Infertility in resource-constrained settings: moving towards amelioration

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Abstract  It is often presumed that infertility is not a problem in resource-poor areas where fertility rates are high. This is challenged by consistent evidence that the consequences of childlessness are very severe in low-income countries, particularly for women. In these settings, childless women are frequently stigmatized, isolated, ostracized, disinherited and neglected by the family and local community. This may result in physical and psychological abuse, polygamy and even suicide. Attitudes among people in high-income countries towards provision of infertility care in low-income countries have mostly been either dismissive or indifferent as it is argued that scarce healthcare resources should be directed towards reducing fertility and restricting population growth. However, recognition of the plight of infertile couples in low-income settings is growing. One of the United Nation’s Millennium Development Goals was for universal access to reproductive health care by 2015, and WHO has recommended that infertility be considered a global health problem and stated the need for adaptation of assisted reproductive technology in low-resource countries. This paper challenges the construct that infertility is not a serious problem in resource-constrained settings and argues that there is a need for infertility care, including affordable assisted reproduction treatment, in these settings.

KEYWORDS: affordable assisted reproduction treatment, infertility, low-income countries, psychosocial aspects, reproductive health care

Infertility: a global health problem

It is often presumed that infertility is not a problem in densely populated areas where fertility rates are high (Ombelet, 2009). It is also commonly argued that scarce healthcare resources and family planning activities should be directed towards reducing fertility and restricting population growth (Daar and Merali, 2002). The current paper challenges the construct that infertility is not a serious problem in resource-constrained settings and argues that there is a need for infertility care, including affordable assisted reproduction treatment, in these settings.

The wish and expectation to have children is shared by most people in the world (Dyer, 2007; Holton et al., 2011;
Lampic et al., 2006; Langdridge et al., 2005; Peterson et al., 2012; Roberts et al., 2011). Infertility, the inability to conceive after a year or more of regular unprotected sexual intercourse (Zegers-Hochschild et al., 2009), is a global health problem. A review of population-based surveys estimated the international prevalence of infertility to be 9% on average (Boivin et al., 2007). However, prevalence rates of 30–40% are reported in some parts of sub-Saharan Africa (Leke et al., 1993). In a study combining data from 47 demographic and health surveys in developing countries (excluding China) it was estimated that, in 2002, more than 186 million ever-married women of reproductive age (15–49) had primary or secondary infertility (Rutstein and Iqbal, 2004).

Approximately one-third of cases of couple infertility is due to male factors, one-third to female factors and one-third relates to a combination of male and female factors or has no identifiable cause (Johnson and Everitt, 2000). In places with poor access to health care, common preventable causes of infertility include post-partum and post-abortion infections, tuberculosis and untreated sexually transmitted infections (Serour, 2008). Infertility can also be a consequence of infections caused by the practice of female genital mutilation (Obermeyer, 2005). Although male factors contribute to about half of all cases of infertility, this is rarely acknowledged and women are often held responsible for couples’ inability to conceive (Dhont et al., 2010; Inhorn, 2003).

Motivations for parenthood and the perceived meaning of children vary among cultures (van Balen and Bos, 2004). In broad terms, in high-income countries the desire for parenthood is expressed as a wish for personal happiness and fulfilment (van Balen and Trimbos-Kemper, 1995) and children are said to be valued as they enhance the relationship and are enjoyable (Langdridge et al., 2005). In resource-poor settings, additional reasons are identified for the wish to have children: the continuation of the family line, compliance with religious and societal expectations, and assurance of security in old age (Okonofua et al., 1997). In a review of studies relating to the value of children to parents and the community in African countries, Dyer (2007, p. 69) found that ‘children secure conjugal ties, offer social security, assist with labour, confer social status, secure rights of property and inheritance, provide community through re-incarnation and maintaining the family lineage, and satisfy emotional needs’.

Psychosocial aspects of infertility

The psychosocial consequences of infertility for couples in high-income countries have been widely described and include increased symptoms of anxiety and depression, loss of self-esteem, relationship difficulties, diminished sexual satisfaction, reduced life satisfaction and social isolation (Boivin et al., 2011; Fisher and Hammarberg, 2012; Greil, 1997; Wright et al., 1989; Kirkman, 2001, 2003; Greil et al., 2010). Although men are adversely affected by infertility, distress is particularly apparent in women (Chachamovich et al., 2010).

Only in the last decade has evidence begun to emerge about how infertility affects the lives of women in low-income countries (van Balen and Inhorn, 2002). During in-depth interviews, 30 women seeking treatment for involuntary childlessness in South Africa testified to the personal suffering caused by their inability to conceive and also to experiences of marital instability, stigmatization and abuse as a result of their childlessness (Dyer et al., 2002). An assessment by the same authors of 120 women on first presentation to an infertility clinic, using the Symptom Check-list-90-R (SCL-90-R, a standardized instrument for the measurement of current psychological symptom status; Derogatis, 1994), confirmed these findings: compared with fertile controls, infertile South African women had significantly higher SCL-90 scores. Furthermore, infertile women who reported that they were in abusive relationships were more distressed than infertile women in non-abusive relationships (Dyer et al., 2005). Suffering among infertile men in South Africa has also been reported (Dyer et al., 2004). In a qualitative study describing the meaning of infertility from the perspective of infertile women in Botswana and the strategies they use to deal with infertility, the theoretical framework of ‘denying and preserving self’ was constructed (Mogobe, 2005). The denial of self included denial of status as a woman, of immortality, of the experiences of pregnancy and childbirth and of economic and social security. Women also believed that they being punished by God and their forefathers. Strategies women used to preserve the self were aimed at preventing or reducing the harm inflicted by others as a result of the infertility (Mogobe, 2005). Studies conducted in Nigeria and Ghana revealed that women’s treatment in the community, their self-respect and understanding of womanhood depend on motherhood (Hollos et al., 2009) and that women experience social stigma, relationship problems and diminished emotional wellbeing as a result of being infertile (Fledderjohann, 2012). Women in Ghana also described how the blame for infertility is disproportionately attributed to women (Fledderjohann, 2012). In a study of couples in Rwanda, domestic violence, union dissolutions and sexual dysfunction were significantly more common among the 312 infertile couples than among the fertile controls (Dhont et al., 2011). In-depth interviews with infertile women in Jordan identified four types of adversity related to being infertile: feeling incomplete, the pressure to conceive from the social network, fear of the husband taking another wife to solve the infertility problem, and marital relationship problems (Obeisat et al., 2012). In spite of the one-child policy enforced in China, infertility in that country is associated with considerable psychosocial distress. Approximately one-third of Chinese infertile women who were seeking infertility treatment had impaired psychological wellbeing as measured by the General Health Questionnaire (Goldberg, 1992) and, when treatment failed, mental health deteriorated further (Lok et al., 2002). In Taiwan, women in couples with a female cause of infertility were found to have lower self-esteem and less acceptance by in-laws than women in couples where the infertility was identified as caused by a male factor (Lee et al., 2001). In the Middle East, women’s social status, dignity and self-esteem depend on her ability to procreate; childbirth is regarded as a family commitment (Serour, 2002). Interviews with infertile women and key informants in the urban slum in Bangladesh revealed that evil spirits and physiological defects were
perceived as leading causes of infertility and that childlessness places women at risk of social and familial displacement (Papreen et al., 2000).

Taken together, results from these and other studies indicate that the consequences of involuntary childlessness are very severe in low-income countries, particularly for women. In these settings, childless women are frequently stigmatized, isolated, ostracized, disinheritied and neglected by the family and local community. This may result in physical and psychological abuse, polygamy and even suicide. Because many families in low-income countries depend on children for economic survival, childlessness and having fewer children than the number identified as appropriate are social and public health matters, not only medical problems.

Access to infertility health care and patterns of healthcare seeking

The ‘right of men and women to … the best chances of having a healthy child’ was endorsed at the International Conference on Women held in Beijing in 1995. In 2004 the World Health Assembly adopted the five core points of the WHO sexual and reproductive health package. One of these was the need globally for provision of high-quality services for family planning, including infertility services (Sallam, 2008). This was followed by a stated target to ‘Achieve by 2015, universal access to reproductive health’ as one of the United Nation’s Millennium Development Goals (United Nations, 2000).

In most high- and middle-income countries, couples who experience infertility can access medical care, including assisted reproduction treatment. It is estimated that up to three-quarters of infertile couples in these settings make use of infertility-related medical care (Boivin et al., 2007). In many European countries and in Australia, the cost is subsidized by government and health insurance schemes (Chambers et al., 2009). However, in most states in the USA, there are no subsidies and the cost of treatment is exorbitant. In 2002 the average cost of one treatment cycle in 25 countries was US$3518 compared with US$9547 in the USA (Collins, 2002). As a result of the high cost of assisted reproduction treatment in the USA, infertility care is often unattainable for low-income groups such as immigrant Latino patients (Nachrigall et al., 2009).

In most low-income countries, assisted reproduction services are available in the private sector but they are only accessible to the wealthy elite who can afford to pay (Nachrigall, 2006). In no low-income country is the cost of a treatment cycle less than half of an average individual’s annual income (Collins, 2002). After conducting a systematic review of the literature relating to out-of-pocket cost of infertility treatment in developing countries, Dyer and Patel (2012) concluded that infertility treatment is prohibitively expensive and that those who invest their scarce resources in infertility treatment risk financial ruin. In Brazil it was found that there is no public access to infertility treatment in 19/25 states (76%) and 26/39 cities (67%); the most commonly stated reasons were ‘lack of any political decision to implement services’ and ‘lack of human and financial resources’ (Makuch et al., 2010). Sundby et al. (1998) surveyed 800 households in Gambia with a total of 14,239 inhabitants and found that 40% of women who identified as subfertile had sought care in the formal health-care system where only very basic investigations were offered and few treatment options were available. Furthermore, the treatment alternatives most commonly offered were curettage and cervical electrocauterization which are unlikely to improve chance of conception and are even potentially harmful. Gambian infertile women more commonly sought help from traditional and spiritual healers than formal health care (Sundby et al., 1998). In Chad, public demand for infertility care far outstrips availability; gynaecologists in public hospitals require infertility patients to seek private care, implying that infertility care is a luxury (Leonard, 2002).

Provision of affordable infertility care

Although attitudes among people in high-income countries towards provision of infertility care in low-income countries have been either dismissive or indifferent, with an emphasis on controlling overpopulation, members of the medical and scientific community increasingly call for action to reduce the global burden of infertility (Gerrits, 2012; Hovatta and Cooke, 2006; Ombelet, 2009; Ombelet and Campo, 2007; Vayena et al., 2002a; Vayena et al., 2009). Most argue that strategies to improve education about sexual and reproductive health and to prevent infertility are paramount to reduce the prevalence of infertility. As this does not resolve the plight of infertility for those affected by it, others assert that these strategies should be coupled with provision of infertility care, including assisted reproduction treatment (Geelhoed et al., 2002; Makuch et al., 2010; Ombelet et al., 2008; Sundby et al., 1998; Vayena et al., 2002b), although concern has also been expressed about the use of scarce health resources for high-tech treatment (Sundby, 2002) and that prevention should be the primary emphasis (van Balen and Gerrits, 2001; van Zandoort et al., 2001). According to Fathalla (2002), the problem of involuntary infertility is made more urgent by family planning policies that rely on voluntary infertility to limit population growth. If, to improve women’s health and maintain appropriate population growth, couples are to be encouraged to postpone childbearing and plan for widely spaced pregnancies, they need to know that help to achieve pregnancy is available to them if they experience difficulties when they want to conceive.

To make infertility care accessible to as many people as possible, it is suggested that services for basic infertility investigations (to determine cause of infertility) and simple forms of infertility treatment (such as ovulation induction and artificial insemination) are integrated into existing reproductive health settings (Ombelet, 2009). Sallam (2008) proposed a model with three levels of assistance: (i) a basic infertility clinic offering diagnostic tests and simple forms of infertility treatment; (ii) an advanced clinic where, in addition to the services offered in the basic clinic, IVF (the simplest procedure) and more advanced diagnostic procedures are available; and (iii) a tertiary-level infertility clinic offering specialized assisted reproduction and surgical procedures. Depending on the level of service, funding options...
include public—private partnership models and partnerships between the World Bank and government, donor agencies, professional societies and the World Health Organization (WHO) (Sallam, 2008).

In 2001 WHO recommended that infertility be considered a global health problem and stated the need for adaptation of assisted reproduction technology in low-resource countries. In response, simplified protocols have been developed. These use less potent and cheaper drugs to stimulate oocyte development, minimal monitoring, simplified culture systems and less technologically advanced equipment (Aleyamma et al., 2011; Hovatta and Cooke, 2006; Ombelet and Campo, 2007), thereby drastically reducing the per-treatment cycle cost.

A crucial part of implementing simplified protocols in low-income countries is that safety and effectiveness are monitored by a body independent of the clinic (Cooke et al., 2008). While lower success rates are expected with simplified protocols, they have been shown to deliver acceptable live birth rates (Aleyamma et al., 2011). The two most common adverse effects of assisted reproduction treatment are ovarian hyperstimulation syndrome, which is potentially lethal and is caused by fertility drugs, and multiple birth. The risk of these is eliminated in low-cost treatment models through the use of minimal ovarian stimulation and single-embryo transfer (Ombelet and Campo, 2007).

Moving towards amelioration

While assisted reproduction services are available in the private sector in most low-income countries’ capital cities, only the very wealthy can access them. Initiatives to set up low-cost alternatives available to a broader range of people are emerging. The European Society of Human Reproduction and Embryology (ESHRE) has established the Task Force Developing Countries and Infertility (www.eshre.eu) which has the following objectives:

1. To raise awareness surrounding the problem of childlessness in resource-poor countries within the donor community, politicians, funding agencies and research organizations through lobbying and publishing, and the general population through information, education and counselling on infertility and its consequences.

2. To study the ethical, socio-cultural and economical aspects of childlessness and infertility care in resource-poor countries.

3. To make infertility diagnosis and infertility treatment, including assisted reproduction treatment, available and accessible for a much larger part of the population, by simplifying the diagnostic procedures and simplifying and modifying the ovarian stimulation protocols and the IVF procedures.

4. To work together with other organizations and societies working in the field of reproductive health to reach the goal of ‘global access to infertility care’.

In 2010 The Walking Egg (www.thewalkingegg.com), a not-for-profit foundation promoting accessible and affordable infertility services in developing countries, was established. The Walking Egg collaborates with ESHRE and WHO to make infertility care an integral part of reproductive health care in low-income settings through innovation and research, advocacy and networking, training and capacity building, and service delivery (Ombelet and van Balen, 2012).

Friends of Low-Cost IVF (www.friendsoflcivf.org) is a US-based charity dedicated to alleviating the suffering caused by infertility in resource-poor settings. Friends of Low-Cost IVF was established by international assisted reproduction experts in 2011; its mission is five-fold: (i) to educate both women and men about the prevention of infertility through safe sex and the early treatment of reproductive tract infections; (ii) to establish high-quality infertility care in public hospitals in resource-poor countries and settings in a cost-effective and culturally sensitive manner; (iii) to train local clinicians, scientists and nurses as key personnel in the provision of low-cost IVF services; (iv) to monitor the success of low-cost IVF in terms of live birth rates in resource-poor settings; and (v) to empower infertile couples worldwide by making infertility care affordable, accessible and culturally acceptable.

While these and other initiatives provide some hope for the goal of alleviating the personal suffering of infertility and improving reproductive health in low-income countries, there are still many social, political, financial and logistic barriers to overcome before this becomes a reality. In-depth interviews with key informants in Bangladesh, including stakeholders from government and non-government organizations, policy makers, donors and public health researchers, revealed that, although the need for infertility services is acknowledged, infertility is not recognized as a priority area in a healthcare system that can provide only the most basic care. Informants also pointed to the lack of technical expertise and infrastructure as barriers for infertility care in Bangladesh (Nahar, 2012). Similar difficulties are identified in other low-income settings such as Sudan, West Africa and Vietnam (Hörbst, 2012; Khalifa and Ahmed, 2012; Pashigian, 2012).

Although these barriers may seem insurmountable, strategies to move towards amelioration of inequitable access to infertility care have been proposed. Nahar (2012) argues that the decisions of policy makers are dependent on donor agencies allocation of funding and because donor agencies’ rely on epidemiological data to determine their funding priorities the psychosocial burden of infertility is not accounted for. She believes that increasing the body of knowledge about the adverse effects of infertility through rigorous research and strong advocacy directed at donor agencies and policy makers will help them see the need to provide funding for infertility care. Khalifa and Ahmed (2012) suggest that decentralization of infertility care and public—private partnerships have the potential to reduce cost and improve accessibility to medical treatment for infertility in countries like Sudan. They recommend that public—private partnerships provide basic infertility investigations and treatment such as ovulation induction and intrauterine insemination in local satellite fertility centres and more technologically advanced treatment such as IVF and intracytoplasmic sperm injection in a centralized service in the capital city. This would in their view improve the quality of the public services and reduce the cost of private services. Hörbst (2012) also believes that the public sector needs to engage with private providers to improve access. 
to infertility care in West Africa. The number of private providers is increasing in West Africa and while they operate according to international standards and have comparable success rates to clinics in high-income countries, they are also aware of and able to accommodate local socio-cultural needs and wishes in their practice. To ensure that more infertile couples can benefit from the experience of established private providers, the public sector should actively involve them in initiatives to deliver affordable infertility care in West Africa (Hörbst, 2012). The importance of training local healthcare professionals in all aspects of infertility care is emphasized by Ombelet and van Balen (2012). They recommend that training programmes run by experts from high-income countries in each of the fields of reproductive medicine, nursing, counselling, embryology and administration would allow local expertise to develop. Well-trained local experts would be able to provide safe, effective and culturally sensitive infertility care to couples in resource-poor settings.

**Conclusion**

With the combined efforts of advocacy, training of local health professionals by experts in reproductive medicine from high-income countries, establishment of private–public partnerships and use of low-cost treatment regimes, reproductive health care that includes affordable infertility care is possible in resource-poor settings.

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Declaration: KH is a co-founder and the secretary of Friends of Low-Cost IVF but has no financial or commercial conflicts of interest. MK reports no financial or commercial conflicts of interest.

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