronic health record system for infertility clinics. This was meant both to improve data collection for the clinic (that could be used to track treatment outcomes and patterns of disease for example) and to capture data that could be part of the South African Register of Assisted Reproductive Techniques (Coetsee, Kruger and Vine, 2014).
2	Vayena et al. (2009)		Since 1989, an international reporting system of ARTs exists, organized by the International Committee Monitoring ART (ICMART). The data come from clinics, and then go to national, regional, and the world registry (Vayena et al., 2009).
3	[1] http://anara-africa.com/	Africa	ANARA (African Network and Registry for Assisted Reproductive Technology), a research network and registry led by Silke Dyer, also aims to collect data from ART centers. All ART centers in Africa are invited to be part of the initiative. The goal is to know more about the extent and outcomes of ARTs in Africa. According to their website, “Data help to increase awareness and acceptance of health interventions.”[1]
4	Van Zandvoort, De Koning and		Van Zandvoort, De Koning and Gerrits (2001) argue that reporting of treatment outcomes, complications and effectiveness rates is relevant in order for patients to make informed choices about infertility treatments and clinics.

	Gerrits (2001)		

2.7. SUBTHEME 7: PATIENT EDUCATION, PATIENT-CENTERED CARE AND COUNSELING

Nr.	References	Country /region	Description
1	Ezabadi et al. (2017)	Iran	Ezabadi et al. (2017) argue: "One of the key responsibilities of health care providers is recognizing and meeting patients' educational needs" (21). In their study of patient of infertility treatments in Iran they therefore attempted to find out what these patients' educational needs are. They conclude that an education program for patients has to include causes of infertility and types of treatment, and that this education has to be provided at the patient's first visit in order to help patients make informed decisions, decrease stress and encourage treatment cooperation. One important thing for health care providers to take into account is that most women thought group education was more effective, while most men did not (preferring individual education or no education at all) (Ezabadi et al., 2017).
2	Li, Liu and Li (2014)		Patient-centered care is seen as something that can improve the quality of infertility treatment, as it can improve well-being and treatment compliance (Li, Liu and Li, 2014).
3	PATH (1997)		According to PATH (Program for Appropriate Technology in Health), "No matter how wide or how limited a clinic's treatment options may be, counseling is always essential" (1997: p. 5). Even when a limited amount of patients (can) become pregnant, counseling helps couples with understanding and coping with infertility (PATH, 1997).
4	Gameiro et al. (2015)		In order to include mental health and counseling services in fertility clinics, ESHRE has developed a guideline for fertility staff for providing routine psychosocial care. These guidelines address needs for care both before, during and after treatment. The needs addressed can be behavioral, relational, emotional and cognitive. These guidelines are used to improve the guidance of patients at fertility clinics (Gameiro et al., 2015).
5	Asazawa (2015) Chegedekova, Khismeto		Various studies point to the positive effect of counseling, group therapy or (partnership) support programs on psychological well-being (Chegedekova, Khismetova and Turgambayeva, 2017; Mosalanejad and Koolee, 2013; Ramezanzadeh et al., 2011; Terzioğlu and Özkan, 2017), marital relationship and/or sexual satisfaction (Asazawa, 2015; Khoramabadi, 2015; Vizheh et al., 2013; Vizheh and

	va and Turgambayeva (2017) Khoramabadi (2015) Maleki-Saghooni et al. (2017) Mosalanejad and Koolee (2013) Ramezanzadeh et al. (2011) Terzioğlu and Özkan (2017) Vizheh et al. (2013) Vizheh and Pakgohar (2013)		Pakgohar, 2013), and some studies even argue that there is a connection between counseling or psychiatric interventions and pregnancy rate for infertile patients (Maleki-Saghooni et al., 2017; Ramezanzadeh et al., 2011).
6	Chan et al. (2013)	Hong Kong	In order to facilitate implementation of counseling, setting up a professional training program in infertility counseling for healthcare professionals is a possibility. This was done in Hong Kong in order to make health care professionals aware of the sensitive issues patients are confronted with during their fertility treatments (Chan et al., 2013).
7	Isbir and Ozan (2018)	Turkey	A study in Turkey aimed to improve knowledge of infertility of nurses and midwives through an elective course for students of nursing and midwifery consisting of active training techniques. The goal was for students to learn about both psychological and biological aspects of infertility, and to be able to offer emotional support and counseling. This proved effective, and might be usable to improve care for infertility in other countries as well (Isbir and Ozan, 2018).
8	Franco et al. (2002)	Brazil	In Brazil, a psychological evaluation test to identify women and men requiring psychological support due to infertility was developed. Those who are identified as having psychological problems caused by

	Li, Liu and Li (2014)		infertility then receive advice to improve their psychological situation (Franco et al., 2002), or are directed to appropriate psychological care (Li, Liu and Li, 2014).
9	Fukushima et al. (2014)	Japan	In low-income settings where providing counseling might not be possible, initiatives such as the introduction of support cards for people experiencing a miscarriage in their fertility treatments in Japan might provide another example of addressing the psychological side of fertility treatments without having to make counseling a mandatory part of fertility treatments. These support cards in Japan were created by counselors and contained explanations of ways one can possibly feel after miscarriage and ways of possibly dealing with those, as well as instructions of how to make an appointment for grief counseling. People could use the information and possibility of making an appointment immediately afterwards but also later on (Fukushima et al. 2014). An alternative support card with information on emotions and ways of dealing with those emotions after getting the infertility diagnosis might be useful.
10	Bennett et al.'s (2012) Wiweko, Sharifa and Bennett's (2012)	Indonesia	According to Bennett et al.'s (2012) and Wiweko, Sharifa and Bennett's (2012) research in Indonesia, a barrier to accessing infertility care can be having little confidence in fertility treatments and having little knowledge of how infertility care works. Patients can also be worried about vaginal examinations and about embarrassment. More patient education and counseling about infertility care could help here. Furthermore, it can be difficult for patients to be referred to the appropriate care, meaning it can be patients' own responsibility to find their own appropriate care, which can be difficult for some. Bennett et al. (2012) therefore suggest that the links between general practitioners and infertility providers needs to be strengthened.
11	Culley et al. (2004) Ethics Committee of the American Society for Reproductive Medicine (2015) Inhorn and Fakih (2006)		A barrier in accessing infertility care can be a barrier in language, for example with immigrant groups in the country they have moved to (Inhorn and Fakih, 2006). Different cultural ideas about the body and about infertility can also cause difficulties in accessing and delivering fertility treatments (Ethics Committee of the American Society for Reproductive Medicine, 2015; Inhorn and Fakih, 2006), or cause frictions in (genetic) counseling appointments (Karbani, 2002). It is therefore good to have multilingual staff or interpreters to help with this issue (Ethics Committee of the American Society for Reproductive Medicine, 2015), to have 'culturally skilled counsellors' (Karbani, 2002: p. 207) and to have information (whether a website, a booklet, or a video) available in multiple languages (specifically those of the main ethnic minorities in a country, created with involvement from people from those minorities) (Culley et al., 2004). It is also important to be sensitive to other preferences from (minority) communities, such as women having a preference for having a female physician (Inhorn and Fakih, 2006).

	Karbani (2002)		
12	Inhorn and Fakih (2006) Karmon et al (2011)		A barrier in getting access and receiving infertility care can be race, ethnicity or religion (Inhorn and Fakih, 2006). Karmon et al. (2011) say that African-American women in their study were more likely not to know the cause of infertility than white American women, which they state can be because physicians have a different attitude towards infertility with different ethnic groups. As physicians sometimes see infertility as an issue mainly affecting white women, this might lead to other ethnic groups having difficulties getting a diagnosis and getting the appropriate care.
13	Missmer, Seifer and Jain (2011)		Stigma might play a role in differences in accessing infertility care between ethnic groups, with some groups possibly having more difficulties discussing infertility in their private lives and facing more stigma (Missmer, Seifer and Jain, 2011).
14	Volks (2013)		For HIV positive couples wanting to access infertility care stigma can play a role in difficulties receiving infertility care. These patients can feel stigma from both family and society (and possible health care providers) for wanting to have children while being HIV positive (Volks, 2013).
15	Missmer, Seifer and Jain (2011)	United States	Missmer, Seifer and Jain (2011) indicate that a barrier to accessing infertility care can be having concerns about having multiples. In their study in the United States, concerns about this topic differed between ethnic groups, with African-American women reporting significant concern about possible having twins. Having worries about this in terms of health risk and economic and social costs might cause certain people not to try to access ARTs at all.
16	Culley et al. (2004)		In order to involve those people in infertility treatments that would not go to the doctor or clinic for fertility problems themselves, the 'social marketing' of infertility treatment can help. For example, information can be provided at religious or community centers, or on the radio/television or online (on blogs or forums for example) (Culley et al., 2004).
17	Gerrits et al. (2017) Kamau (2011)	Kenya	In workshop with various types of participants in the field of infertility in Kenya, participants highlighted the importance of engaging religious leaders in getting awareness for infertility (care) and destigmatization of it (provided said religious leaders are not against ARTs) (Gerrits et al., 2017). Kamau (2011) similarly suggests (based on research with infertile married women in Kenya) that one way of raising awareness of infertility and possibly reducing the stigma is through discussing infertility in church.

2.8. SUBTHEME 8: PEER SUPPORT GROUPS

Nr.	References	Country /region	Description
1	[1] https://www.healthynewbornnetwork.org/blog/russian-ngo-launches-mhealth-infertility-support-program/	Russia	An example of support where attention to mental and physical health is combined is the Russian initiative 'mHealth program' for people undergoing assisted reproductive technologies. The Health and Development Foundation launched the program in 2013. In this program, there are opportunities for interaction with both peers and experts through social networks, online and offline seminars with reproductive health specialists at clinics and text messages to participants' mobile phones. Online contact is thus an important way of being able to get both support and information, from both experts and people who are in a similar situation.[1]
2	[1] http://www.muslimfertilityproject.com/		The Muslim Fertility Project is "a project established in 2016 to strengthen and empower Muslims with infertility through empirical research, dialogue, education, resources, and training". It combines online and offline support and education.[1]
3	[1] http://projectpomegranate.org/		Project Pomegranate provides spiritual and educations resources to people who have experienced infertility, pregnancy loss or infant death.[1]
4	(Bushee, forthcoming)		Support groups can exist online, offline (with people meeting face-to-face to talk about fertility issues), or both online and offline. Support groups can be part of a larger organization or clinic or be professionally facilitated, but can also be peer-to-peer only. Contact with peers through support groups can be an important part of dealing with infertility. Support can bring comfort, information, relieve feelings of distress and stigmatization. Some tips for finding and keeping members for a support groups are: having health care providers refer patients to the support group, advertise the support group, have written documentation on the emotional aspects of

			infertility, and create face-to-face sessions. With these face-to-face sessions, take gender into account. Some people prefer single-sex support groups. Additionally, the hours of the sessions have to fit with the schedules of men and women (if men generally work more hours, evening session might be preferable for them). Furthermore, it is important that support groups are safe spaces to discuss fertility issues that try to be inclusive. This means that it includes people of different levels of education and socio-economic status and that it includes men. Fundraising and advocacy, such as wanting to decrease the stigma of infertility in society, can also be part of a support group (Bushee, forthcoming).
5	[1] https://www.fertilityforcoloredgirls.org/ [2] https://www.oprahmag.com/life/health/a22799911/infertility-support-groups-black-women/	United States	Fertility For Colored Girls is an organization that raises awareness of infertility issues and specifically targets black women and couples struggling with infertility.[1] They provide education on treatment options, monthly support groups in various cities in the United States, connect patients with counselors and offer financial grants. Currently, they organize the 'Break the Silence: Black Women Talk (In)Fertility Tour', in which they go on tour in various cities to talk about infertility, with entertainers and experts from the field present.[2] Fertility For Colored Girls shows that there is interest for a more specifically targeted initiative around discussing infertility, which can be relevant to take into account when initiating a program. It also employs an interesting combination of online and offline activities, where peers can meet each other but new people can also be introduced to the group and the topic.

2.9. SUBTHEME 9: HEALTH CARE COVERAGE, PUBLIC SECTOR AND OTHER SUBSIDIES

Nr.	References	Country /region	Description
1	Adamson (2009)		A way of making fertility care and treatments more accessible is to include these under health care coverage, meaning patients do not solely pay out of pocket but that the state covers (part of) infertility treatment. According to Adamson (2009), there is improvement internationally in coverage for ARTs. Not only does this lead to more accessibility of ARTs, but it can also result in more focus on the quality, safety and efficacy of these services (Adamson, 2009).
2	Fleetwood and Campo-		According to Fleetwood and Campo-Engelstein (2010), the lack of legal regulation is part of the reason ARTs are expensive in some countries. They say that because there is no legal regulation of ARTs (for example in the United States), doctors are allowed to set the

	Engelstein (2010) Murage, Muteshi and Githae (2011)		prices for fertility treatments themselves, making the price a lot higher than the cost of services. In order to protect patients from costly care and to ensure their safety, part of improving fertility care should be regulation of fertility treatments (Murage, Muteshi and Githae, 2011). While legal regulation will not make the costs of ARTs cheap, it can make sure doctors cannot ask any price people are willing to pay.
3	Sadeghi (2015)	Middle East	In various countries in the Middle East, there are many IVF centers. The reason that there is more possibility for infertility care and treatments than for example in Sub-Saharan Africa is partly said to be because of governmental support for infertility care, where treatments are fully or partially covered by health insurance. The costs of treatments are also generally lower than for example the United States or the United Kingdom, making treatments more accessible (though still not cheap compared to local incomes) even when not fully covered by health insurance (Sadeghi, 2015).
4	Inhorn (2009)	Egypt	Inhorn argues that Egypt can be seen as an example of a low-income country where population growth rates have been lowered at the same time as state subsidization for infertility care has increased. She argues that state subsidization for infertility care exists in Egypt for various reasons. It is partly because Egypt is a pronatalist country, partly because Egypt hosted the 'Cairo conference' in 1994 where infertility was mentioned as an important issue, and partly because Egypt has many highly trained IVF physicians (two of which have been president of the International Federation of Gynecology and Obstetrics) (Inhorn, 2009). Having accessible infertility care in a low-income country is thus possible, as Egypt proves.
5	[1] https://resolve.org/get-involved/advocate-for-access/current-legislation/state-bills/fair-access-fertility-treatment-act-toolkit/	United States	In New York State, due to advocacy and negotiation, access to fertility treatment coverage was established. People in the state of New York will from 2020 have access to IVF insurance coverage and to fertility preservation before undergoing treatment for cancer or other medical treatments.[1]

6	[1] https://gulfnews.com/uae/government/khalifa-foundation-implements-infertility-treatment-project-1.1713629	Palestine	The Khalifa Bin Zayed Al Nahyan Foundation launched a humanitarian project in 2016 that aims to finance fertility treatment surgeries (specifically IVF) for over 600 women in the Palestinian territories. This project is supported by His Highness Sheikh Khalifa bin Zayed Al Nahyan (President of the United Arab Emirates and Emir of Abu Dhabi) and His Highness Sheikh Mohammed bin Zayed Al Nahyan (Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces).[1]
7	Feinberg et al. (2017) Peipert et al. (2019)	United States	In the United States (specifically the state of Illinois) patients can request a financial grant from the Life Foundation (a private foundation), which they can towards infertility treatment or adoption. The foundation raises money through a yearly sponsor race called 'Run For Life' and through corporate sponsorships and individual donations. Next to grants, the Life Foundation also provides educational events and programs (both online and in-person) about infertility (Feinberg et al., 2017). However, while private foundations in the United States provide increasing access to ARTs, the majority of their services and grants are only available to people with a history of cancer, meaning they do not provide access to care for everyone with fertility issues (Peipert et al., 2019).

3. DE-STIGMATIZATION OF INFERTILITY

Nr.	References	Country /region	Description
1	[1] https://resolve.org/ [2] https://fertilitycenterlv.com/the-fertility-center-of-las-	United States	An example of an initiative that aims to increase awareness around infertility is the National Infertility Awareness Week in the United States, which is organized yearly. The National Infertility Awareness Week has a different theme each year and is part of the organization RESOLVE, the National Infertility Association of the United States.[1] According to the website of The Fertility Center of Las Vegas, who also take part in the National Infertility Awareness Week, "raising awareness and providing education about infertility is one of the best ways to destigmatize it."[2]

	vegas/national-infertility-awareness-week-be-proactive-about-fertility/		
2	[1] https://www.fertilityforcoloredgirls.org/ [2] https://www.oprahmag.com/life/health/a22799911/infertility-support-groups-black-women/	United States	An example of destigmatizing infertility is the American initiative 'Fertility For Colored Girls'. This is an organization that raises awareness of infertility issues and specifically targets black women and couples struggling with infertility.[1] They provide education on treatment options, monthly support groups in various cities in the United States, connect patients with counselors and offer financial grants. Currently, they organize the 'Break the Silence: Black Women Talk (In)Fertility Tour', in which they go on tour in various cities to talk about infertility, with entertainers and experts from the field present.[2] Fertility For Colored Girls shows that there is interest for a more specifically targeted initiative around discussing infertility, which can be relevant to take into account when initiating a program (for example when a program is created from higher up, such as by a NGO). It is also an interesting combination of online and offline, where peers can meet each other but new people can also be introduced to the group and the topic.
3	[1] https://edition.cnn.com/2018/05/07/health/china-infertility-intl/index.html	China	The 'The UFO Fertility Show' is a Chinese wildly popular television show set in a future when aliens have travelled back to Earth via UFO to explore why the human race is perishing. To a certain extent, the show raises awareness of infertility and the first two episodes alone have attracted 46 million views altogether online.[1]
4	[1] https://www.washingtonpost.com/politics/2018/11/09/michelle-obama-is-one-		Influential people sharing their personal infertility stories helps normalize the prevalence of infertility, the use of ARTs and involuntary childlessness and consequently aid de-stigmatization efforts. Examples of prominent influencers who have shared personal infertility stories are former First Lady of the United States Michelle Obama,[1] First Lady of Namibia Monica Geingos,[2] infertility blogger Vanessa Haye,[3] and American television host Jimmy Fallon.[4] Their stories have gone on to touch many and helped break the silence on infertility.

	millions-who-silently-struggled-with-infertility-heres-why-her-broken-silence-could-matter [2] https://www.namibian.com.na/189681/archive-read/Break-infertility-stigma-%E2%80%93-Geingos [3] https://www.bbc.com/news/av/health-48227027/blogger-there-is-a-stigma-around-infertility [4] https://www.businessinsider.com/jimmy-fallon-reveals-fertility-struggle-2013-8?international=true&r=US&IR=T		

5	[1] https://www.stylist.co.uk/life/meet-the-artists-exploring-the-invisible-struggle-of-infertility-fertility-fest-2018/205895 [2] https://www.fertilityfest.com/	United Kingdom	Various artists from the United Kingdom have used art to break the silence around infertility. Examples of their work include the embroidery of symbols of fertility on gowns worn during IVF treatment (Tabitha Moses), a photography project called *Photos I'll Never Take* where traditional family photos are made with a doll instead of a child (Tina Reid-Peršin), and the photographic project SEED where photographs are taken of crucial moments of infertility treatment (Sophie Ingleby). The works of these artists were on display at Fertility Fest.[1] This is an arts festival dedicated to fertility and infertility. The goal of the festival is to use arts (theatre, dance, music, visual art, film and literature) to improve understanding of the emotional struggles of people having fertility issues, to improve the public conversation on infertility and reproductive science, and to improve fertility education. Every year the festival is organized in the United Kingdom. The organization of the festival also organizes Fertility Shows in various places in the United Kingdom, where both experts and artists talk together about issues related to fertility and infertility.[2]
6	Walker and Novotny (2016) [1] https://www.facebook.com/artofinfertility/ [2] http://www.artofinfertility.org/ [3] https://medhumdosis.com/2018/10/17/feature-the-art-of-infertility-a-community-project-reimagining-reproduction-advocacy/	United States	Another example of an art project aiming to raise awareness around infertility is 'The ART of Infertility'. This project, based in the United States, aims to break the silence around infertility, support people living with infertility and advocate for infertility rights. The organization has a following of nearly two thousand users on both Facebook and Twitter[1], and travels around the world with exhibits on the topic of infertility as well as offers innovative healthcare curriculums incorporating oral histories and artwork, and organizes art and writing workshops for those suffering from infertility or reproductive loss.[2][3] Part of their goal is to facilitate conversations between physicians and patients (Walker and Novotny, 2016).

7	[1] https://infertilityillustrated.com/ [2] https://www.instagram.com/infertilityillustrated/		'Infertility Illustrated' is an art project by Christine McDonough, who sketches and illustrates the 'average day in the life of someone dealing with infertility'.[1] Her work has a following of nearly thirteen thousand users on Instagram.[2] Through art projects, large audience can thus be reached - both offline and online. This can be very influential when trying to break with the stigma of infertility.
8	Gameiro et al. (2019)		Artistic activities can serve as a form of expression to address and understand people's infertility experiences. DrawingOut, for example, is a participatory visual research method that entails a one-day metaphor-centered drawing workshop to collect visual and textual data about health-related topic, among which infertility (Gameiro et al., 2019: p. 3). Participants are asked to sketch certain experiences and feelings, and because of its visually oriented design DrawingOut allows for the engagement of participants with varying levels of language proficiency and from diverse cultural and religious backgrounds (Gameiro et al., 2019: p. 9). In a study by Gameiro et al., participants struggling with infertility were very positive about DrawingOut as they found the drawing appealing and enjoyable, making it easier for them to talk such a commonly stigmatized and distressing topic (2019: p. 9). Moreover, the co-produced drawings ensuing from the workshop may be used, published and disseminated in ways (e.g. booklets, brochures, etc.) that allow for the reach of a wide and varied audience, particularly given that the drawings and graphic elements tend to capture the participants' varied socio-cultural and religious backgrounds –facilitating identification by others from similar backgrounds facing similar infertility challenges (Gameiro et al., 2019: p. 9). In doing so, infertility becomes an easier and more normalized topic of discussion, benefitting the de-stigmatization of infertility.
9	[1] http://www.merckmorethanamother.com [2] http://www.merckmorethanamother.com/about_merck_more_than_a_mother.php	Africa	One organization that actively seeks to fight the stigma of infertility in the Global South is the More Than a Mother Project by the Merck Foundation, a non-profit foundation founded by Merck - a pharmaceutical company that develops and offers infertility treatments.[1] In addition to defining policies to improve access to safe and effective fertility care and the offering of infertility treatments, they address the need for interventions to reduce stigmatization and social suffering of infertile women as well as the necessity for a team approach to family building among couples.[2] On their website, they offer a wide range of resources that are useful when trying to raise awareness and break the stigma of infertility. These resources include, but are not limited to; brochures, posters, a theme song, videos, publications and news updates. Particularly the video interviews with women who share their personal infertility stories and speak of the range of struggles they face - and in some cases overcame - are powerful. To

			destigmatize infertility, it can be very effective to put a face to the condition which has the potential of transforming the condition from a stigmatized state of disgrace to a recognized experience that is often undesired by those affected as well and can have serious implications for their well-being, not just physically but also socially and financially.

4. MALE INVOLVEMENT

4.1. SUBTHEME 1: INVOLVING MEN IN INFERTILITY CARE

Nr.	References	Country /region	Description
1	PATH (1997)		A first step in involving men is (the requirement of) taking a medical history and performing medical tests on both women and men in a clinic or hospital when fertility is tested.
2	Kerubo Ondieki (2012)	Kenya	Recommendations to improve male participation in the infertility clinic based on research on male involvement in the management of infertile couples in Kenya are to encourage women to come with their spouse and for health care providers to make an effort in making men come to the clinic (through contacting the male partner themselves and not solely depending on women's initiative to bring him).
3	Parrott et al. (2015)	Malawi	Parrott et al. (2015), based on research in Malawi, argue that an option to involve men in infertility care is to not just encourage but to require couples to go to clinical visits together.
4	Joshi (2008)		It important to involve men in reproductive health because men are often key decision-makers in the lives of women in low-income countries. Having support from involved male partners is thus important for some women, both to be able to have or continue infertility treatments and to lower psychological stress through having a support system.
5	Grace et al. (2019)	United Kingdom	In the United Kingdom, the fact that fertility is seen as 'women's business' by both men and women struggling with fertility and by healthcare professionals, led to a lack of male involvement becoming a self-fulfilling prophecy: men wanted to be involved, but because they felt excluded from the discourse and felt it was expected for them not to be interested in engaging in the topic, they did not get involved. Male infertility thus needs to become less stigmatized in order for men to become part of fertility care. And the other way

			around as well: men need to become part of infertility care in order for male infertility to become less stigmatized.
6	Onyango, Owoko and Oguttu (2010)	Kenya	In the study by Onyango, Owoko and Oguttu (2010) on factors that influence male involvement in sexual and reproductive health in Kenya, it was found that the few times men did accompany their partner to the clinic, the staff would not allow them to enter the consultation room with their partner. This made men reluctant to get involved in reproductive health. It is thus important to directly address men and encourage or require male involvement in infertility care, and not assume that men will automatically get involved.
7	Bashed et al. (2012)	Bangladesh	It is necessary to address the lifestyle factors connected with male infertility (such as use of tobacco or alcohol, diet and use of contraception) in order to make men aware that these factors are connected with infertility. Bashed et al. (2012) suggest making a policy document for this in Bangladesh.
8	Hardee, Croce-Galis and Gay (2017)	India, Congo	Hardee, Croce-Galis and Gay (2017) suggest that having a family planning hotline (a telephone helpline) is a promising way to involve men in reproductive health. Both in India (Malde, 2005, in Hardee, Croce-Galis and Gay 2017) and Congo (Kasongo and Ligne Verte, 2016, in Hardee, Croce-Galis and Gay 2017) the large majority of calls to the existing family planning hotlines comes from men, and one of the topics often asked about is infertility.
9	Ko-Ko-Zaw et al. (2011)	Myanmar	In Myanmar a reproductive health hotline was established in order to provide reproductive health information. Medical doctors answered the calls. In Myanmar about as many men as women called the hotline, and infertility was the most asked about topic. However, the majority of callers asking about infertility were women. Nevertheless, both men and women were reached by the hotline.
10	[1] https://www.psfk.com/2019/02/interview-dadi-male-fertility.html	United States	An initiative that according to the founder can “empower men to take control of their fertility” is Dadi. With this service, men receive a kit for $99.99 (which includes a cup and a preservative), which they can use to send their sperm off for testing at a lab. They get a result back within a few days. It educates people about male infertility and aims to normalize the conversation on reproductive health of men and for men to test their fertility in convenient way.[1] While the price is likely too high for many people to access it in low-income countries, a similar lower-cost initiative might be possible to develop in order to involve men more in fertility testing.
11	[1] https://www.mobihealthnews.co	United States	Researchers from Harvard Medical School have devised a method for testing male infertility that can be done at home with a smartphone and a custom-made 3D-printed case, which is able to magnify sperm and reveal the number of sperm and their motility (being able to

	m/content/harvard-researchers-develop-low-cost-smartphone-based-male-fertility-test		detect abnormal sperm samples with 98% accuracy). The tool, consisting of disposable microchip that is made part of the smartphone attachment and activates the camera to turn into a microscope, would cost under $5. The tool makes it possible for men to test their own fertility at home.[1]
12	[1] https://www.exseedhealth.com/		The company ExSeed also provides a method for testing male infertility at home with the use of a smartphone and an additional ExSeed device. They provide not only fertility testing, but also a personalized lifestyle intervention program aimed to change one's fertility status. Clients have access to fertility consultants and get advice on nutrition, exercise and supplements. Their goal is "to empower men to make informed decisions about their health and lifestyle through their own smartphone device".[1]

4.2. SUBTHEME 2: CREATING AWARENESS

Nr.	References	Country /region	Description
1	[1] https://aricanexecutive.com/article/read/8481	Africa	An initiative that aims to involve men in the societal awareness of infertility and in the destigmatization of infertility is Merck. Through the 'Fertility is a Shared Responsibility' initiative Merck wants there to be acknowledgement in society and from men themselves about male infertility and the role of male partners in a couple's infertility. As women tend to be seen as responsible for the couple's infertility, raising awareness about male infertility might correct this idea and the stigma that comes with it for many women.[1]
2	Onyango, Owoko and Oguttu (2010)	Kenya	In the study by Onyango, Owoko and Oguttu (2010) in Kenya, the majority of participants argue that for creating awareness it is useful if men and women are approached separately. That way, people feel freer to share stories and ask questions, and men might be more likely to get involved. This might be an interesting suggestion for projects that aim to involve men in infertility treatments and decrease stigmatization of infertility.
3	Leung, Henry & Mehta (2018) [1] https://w		What also helps in creating awareness and decreasing stigma of male infertility, is media coverage of celebrities speaking about their own experiences with male infertility also creates more awareness of male infertility (Leung, Henry & Mehta, 2018). Various male celebrities have spoken out about their struggles with infertility open up the discussion, create awareness and decrease stigma.

	ww.huffpost.com/entry/male-celebrities-help-destigmatize-male-infertility_b_594bee3ae4b07cdb1933c06d?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAGdw7eZ_f0Yna9Vx-xDmZjyBQY13GzpzRnr4uEJhkPba3GeumOyTlFOXXeYe6saQOBMMynqvs-S4l80nMgl-y-O-EykEOcTVjxf6ina5kb4S5zR_XqX9Wc4mKZe11O0VQXOHDIO6o5BqNcb7NDiV7HA9vpAzbVPsQs		Encouraging media campaigns and celebrity involvement might thus be effective.

	qZDJJCmTWt		
4	Hsiao, Huang and Chen (2011) Leung, Henry and Meht (2018)	United States, Taiwan	It is necessary to improve information on male infertility (and referral to a urologist) on websites giving information on infertility (such as of ART clinics) (Hsiao, Huang and Chen, 2011; Leung, Henry and Mehta, 2018). According to Leung, Henry and Mehta (2018), in the United States 20% of those websites fail to mention male infertility entirely and less than 25% of websites mention referral to an urologist. Improving the information on male infertility for those struggling with fertility issues and looking for information can be a useful step in creating awareness of male infertility for those who might need this awareness the most.
5	Connell (1995) Inhorn (2012a) Inhorn (2012b) Inhorn (2018) Inhorn and Birenbaum-Carmeli (2009) Inhorn and Wentzell (2011) [1] https://www.nytimes.com/2017/10/21/opinion/sunday/male-infertility-middle-east.html	Middle East	According to Inhorn, looking at and learning from attitudes on male infertility in the Middle East is helpful in dealing with the possible coming 'male infertility crisis'. Efforts from the government (making infertility treatment more accessible through public financing), medical progress (offering advanced medical treatments and making male infertility a medical problem instead of a problem of masculinity), and religious permissions (Islamic clerics were some of the world's first religious leaders to approve of IVF) helped in making male infertility treatment more accessible in the Middle East. Moreover, men in the Middle East themselves have played a large role in removing stigma from male infertility.[1] They generally acknowledge and take responsibility for their own reproductive impairments and are willing to seek treatments, instead of holding women responsible for fertility and conception (Inhorn, 2012a; Inhorn, 2012b; Inhorn, 2018). Furthermore, they are becoming increasingly open in telling family, friends and colleagues about their infertility problems. This openness about male infertility can lead to the destigmatization of male infertility, which Inhorn argues other countries and areas can learn from.[1] Inhorn and Wentzell (2011) see this as a form of 'emergent masculinities': "ongoing, context-specific, embodied changes within men's enactments of masculinity, particularly as they encounter emerging health technologies" (p. 802). This concept contrasts with Connell's (1995) 'hegemonic masculinity', the ideal form of masculinity in a particular context that men attempt to adhere to. New ways of engaging with reproductive health and reproductive technologies are thus connected to new ways of 'being a man' and challenge existing social norms (Inhorn and Wentzell, 2011; Inhorn and Birenbaum-Carmeli, 2009).

6	Kamau (2011)	Kenya	Kamau (2011) argues that it would be beneficial if men would be open about their experience with infertility in order to raise awareness of (male) infertility more broadly. Awareness thus does not only need to come from projects and education, but also be brought into the open by (infertile) men themselves.

4.3. SUBTHEME 3: ACCESS TO MALE INFERTILITY TREATMENTS

Nr.	References	Country /region	Description
1	Leung, Henry & Mehta (2018)		When it comes to access to treatments for male infertility, one element that is relevant is the number of male reproductive specialists in the area. When there are no male reproductive specialists near someone, it can be hard to get an accurate diagnosis or treatment. Offering training courses or seminars to physicians in similar fields can improve this lack of accurate skills of diagnosing and treating male infertility (Leung, Henry & Mehta, 2018).
2	Leung, Henry & Mehta (2018)	United States	An element that influences accessibility of infertility care is the insurance coverage for diagnosis and treatment of male infertility. In the United States for example, female infertility is covered in more states than male infertility, meaning involving men in (male-factor) infertility can be costly (Leung, Henry & Mehta, 2018). It is therefore important that if projects are aiming to increase health care coverage of infertility, this inequality is also addressed.
3	Barratt, De Jonge and Sharpe (2018)		What is furthermore relevant is the lack of progress of treatments for male infertility. Barratt, De Jonge and Sharpe (2018) argue that ICSI is the 'most transformative example' for management of male infertility, but that with ICSI the burden of treatment is on the woman, and that is thus is not directly treating male infertility. In family planning as well, the burden seems to fall mainly on women, which they argue is related to "inadequate understanding of the male reproductive process" (as for example no effective and reversible form of contraception for men has been developed since the condom). They therefore argue for the development and implementation of the 'Male Reproductive Health Ecosystem'. This 'Male Reproductive Health Ecosystem' consists of: identifying and prioritizing research gaps, developing a plan for closing these gaps, mobilizing strategic funding schemes, and formulating and implementing policy changes (Barratt, De Jonge & Sharpe, 2018). Taking into account the gaps in research on male infertility and on policies relating to male infertility is thus important in order to be

			able to improve those gaps and make male-factor infertility better and more accessible.