The economic impact of infertility on women in developing countries – a systematic review

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Abstract

Background: **It is the responsibility of health systems to provide quality health care and to protect consumers against impoverishing health costs. In the case of infertility in developing countries, quality care is often lacking and treatment costs are usually covered by patients. Additional financial hardship may be caused by various social consequences. The economic implications of infertility and its treatment have not been systematically explored.**
Methods: **A systematic MEDLINE search was conducted to identify English language publications providing original data from developing countries on out-of-pocket payment (OoPP) for infertility treatment and on other economic consequences of involuntary childlessness.**
Findings: **Twenty one publications were included in this review. Information on OoPP was scant but suggests that infertility treatment is associated with a significant risk of catastrophic expenditure, even for basic or ineffective interventions. Other economic disadvantages, which may be profound, are caused by loss of access to child labour and support, divorce, as well as customary laws or negative attitudes which discriminate against infertile individuals. Women in particular are affected.**
Conclusion: **Pertinent data on OoPP and other economic disadvantages of infertility in developing countries are limited. According to the evidence available, infertility may cause impoverishing health costs as well as economic instability or deprivation secondary to social consequences. Health systems in developing countries do not appear to meet their responsibilities vis-à-vis infertile patients.**

Key words: **Catastrophic health cost, childlessness, developing countries, economics, infertility, out-of-pocket payment.**

Introduction

Health systems have the responsibility to provide health services and to meet consumer satisfaction. Increasingly, their responsibility to protect households against excessive or catastrophic health costs is also recognised. Key mechanisms of financial risk protection against illness include risk pooling and prepayment. Four main insurance mechanisms exist, comprising state-funded Ministry of Health systems or national health services; social health insurances which generally are not for profit and reliant on payroll deductions; community-based health insurances which are also non-profit, involve voluntary membership and are controlled by the community; and private health insurances based on payment of premiums (Gottret and Schieber, 2006). In the partial or complete absence of financial risk protection, health care costs are covered through out-of-pocket payments [OoPP] by consumers.

In many low-resource settings infertility is common and frequently associated with negative psychosocial consequences including marital instability, divorce, social isolation and stigmatisation (van Balen and Gerrits, 2001; Dyer, 2007; van Balen and Bos, 2009; Gerrits and Shaw, 2010). Against this back-drop, infertile women often engage in relentless health-seeking behaviour accessing both biomedical and traditional health services (van Zandvoort et al., 2001). In many developing countries infertility management in the public health sector is, however, of relatively poor quality or entirely lack-

ing. Use of existing services may be free or require payment of user fees, either over or under the counter. Alternatively women may access private health care, where available, encountering a range of treatment options which may be of inconsistent quality and benefit (Macklin, 1995). Insurance for private infertility care rarely exists, and costs are usually covered through OoPP. Interventions in the traditional health sector rely on various ceremonies and remedies, again relying on patient payment or payments made in kind. The usual lack of cost regulations regarding infertility interventions puts patients at the additional risk of exploitation.

It follows that infertility in low-resource settings may be associated with a significant risk of impoverishing health expenditure, in other words OoPP which threatens survival, or creates or deepens poverty (Habbema, 2008). To our knowledge the frequency and impact of this risk has to date not been reported. To address this information gap we conducted a systematic literature review on OoPP for infertility care and other economic consequences of infertility in developing countries. Two previous systematic reviews on infertility in low-resource settings included some information on economic consequences, but neither of them focussed on this theme and one review only included publications from sub-Saharan Africa (van Balen and Bos, 2009; Gerrits and Shaw, 2010). We therefore anticipated that the results of this review would make a relevant contribution to the existing literature and provide new insights into what extent health systems meet or fail in their responsibilities towards infertile patients.

Methods

The primary objective of this review was a systematic evaluation of reported OoPP for infertility care in developing countries including both the biomedical and traditional health sector. Other economic implications of infertility were included as a secondary objective.

A MEDLINE search was conducted on English paper publications using the key words 'infertility' and 'involuntary childlessness' in combination with 'developing countries', 'low resource-settings', 'Africa', 'Asia', 'Latin America' and 'out-of-pocket payment', 'health-cost', 'catastrophic cost', 'impoverishing cost', 'economic consequences', 'social consequences'. All manuscript titles generated by the MEDLINE search were read. Abstracts and manuscripts were reviewed if within the field of interest. In addition, the bibliographies of retrieved manuscripts were searched for further references. Only publications presenting original research data, conducted in developing countries and accessible through South African University Libraries were considered for inclusion. Developing countries were defined as low-income and lower middle income countries according to the World Bank classification of countries by Gross National Income per capita (The World Bank Group, 2012).

We used the terms 'impoverishing expenditure' and 'catastrophic expenditure' in keeping with previous research. Accordingly, these terms describe, *qualitatively*, health costs that threaten the survival of individuals or their households because of financial collapse, or cause or deepen poverty. In *quantitative* terms catastrophic expenditure has been defined as a direct health cost that exceeds 40% of a household's annual expenditure excluding payments for food, although some authors have worked with a lower threshold of 20% (Xu et al., 2003, 2007; Habbema, 2008). Annual household expenditure, after subtracting the cost of food, has been considered a more reliable indicator of purchasing power than annual household income (Xu et al., 2003).

Results

A total of 485 manuscript titles were read. Following abstract and manuscript review, 21 papers were identified for inclusion in this review. Table I provides an overview of the publications, research methods and key findings from African countries, and related information from Asia is presented in Table II.

Out-of-pocket payment for infertility care

Few studies provided quantitative information on the OoPP for infertility treatment. In a study from Northern India, 53% of couples attending an 'infertility camp' at a primary care facility had spent in excess of 1000 Indian Rupees (IR) on prior treatment (Singh et al., 1996). The majority had first accessed the traditional health sector, and 46% of couples had accessed four or more sources for help. The authors contrasted this OoPP to the national average annual income per capita of IR 3835 and concluded that it was a 'considerable expenditure'. Similar results have been reported from Rwanda where women had spent a mean total of 73 USD (range 27-270 USD) on infertility treatment, and male partners had spent 91 USD (range 22-200; difference not statistically significant) (Dhont et al., 2010). This cost was double their monthly income for 50% of women, and for 25% it was six times their monthly earnings. Most patients had accessed treatment from the public and/or private health sector. Interventions involved clomiphene citrate or a combination of antibiotics, hormones, non-steroidal anti-inflammatories and

Table 1. — Cost of treatment and other economic consequences of infertility: Studies from Africa.

Study	Area	Methods	Sample	Cost of Treatment	Other Economic Consequences
Barden-O'Fallon J. 2005	Malawi	Qualitative: Interviews	15 women, 11 men	–	lack of domestic support and of financial security in old age.
Dhont N et al. 2010	Rwanda	Quantitative: Hospital based survey	312 infertile women, 254 male partners	For 75% of women fertility costs were ≥ twice their monthly income. Treatment included clomiphene, hormones, steroids, antibiotics	–
Dhont N et al. 2011	Rwanda	Quantitative & Qualitative: FGD[1]	Quantitative: 312 fertile and 312 infertile couples. Qualitative: 7 FGD[1]	–	Lack of financial support from husband; loss of security and land-claim rights; men less motivated to work.
Feldman-Savelsberg P. 1994	Cameroon	Qualitative: Interviews	Number not specified	–	Lack of financial support;greater risk of divorce; may need to repay bride wealth; may be rejected by family; no children to expand workforce
Gerrits T. 1997	Mozambique	Qualitative: Interviews	34 infertile women	–	lack of domestic support/child labour.
Hollos M. 2003	Nigeria	Qualitative: Life Stories	6 women	Infertile women have to self-fund or husbands are only willing to pay for traditional healers.	Infertile woman had to pay the bride wealth for additional wives; Children help to establish land claims and expand the labour force.
Hollos M et al. 2009	Nigeria	Quantitative & Qualitative: interviews with Ijo and Yakurr people	Enumeration: 812 and 966 areas identified. In depth interviews: 25 fertile and 25 infertile women	Treatment expensive and ineffective. Women self-fund.	Infertile women divorced or ridiculed; no right to residence or inheritance from husband's estate; must return to their own family and risk being marginalized.
Mogope DK. 2005	Botswana	Qualitative	40 infertile women	–	Lack of social, economic security; lack of support/financial security in old age.
Okonofua FE. 1997	Nigeria	Qualitative: FGD[1]	25 women	Infertile women at risk of financial and sexual exploitation by traditional healers.	No financial security; excluded from inheritance.
Pearce TO. 1999	Nigeria	Qualitative	Number not specified	–	Excluded from inheriting from deceased husband's estate.
Runganga AO et al. 2001	Zimbabwe	Qualitative: In depth interviews and FGD	42 informants	–	Loss of financial support; infertile couples used as social service to others
Seybold D. 2002	Senegal	Narrative	1 infertile woman	Self-funded fertility treatment with cost supplementation from husband. Traditional healer accessed after apparent failure of treatment. Attempt at sexual exploitation by traditional healer.	–
Sundby J. 1997	Gambia	Quantitative & Qualitative	Quantitative: 243 infertile women. Qualitative: 4 infertile women	Traditional healers are accessed first, at high cost. Perception that private hospitals are better than state facilities but these are very expensive and women cannot afford them.	–

[1] FGD: Focus Group Discussion.

Table 2. — Cost of treatment and other economic consequences of infertility: Studies from Asia.

Study	Area	Methods	Sample	Cost of Treatment	Other Economic Consequences
Nahar P, Richters A. 2011	Bangladesh	Life histories	20 rural, illiterate women, 11 urban middle class women.	Cost of 'high tech' infertility treatment 2000-6000€, may cause poverty. Rural women visit indigenous healers who are less costly. Women reduce expenditure on other and basic needs. Lengthy treatment unaffordable.	Financial insecurity. Threat of divorce. Divorced women economic burden to parents; parents may have to raise 2nd bride price. Infertile women cannot work. Husband may lose motivation to work.
Nahar P et al. 2000	Bangladesh	Qualitative	120 non-infertile men & women; 20 infertile women; other key informants	–	Women suffer marital insecurity, abuse. Financial insecurity. Infertile men and women are not offered jobs. Women may resort to prostitution.
Sami N, Ali TZ. 2006	Pakistan	Descriptive case series	400 infertile women	–	Threat of divorce and subsequent financial insecurity
Singh A et al. 1996	Northern India	Quantitative	129 infertile couple	53% of couples spent > 1000IR[1] on previous treatment; 46% had accessed 4 or more sources for help;	–
Unisa S. 1999	India	Quantitative & Qualitative: household survey and Interviews	332 infertile women and 101 men; 60 case studies	Poor public services, private care preferred although more costly;	–
Widge A. 2005	India	Qualitative: Interviews	4 couples, 18 women	ART cost 600-1000USD; cost 'exorbitant'	–
Wiersema N et al. 2009	Vietnam	Quantitative & Qualitative: questionnaire survey and interviews	118 infertile couples. 28 men and women were interviewed	Cost of ART 3000 USD; self-funded; many cannot afford treatment; take loans or sell assets	–
Winkvist A, Akhtar HZ. 2000	Pakistan	Qualitative: Interviews	42 women (18 urban, 24 rural), 8 mother-in laws, 6 local healthcare providers	–	Women suffer abuse, lack of financial support; threatened with divorce; forced to do additional work.

[1] IR: Indian Rupees.

steroids for women and testosterone and clomiphene citrate for men.

Three studies provided information on the range of cost. A qualitative study which evaluated the experiences of middle and upper-middle class urban Indian women with assisted reproductive techniques (ART), reported the cost of ARTs at 600-1000USD (Widge, 2005). Informants uniformly described this cost as 'exorbitant'. No further information on available income or the impact on households was provided. The author concluded that ART was financially stressful and highly commercialized, and that couples were at risk of being exploited. Patients undergoing infertility treatment in Vietnam had to self-fund the cost of treatment. The cost for ART was 3000USD, which was unaffordable to most despite some interviewees stating they were willing to sell their homes (Wiersema et al., 2006). A study from Bangladesh, collecting raw data by means of life histories, reported a cost of 2000-6000€ for 'high-tech' infertility treatment which, according to informants, could cause poverty (Nahar and Richters, 2011). Despite the cost, almost all urban women had undergone such treatment. Rural women usually went to a traditional healer, and although the cost was less it was still noted to be 'hard earned money'. Both urban and rural women cut down on expenditure for basic needs and social events without further details given. Lengthy treatment was unaffordable to both groups.

Some further insight is provided by qualitative studies which refer to the cost of treatment in the context of descriptions of health-seeking behaviour or the overall experience of infertility. According to life histories of infertile women living in Nigeria, some men refused to pay for infertility treatment, possibly because they already had children from other women/wives (Hollos, 2003). These women had to use their own earnings or forfeit care. Other men paid for their wives, but unless conception occurred the marriage usually failed. Infertile women in the Gambia spent 'considerable amounts' on traditional health care (Sundby, 1997). Treatment in the

biomedical sector was perceived to be of limited quality, with most doctors providing poor care and good doctors being unaffordable. Focus group discussions from Nigeria and the life history of a woman living in Senegal revealed that traditional healers may exploit infertile women financially or sexually, but according to one Nigerian informant this 'was the price to pay' in order to conceive (Okonofua et al.,1997; Seybold, 2002).

Other economic consequences

Thirteen manuscripts were identified which described other economic consequences. Although some manuscripts provided rich detail, the overall amount of information was scant. Five types of consequences emerged from the data, namely (1) loss of income through lack of work done by children; (2) economic disadvantages caused by customary law or cultural traditions; (3) economic disadvantages caused by negative attitudes of individuals; (4) loss of financial security following divorce/abandonment; and (5) loss of old age security.

According to studies from Africa and Asia, children assist with domestic and subsistence related activities, and the labour contribution of children of all ages has been described as being considerable (Feldman-Savelsberg, 1994; Gerrits, 1997; Hollos, 2003; Barden O'Fallon, 2005; Hollos et al., 2009). Furthermore, ethnographic research from Cameroon described how children allowed women to create an essential network of exchange and support that infertile women were unable to establish (Feldman-Savelsberg, 1994). Research from Bangladesh emphasised the importance of sons, who are supplementary earners. In this setting poverty was further aggravated by the fact that women were not permitted to seek work outside their homes, either because this would shame their husbands, who were responsible for providing for their households, or because of feared infidelity (Nahar and Richters, 2011).

Some cultural traditions or customary laws create economic difficulties for infertile couples or women. In Nigeria and Cameroon land claims are negotiated through the number of children (Feldman-Savelsberg, 1994; Hollos, 2003). Studies from sub-Saharan Africa have documented that a childless widow may face poverty as she had little or no right to inherit from her deceased husband (Sundby, 1997; Okonofua et al., 1997; Pearce, 1999). In addition, widowed women were reported to lose their right to reside in their deceased husband's compound unless they had born a son (Hollos 2003; Hollos et al., 2009). The traditional payment of bride wealth may create economic hardship. In sub-Saharan Africa the bride wealth is paid by the husband to the family of his bride. In case of infertility this price may have to be repaid. This burdens the relatives of the infertile woman, who in turn may face ostracism from both families (Feldman-Savelsberg, 1994). Hollos (2003) described the strategy of one woman who raised the bride wealth to pay for two additional wives for her husband. Although this gained her the respect of the co-wives and their ten children, she still ended up leaving her husband and living with her brother, who barely tolerated her. Qualitative research conducted in Bangladesh reported the concerns of a female relative of a divorced, infertile woman who said: "If we have to raise the money again for her 2nd marriage we will become beggars" (Nahar and Richters, 2011).

Negative attitudes towards infertile people, including stigmatisation and abuse, frequently exist and these attitudes can have economic implications. In Cameroon, an infertile woman may receive fewer gifts from her husband (Feldman-Savelsberg, 1994). Outright deprivation results when husbands withhold financial support including basic necessities such as food, clothes or fuel, as reported from both African and Asian countries (Nahar et al, 2000; Winkvist and Akhtar, 2000; Dhont et al., 2011; Nahar and Richters, 2011). "Many days I just starve. He says, unless you show me your pregnancy I will not give you food and remarry soon" said a rural woman living in Bangladesh (Nahar and Richters, 2011). In the same study, another woman described how she would sit alone in her dark hut at night, forgotten by everyone, as her husband did not provide fuel for a lamp. Another qualitative study from Bangladesh reported that infertile men and women living in urban slums would not be offered jobs, and that women may have to resort to prostitution in order to survive (Nahar et al., 2000). Two studies from Rwanda and Zimbabwe outlined that infertile couples were frequently used as social servants within the family, being burdened with the care of the financially needy, sick or disabled without being consulted (Dhont et al., 2011; Runganga et al., 2001). Other people's children may also be placed in their care, which could be a burden or a blessing (Okonofua et al., 1997; Dhont et al., 2011). Lastly, infertility may create negative work attitudes among men, who may lose their drive to prosper, resulting in reduced household income and means (Dhont et al., 2011; Nahar and Richters, 2011).

Divorce or abandonment, which is not uncommon in the case of infertility, often carries economic consequences. Women may lose access to land, which is usually owned by men, as well as other belongings and their homes (Feldman-Savelsberg, 1994; Runganga et al., 2001; Hollos, 2003; Sami and

Ali, 2006; Hollos and Larsen, 2009; Dhont et al., 2011; Nahar and Richters, 2011). One woman living in Zimbabwe explained that she had to leave three homes because of her inability to conceive (Runganga et al., 2001). Women who are divorced may have to return to their own families where they may face further economic hardship and have little prospect of remarriage (Hollos 2003; Hollos et al., 2009; Nahar and Richters, 2011).

Lastly, infertile women, and at times men, voiced fear of economic difficulties in old age as they would lack the support of children (Feldman-Savelsberg, 1994; Koster-Oyekan, 1999; Hollos, 2003; Barden O'Fallon, 2005; Mogobe, 2005). Since most studies included participants of reproductive age, lack of old age support was mostly a fear of future economic hardship rather than current life experience. Fostered children or children of relatives were generally deemed unreliable in providing old age security (Sundby, 1997; Hollos, 2003; Barden-O'Fallon, 2005; Wiersema et al., 2006).

Discussion

There is a dearth of information on OoPP for infertility treatment in developing countries. As outlined above, quantitative evidence of catastrophic health costs requires not only information on the direct cost of care but also on annual household expenditure. In this review only four studies provided some quantitative information on the cost of care, and of these two referred to a range of cost only. No study provided information on participants' annual household income or expenditure. There is therefore insufficient evidence to quantitatively determine the occurrence of infertility related catastrophic OoPP. At the same time the evidence is suggestive of the fact that infertile individuals are likely to face catastrophic expenditure. The qualitative data on payment for infertility treatment further support this assumption.

The cost of infertility treatment in general and ART specifically is often cited as a major barrier, especially, but not only, in developing countries (Nachtigall, 2006; Inhorn, 2009; ESHRE Taskforce on Ethics & Law, 2009). In this context it is often assumed that those who cannot afford the cost, forfeit treatment. Our findings support this concept to some extent, as some of the qualitative studies documented that women could not access treatment because of cost, could not afford to pay for 'good' doctors or could not undergo 'lengthy' treatment. At the same time the data challenge the conclusion that cost prevents access to care. Instead, the studies have documented that some patients seek and pay for treatment despite the fact that they cannot afford it, thereby incurring crippling financial burdens.

Health economists have previously emphasized that willingness to pay does not imply ability to pay (Russel, 1996). Indeed it is the very act of willingness to pay for treatment that is unaffordable, which puts households at risk of catastrophic or impoverishing health costs. Studies that have evaluated catastrophic OoPP for health care in developing countries have, as yet, not included infertility. A detailed review of this literature is beyond the scope of this manuscript, but a few observations are pertinent to this discussion. According to health economists and researchers, treatment is likely to be purchased despite serious financial restrictions if the disease is considered to be severe (Russel, 1996). According to evidence from Vietnam and Burkina Faso, catastrophic expenditure was not necessarily caused by acute, dramatic illness but rather by relatively small but recurrent costs for chronic ill-health (Su et al., 2006; Thuan et al., 2006). Critical to the financial coping of individuals or households is a network of support from which financial and other assistance can be drawn. Women, especially if widowed, divorced or childless have been recognised as particularly vulnerable in this context (Russel, 1996). Health system variables associated with catastrophic OoPP have included poor coverage, poor quality of services, and user fees (Chuma et al., 2007). Poor quality public services result in higher utilization of private care, which in turn is another risk factor for catastrophic expenditure and long term debt (Van Damme et al., 2004; Su et al., 2006). In addition, poor people paid higher fees for the same private health services when compared to better-resourced patients, and paid higher interest rates to money lenders, according to evidence from Cambodia (van Damme et al., 2004).

All of the above risk factors apply to the problem of infertility in developing countries. In conjunction with the data presented in this review this indicates that involuntary childlessness is a significant risk factor for catastrophic or impoverishing health expenditure. Data are urgently needed, and to this extent we have recently conducted a survey of 150 couples undergoing ART in the public health sector of South Africa, where treatment was subsidised but required co-payment by patients. Outcome measures included direct and indirect cost burden on households, financial coping strategies and frequency of catastrophic expenditure. While final results are being analysed, interim findings indicated that one in three households incurred catastrophic cost. Financial coping strategies included the borrowing of money, selling of assets, and reduction of household expenditure including basic necessities and education (Dyer et al., unpublished data).

As noted, the cost of infertility treatment and ART is not only problematic for developing countries but

also for high-income countries. According to reviews on the health economics of ART, the cost for ART treatment was 25% of the average annual household expenditure in Canada and 50% of an individual's annual disposable income in the USA, from which authors concluded that 'if unsubsidized, direct cost [for ART] represents a significant burden to patients' (Collins, 2002; Connolly et al., 2010). This suggests both similarities and differences between developed and developing countries. In both regions couples may face crippling costs which may reach catastrophic proportions. In developed countries, however, this cost appears to be mainly associated with ART, while this review indicates that catastrophic payment may be incurred for basic interventions such as hormones and antibiotics, which may frequently be ineffective. Moreover it is likely that the implications of catastrophic expenditure on households differ between developed and developing countries, with, for example, more patients in low-income countries living close or below the poverty line and having little or no resource to governmental social security.

The review of other economic consequences related to infertility revealed both a richness and dearth of information. The richness is generated predominantly by some qualitative studies which describe vividly the suffering, the financial disadvantages and the economic deprivation that people, especially women, experience because of their inability to conceive. According to this evidence, involuntary childlessness has far reaching economic consequences, starting with lack of access to child labour and old age security, and aggravated by cultural traditions or customary laws which disadvantage infertile women and to a lesser degree men. Arguably the worst economic hardship is however caused by individual attitudes reflecting severe ostracism and stigmatisation. At the same time there is a striking absence of information. Firstly, no study focussed entirely on the economic implications of infertility, and in only a few studies these were specifically reported as one of various outcome measures. In most instances the economic consequences were reported briefly and as part of other social experiences. In addition, there are no data at all from many countries and entire regions. No studies within our scope of enquiry, could, for example, be identified from South America. In view of the magnitude of the problem, based on the number of infertile women in developing countries and the impact of infertility on peoples' lives, this lack of information is difficult to explain. Perhaps this information gap still reflects an on-going belief that overpopulation and not infertility requires attention in developing countries.

Invariably this review has limitations. Firstly, the information presented is based on relatively few studies. The available data were very heterogeneous making it difficult to extract findings. Moreover, the exact source of information was not always clearly stated. More data are required from more countries for a better understanding of the economic consequences of infertility and its treatment. While we may speculate that experiences may be similar in other low-resource settings, the findings apply to the context in which they were collected and cannot be extrapolated to all developing countries. At the same time the absence of evidence of negative economic consequences of infertility must not be interpreted as the evidence of the absence of such implications. A further limitation is the extent of our literature search. It is likely that valuable information exists in papers not accessible in South Africa and especially in non-English and non-medical literature. Lastly, the authors are not health economists but clinicians with a clinical and research interest in infertility-related psychosocial consequences and quality of life in low-resource settings.

Conclusion

Available evidence, although scant, documents that infertility is associated with a range of economic disadvantages resulting at times in outright deprivation. It also indicates that patients who access care are at risk of catastrophic expenditure even for basic, traditional or ineffective medical interventions. Catastrophic payment for health has been referred to as the 'medical poverty trap' (Whitehead et al., 2001). It would appear that for many women in developing countries infertility is a 'medical and social poverty trap'. While some of the social aspects of this economic hardship are outside the remit of health systems, the overall lack of quality infertility care and the absence of financial risk protection against infertility-related OoPP cannot be overlooked. Indeed, it may be seen as a severe infringement of women's right to reproductive health.

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