

## NEW DEBATE

# International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care

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**INTRODUCTION:** The purpose of the present study was to review existing population surveys on the prevalence of infertility and proportion of couples seeking medical help for fertility problems. **METHODS:** Population surveys, reporting the prevalence of infertility and proportion of couples seeking help in more and less developed countries, were reviewed. **RESULTS:** Estimates on the prevalence of infertility came from 25 population surveys sampling 172 413 women. The 12-month prevalence rate ranged from 3.5% to 16.7% in more developed nations and from 6.9% to 9.3% in less-developed nations, with an estimated overall median prevalence of 9%. In 17 studies sampling 6410 women, the proportion of couples seeking medical care was, on average, 56.1% (range 42–76.3%) in more developed countries and 51.2% (range 27–74.1%) in less developed countries. The proportion of people actually receiving care was substantially less, 22.4%. Based on these estimates and on the current world population, 72.4 million women are currently infertile; of these, 40.5 million are currently seeking infertility medical care. **CONCLUSIONS:** The current evidence indicates a 9% prevalence of infertility (of 12 months) with 56% of couples seeking medical care. These estimates are lower than those typically cited and are remarkably similar between more and less developed countries.

*Keywords:* infertility; population; prevalence; treatment-seeking

### Introduction

Parenthood is undeniably one of the most universally desired goals in adulthood, and most people have life plans that include children. However, not all couples who desire a pregnancy will achieve one spontaneously and a proportion of couples will need medical help to resolve underlying fertility problems. Infertility has been recognized as a public health issue worldwide by the World Health Organization (WHO). In his opening lecture of a WHO international meeting, Dr Mahmoud Fathalla focused on accessibility as a key millennium challenge for those involved in the delivery of infertility treatment and assisted reproduction (see Vayena *et al.*, 2001). In order to set up adequate fertility services to meet this challenge, one must know both the potential need and demand for medical services in individual countries and an international estimate against which individual country estimates can be compared.

The aim of the present paper is to review existing literature to address two questions: (i) What is the potential need for infertility medical care as indicated by the prevalence of infertility in world populations? (ii) What is the actual proportion of couples that

seek and/or receive medical care for fertility difficulties? In a separate paper, we will address the psychological factors that may be contributing to engagement in the medical process. Answers to these questions may help empower people with fertility problems and professionals in their common efforts to persuade organizations and governments to allocate resources and structures for easing the burden of infertility.

### Material and Methods

#### *Potential need for infertility medical care*

In order to estimate the potential need for infertility medical care, we examined population surveys on the prevalence of infertility. Citations eligible for the present study were those based on population surveys published since 1990. This means that estimates that defined infertility prevalence within a hospital or medical practice were excluded. A specific PubMed search used the terms infertility[MeSH] AND prevalence[MeSH] and epidemiological studies. The 85 citations since 1990 were scanned for relevance, full reports were obtained as necessary and other citations were identified in the reference lists of the relevant citations. The 28 studies selected for review involved

populations from different countries and defined different reproductive states: 'infertility' (a delay in conception for a given period of time), 'subfecundity' (a delay in conception or difficulty in carrying a pregnancy to term) and 'childlessness' (no child after a given period of marriage) (Stephen and Chandra, 1998; Larsen, 2005). The 'childlessness' definition was often used in reports from less developed countries. For one report of 28 countries in sub-Saharan Africa, we estimated a single weighted average percentage infertility with weight proportional to the number of women aged 20–44 in marital and consensual unions in each country (Larsen, 2000).

We distinguished between current and lifetime prevalence of infertility. The period of reproductive life covered by each survey corresponded approximately to the following: (i) Current infertility/subfecundity ('Are you presently experiencing a delay in conception/difficulty in carrying a child?') or (ii) cumulative or lifetime infertility/subfecundity ('Have you ever experienced a delay in conception/carrying a child?') or a period of childlessness after marriage (After being married for [specified number] years do you have a child?)

In the present paper, we report data from current and lifetime population surveys; however, in our discussion, we will focus on current population estimates because these are the most relevant estimates on which to base the development of reproductive policies and planning of medical care services for infertility for now and in the future.

#### **Demand for infertility medical care**

A specific PubMed search used the terms infertility[MeSH] AND \*patient acceptance of health care[MeSH] (138 citations since 1990). A further search used infertility[Title/abstract] AND treatment-seeking (nine citations since 1990). All were scanned for relevance, full reports were obtained as necessary, and other citations were identified in the reference lists of the relevant citations. In total, 17 studies provided information on demand for medical care. Demand for infertility medical care was defined as the proportion of couples who decide to seek any medical advice or care to resolve their fertility problem. We present an overall figure that includes any type of medical care (e.g. general advice, diagnostic testing, treatment advice and actual treatment), and, where available, we also provide a breakdown according to percentage seeking treatment advice and percentage receiving treatment.

#### **Development status**

All empirical reports (prevalence or seeking medical care) were categorized into a development status according to the United Nations' listing of development status by country or region (see <http://unstats.un.org/unsd/methods/m49/m49regin.htm> (last accessed 10 April 2006)).

Searches and data extraction as described were carried out independently by two authors (J.A.C. and L.B.). Disagreements were resolved through discussion among all authors.

#### **Procedure for deriving international estimates from population data**

To obtain the necessary population values for the international estimates, data from several sources were consulted:

- (i) The current world population estimate (i.e. 6.508 billion) was obtained from the web site of the US Census Bureau: <http://www.census.gov/ipc/www/world.html> (last accessed 06 April 2006).
- (ii) The proportion of women age 15–49 who are in a married or consensual union was estimated from the World Contraceptive Use Report available on the web site of the Population Division, Department of Economic and Social Affairs, United Nations, New York, NY 10017, USA in the report

<http://www.un.org/esa/population/publications/contraceptive2003/wcu2003.htm> (last accessed 06 April 2006). The most recent estimates on this website were for 2000 and these were updated to 2006 by applying the 1.706% average population increase in less developed countries and 0.277% in more developed countries from 1993 to 2003 as reported in the most recent World Health Report <http://www.who.int/whr/2005/en/index.html> (last accessed 06 April 2006).

- (iii) Since estimates of infertility prevalence usually have as their denominator women aged 20–44, the population of women aged 20–44 years in married and consensual unions was derived from the population aged 15–49 using the age structure of global populations reported by the US Census Bureau <http://www.census.gov/ipc/prod/wp02/wp-02004.pdf> (page 33, last accessed 06 April 2006).
- (iv) The calculation of international estimates began with the number of women aged 20–44 married or living in a consensual union in more and less developed countries. Each of the population estimates from more and less developed countries was multiplied by the corresponding proportion of women with infertility to get estimates of infertile women in more and less developed countries.
- (v) The estimated number of infertile women in more and less developed countries was then multiplied by the proportion of those seeking infertility medical care to get estimates of the number of infertile women seeking medical care in more and less developed countries.

As the number and distribution of the estimates presented did not justify the use of confidence intervals, additional estimates were done for a clinically relevant range of infertility prevalence and medical care seeking behaviour.

## **Results**

### **Potential need for infertility medical care**

Table 1 shows data from population surveys reporting on prevalence of current and lifetime infertility. Fourteen studies provided estimates of infertility prevalence in 10 individual more developed countries, on the basis of surveys involving 52 253 women. A further study included data from five European countries (Olsen *et al.*, 1998). In total, four estimates were for current infertility of 12-month duration, one was for current subfecundity of 12-month duration and one was for current infertility of 24-month duration. Nine estimates were for lifetime occurrence of infertility lasting 12 months and one was for lifetime infertility lasting 24 months. The prevalence of lifetime infertility ranged from 6.6% to 26.4%.

The primary interest in the present report was the prevalence of current infertility, which ranged from 3.5% to 16.7%. The representative estimate of current infertility for this range is the median figure of 9% for 12 months delay among women aged 20–44 in married and consensual unions. A clinically relevant range would be from 5% (nearly the lowest estimate) to 15% (nearly the highest estimate).

Eleven studies provided estimates of infertility prevalence in less well-developed countries (i.e. 28 countries in sub-Saharan Africa, China, Chile and India) in surveys involving 120 160 women. Three estimates involved current infertility: two for 12-month and one for 24-month duration. Five estimates were for lifetime occurrence of periods of infertility lasting

**Table 1:** Potential need for medical care (prevalence of infertility)

Authors	Country or region	Year of survey	Women sampled	Age of survey sample	Reproductive state defined	Time to state (months)	Period covered by survey	Population sample size	Percent infertile
More developed countries									
<i>Current</i>									
Philippov <i>et al.</i> (1998)	Russia	1998	Married	18–45	Infertility	12	Current	2000	16.7
Royal Commission 1993	Canada	1991	Married	18–44	Infertility	12	Current	1412	8.5
Royal Commission 1993	Canada	1991	Married ≥1 yr	18–44	Infertility	24	Current	1412	7
Stephen and Chandra (2006)	USA	2002	Married	15–44	Infertility	12	Current	15 303	7.4
van Balen <i>et al.</i> (1997)	Netherlands	1992	All	25–49	Infertility	12	Current	3295	10.7
Webb and Holman (1992)	Australia	1988	Married	16–44	Infertility	12	Current	1495	3.5
<i>Lifetime</i>									
Buckett and Bentick (1997)	UK	1995	All	45–54	Infertility	12	Lifetime	728	17.3
Dick <i>et al.</i> (2003)	Australia	1991–1993	All	15–50	Infertility	12	Lifetime	1638	18.4
Ducot <i>et al.</i> (1991)	France	1988	All	18–49	Infertility	12	Lifetime	3181	12.2
Greil and McQuillan (2004)	USA	2002	All	25–50	Infertility	12	Lifetime	580	21.2
Gunnell and Ewings (1994)	UK	1993	All	36–50	Infertility	12	Lifetime	2377	26.4
Olsen <i>et al.</i> (1998) <sup>a</sup>	Europe	1991–1993	All	25–44	Infertility	12	Lifetime	6630	11.3
Rostad <i>et al.</i> (2006)	Norway	1985–1995	All	50–69	Infertility	12	Lifetime	9983	6.6
Schmidt <i>et al.</i> (1995)	Denmark	1995	All	15–44	Infertility	12	Lifetime	2865	15.7
Templeton <i>et al.</i> (1990)	UK	1988	All	46–50	Infertility	24	Lifetime	766	14.1
Webb and Holman (1992)	Australia	1988	Married	16–44	Infertility	12	Lifetime	1495	19.1
								52 253 <sup>b</sup>	
Less developed countries									
<i>Current</i>									
Che and Cleland (2002)	China	1988–1995	Newly married	25–45	Infertility <sup>c</sup>	12	Current	7872	9.3
Larsen (2005)	Northern Tanzania	2003	All	20–44	Infertility	24	Current	2019	6.9
Sundby <i>et al.</i> (1998)	Gambia	1994	Married	15–49	Infertility	12	Current	2918	9.2
<i>Lifetime</i>									
Barden-O'Fallon (2005)	Rural Malawi	2000–2002	All	15–34	Infertility	12	Lifetime	678	19.6
Fuentes and Devoto (1994)	Santiago, Chile	1993	Married	15–45	Infertility	12	Lifetime	474	25.7
Geelhoed <i>et al.</i> (2002)	Rural Ghana	1999	All	15–44	Infertility	12	Lifetime	1073	11.8
Unisa (1999)	India (Pradesh)	1998	Married ≥3 years	20–49	Childlessness	36	Lifetime	6640	5
Zarger <i>et al.</i> (1997)	Indian Kashmir	1997	Married ≥1 year	15–44	Infertility <sup>d</sup>	12	Lifetime	10 063	15.1
Che and Cleland (2002)	Shanghai, China	1988–1995	Newly married	25–45	Infertility <sup>d</sup>	24	First 5 years	7872	3
Ericksen and Brunette (1996) <sup>c</sup>	Sub-Saharan Africa	1977–1992	Newly married	20–41	Childlessness	60	First 5 years	WFS and DHS	14.5
Larsen (2000)	Sub-Saharan Africa	1977–1997	Newly married	20–44	Childlessness	60	First 7 years	66 453	16.4
Liu <i>et al.</i> (2005)	China (national)	2005	Newly married	15–57	Childlessness	84	First 7 years	21 970	1.3
								120 160	

<sup>a</sup>Actually planned to conceive. Information from the European Study of Infertility and Subfecundity. Data also used by Olsen *et al.* (1996) and Karmaus and Juul (1999).

<sup>b</sup>Total does not include duplicate current and lifetime.

<sup>c</sup>DHS, Demographic and Health Surveys; WFS, World Fertility Survey; Lifetime: in pre-menopausal women this means lifetime to date of interview.

<sup>d</sup>Primary infertility only.

12–36 month. Further four studies examined infertility prevalence for a period between 5 and 7 years after marriage. The prevalence of lifetime infertility ranged from 5.0% to 25.7%. The lowest estimated rate of childlessness in the first 5–8 years of marriage was 1.3% in China, whereas the highest estimated rate was 16.4% using the weighted average for

sub-Saharan African countries (the range was 8–28% for the 28 countries as reported in the original report, Larsen, 2000).

The primary interest again is in prevalence of current infertility for which we have only three studies that showed a range from 6.9% for a 24-month delay in northern Tanzania to 9.2% and 9.3% for 12-month delay in Gambia and Shanghai,

respectively. As with the more developed countries, the representative estimate of current infertility for this range is the median estimate of 9% for 12-month delay among women ages 20–44 in married and consensual unions. Given that the average is similar to that for more developed countries, the clinically relevant range is also estimated to be from 5% to 15%, corresponding to the range in more developed countries.

### Demand for infertility medical services

Table 2 shows the proportion of women who sought and/or received medical care in more and less developed countries. From more developed countries, 12 studies provided estimates of seeking behaviour from 7 countries and one of these (Olsen *et al.*, 1998) provided an average estimate from a further five European countries. In total, these surveys concerned 4810 infertile women. From less developed countries, five studies provided estimates from five countries, involving 1600 infertile women.

The proportion of infertile couples seeking any infertility medical care ranged from 42% to 76.3% in more developed countries and from 27% to 74.1% in less developed countries. Care-seeking appears to follow a similar pattern in more and less well developed countries, with slightly more couples seeking care in developed countries (mean 56.1%) than in less developed countries (mean 51.2%). The best available

evidence is consistent with a proportion of 45% not seeking treatment in all countries, with a sensible range from 30% to 60%.

It was possible to examine the proportion of infertile women who undergo infertility medical care. In more-developed countries, an average of 42.0% of women sought medical advice (six studies) and 22.4% underwent treatment (four studies). Only one study in less well developed nations provided the proportion of women who sought treatment advice (34.9%), and only one study gave the percentage who received infertility treatment (58%).

### Estimated number of couples needing and demanding infertility medical services

Table 3 shows population values overall and according to age and marital status. An estimated 1.139 billion women aged 15–49 are currently in married or consensual unions in 2006 and they represent 17.5% of the 6.508 billion world population. The 804 million women aged 20–44 in married or consensual unions are 12.4% of the 6.508 billion total, and this category includes 122 million women in more developed countries and 682 million women in less developed countries.

There are 72.4 million women aged 20–44 and living in married or consensual relationships who have infertility defined as currently experiencing >12-month delay in conception while not using contraception. Of these women, ~40

**Table 2:** Demand for infertility medical care

Authors	Country or region	Number infertile	Percentage seeking any medical care	Percentage overall seeking different types of treatment		Percentage not seeking care
				Treatment advice	Received treatment	
<i>More developed countries</i>						
Buckett and Bemtick (1997)	UK	126	61 (48.4)	43 (34.1)	26 (20.6)	65 (51.6)
Dick <i>et al.</i> (2003) <sup>a</sup>	Australia	302	198 (65.6)			104 (34.4)
Ducot <i>et al.</i> (1991)	France	387	240 (62)	118 (30)	44 (11.4)	147 (38)
Greil and McQuillan (2004)	USA	123	64 (52)		32 (26)	59 (48)
Gunnell and Ewings (1994)	UK	618	310 (50.2)	170 (27.5)		308 (49.8)
Olsen <i>et al.</i> (1998) <sup>a,b,c</sup>	Europe	751	349 (49)			363 (51)
Philippov <i>et al.</i> (1998)	Russia	333	254 (76.3)	186 (55.6)		79 (23.7)
Schmidt <i>et al.</i> (1995) <sup>a,d</sup>	Denmark	448	198 (44.2)			250 (55.8)
Stephen and Chandra (2000) <sup>e</sup>	USA	1210	508 (42)		380 (31.4)	702 (58)
Templeton <i>et al.</i> (1990)	UK	108	75 (69.4)	67 (62)		33 (30.6)
van Balen <i>et al.</i> (1997) <sup>a,g</sup>	Netherlands	351	85 (65.6)	–		46 (35.1)
Webb and Holman (1992) <sup>f</sup>	Australia	53	23 (48.9)	20 (42.6)		24 (51.1)
				42	22.4	
<i>Less developed countries</i>						
Barden-O'Fallon (2005) <sup>a</sup>	Rural Malawi	133	77 (57.9)			56 (42.1)
Che and Cleland (2002) <sup>a</sup>	China	732	417 (57)			315 (43)
Fuentes and Devoto (1994) <sup>a</sup>	Chile	122	33 (27)			89 (73)
Sundby <i>et al.</i> (1998)	Gambia	281	112 (40)	98 (34.9)		169 (60)
Unisa (1999)	India (Pradesh)	332	246 (74.1)		193 (58)	86 (26)
				34.9	58	

<sup>a</sup>No information was provided on the type of medical care sought.

<sup>b</sup>Information from the European Study of Infertility and Subfecundity. Data also used by Olsen *et al.* (1996) and Karmaus and Juul (1999).

<sup>c</sup>Calculations based on the number of infertile people who participated in the treatment seeking section ( $n = 712$ ).

<sup>d</sup>Twenty-six participants who sought treatment did not meet definition for infertility, so were excluded from further analysis.

<sup>e</sup>Most recent paper (Stephen and Chandra, 2006) did not include information regarding type of treatment sought.

<sup>f</sup>Current infertility. Calculations based on reproductive disability sample ( $n = 47$ ).

<sup>g</sup>Calculations based on number of people who responded to the final questionnaire ( $n = 131$ ).

**Table 3:** World estimate of potential need and demand for infertility medical care

	World	More developed countries	Less developed countries
(a) World population 09 : 44 GMT (EST + 5) 06 April 2006	6 508 032 884		
(b) Population data Number of women of reproductive age (15–49 years) who are in a marital or consensual union: 2006	1 139 394 885	172 888 758	966 506 127
(c) Number of women aged 20–44 years who are in a marital or consensual union	804 278 743	122 039 123	682 239 619
(d) Potential need (prevalence of infertility) Number of women 20–44 years in marital or consensual union currently not conceiving in 1 year (while not using a contraceptive method)			
Estimate (9%)	72 385 087	10 983 521	61 401 566
Low (5%)	40 213 937	6 101 956	34 111 981
High (15%)	120 641 811	18 305 868	102 335 943
(e) Demand for treatment Number of infertile couples seeking medical care			
Estimate (56%)	40 535 648	6 150 771	34 384 876
Low (30%)	12 064 181	1 830 587	10 233 594
High (75%)	90 481 358	13 729 401	76 751 957

Note: See materials and methods section for notes on (a) to (e).

million are likely to seek health care and 32.6 million will not seek health care for the management of the infertility. If the lowest assumptions about prevalence and extent of non-treatment apply, there would be an estimated 40.2 million infertile women and only 12.0 million would be seeking treatment. If the highest assumptions apply, there would be an estimated 120.6 million infertile women and 90.4 million would be seeking treatment.

## Discussion

The main findings of this review were that prevalence and demand for infertility medical services was lower than typically cited (Greenhall and Vessey, 1990) and remarkably similar between more and less developed countries. On the basis of current world population, 72.4 million people are currently infertile and of these ~40.5 million are currently seeking infertility medical care. Our results indicate a need for more research on the prevalence of infertility and treatment-seeking behaviour worldwide and on the factors that impact on these estimates, including accessibility of medical care.

The potential need for infertility medical services, as indicated by the prevalence of current infertility in more and less well developed countries, was ~9%. This estimate is valid insofar as it was based on all population surveys of current infertility published since 1990, which together sampled ~170 000 women. The surveys were population-based and almost all (88%) sampled at least 1000 women. The analysis showed modest variation between reports with a sensible range between 5% and 15% for both more and less developed countries, which is within the commonly reported range. Although current prevalence from less developed countries was based on only three reports, these sampled ~13 000 women. We also found that lifetime prevalence of infertility, which was based on many more studies ( $n = 19$ ), was remarkably similar in more (6.6–26.4%) and less (5.0–25.7%) developed countries, suggesting that similarity in the current

prevalence was not just an artefact of a smaller number of studies. Our estimates for more- and less-developed countries therefore represent current best evidence, and that evidence indicates that there may not be as much difference in prevalence of infertility according to development status, as has been commonly believed.

Why could prevalence be similar across nations? One possibility is that countries most affected by factors that reduce fertility, for example curable sexually transmitted diseases (STDs), were not those sampled in the surveys reported. A WHO report showed that the number of adults per 1000 population infected with curable STDs was 19 and 20 in North America and Western Europe respectively, (WHO, 2001), which was comparable to the rates for the less developed countries contributing to our review, i.e. 21 and 7 in North Africa and East Asia, respectively. By comparison, the number infected per 1000 is 119 in sub-Saharan Africa and 50 in Southeast Asia, which did not contribute to our estimate of current infertility. However, even with this consideration, we find that lifetime prevalence of infertility is similar in more and less developed countries even in those countries that have demonstrated higher exposure to infectious disease (e.g. Chile and sub-Saharan Africa). Second, the trajectory of infertility over time may show convergence of prevalence according to development status. Stephen and Chandra (2006) recently reported from the National Growth Survey that prevalence of 12-month infertility stayed more or less the same in the USA from 8.5% in 1982 to 7.4% in 2002. In contrast, in some African countries (e.g. Central African Republic, Cameroon and Nigeria), prevalence has dropped dramatically from an exceptionally high level reaching 30–40% in the 1950s and 1960s to a national estimate of only 6% in 1994 (WHO, 1991; Larsen, 2005). This decline may be due to significant decreases of 30–40% in the prevalence of some STDs in African nations (WHO, 2001).

Finally, the similarity in prevalence between more and less developed countries may be genuine but the mechanism(s)

contributing to that prevalence may differ according to country. Cates *et al.* (1985) reported that most cases of infertility in Africa were due to infection, which is very low in more developed countries. In the latter however, there is a steady increase in age-related infertility which is not found in less well-developed nations (Lunenfeld and Van Steirteghem, 2004). With the one child policy in China, secondary infertility is almost non-existent. In contrast, in sub-Saharan Africa where women marry at very young ages, they are not exposed to STDs until after they are pregnant, thus secondary infertility is the dominant form (Cates *et al.*, 1985). Our results indicate the need for more population surveys of current prevalence of infertility and of the factors that may account for similarities and differences between more and less developed nations.

In parenting surveys the vast majority of people, around 95%, express the desire to have children at some point in their lives (Lampic *et al.*, 2006) and one would therefore expect that most people would seek medical care when faced with fertility difficulties. However, demand for infertility treatment was unexpectedly low in more developed countries with only about half of the people who experienced fertility problems deciding to seek any infertility medical care. This percentage was representative of studies reporting current and lifetime estimates and of samples from European and North American countries. Any medical care was defined in these studies as any contact with medical professionals for fertility problems and could include any contact along the continuum of reproductive care from initial consultation with a GP for difficulties in conceiving, to diagnostic testing, seeking treatment advice or actually receiving specialist fertility treatment. When this overall score was decomposed, it was found that even fewer people seek treatment advice, and <25% of infertile people actually receive any specialist infertility treatment. What is even more surprising given economic, social and cultural diversity is that population surveys in less developed countries show the same trend with ~50% of infertile people seeking any medical care. This average world-wide percentage was based on 17 independent population surveys in 16 countries, sampling about 6500 people, so that we can confidently say that this value represents current best evidence.

Our findings therefore show that a proportion of infertile people are not willing to enter the medical process, and fewer still proceeding to actual fertility treatment. Many factors may be contributing to this discrepancy between expected and observed population values for those seeking advice and treatment. Here, we explore possible methodological and population issues.

One possible factor to account for low take-up of medical services is the period of time examined in a given study, with a current 12-month interval underestimating percentage of couples who, after a protracted period of natural attempts, eventually do seek medical treatment. However, the average for engagement in medical services in the current studies was 58% (Webb and Holman, 1992; van Balen *et al.*, 1997; Philippov, 1998; Stephen and Chandra, 2000) compared with 54% in the remaining lifetime surveys. Another factor is that people may not be motivated to seek treatment if fertility

services are known to be limited or unavailable. Yet, even in countries that provide generous access to treatment, e.g. Denmark, the rate of seeking medical care was about the same as that reported for Gambia, where accessibility is much more restricted (Sundby *et al.*, 1998). A third possibility, as was argued for prevalence of infertility, is that the less developed countries contributing to the present report were not representative of their development status. However, the surveys used sampled people from Africa, Chile and India, which are clearly prototypical of the less well-developed status. Furthermore, examination of the four surveys showing particularly high rates of people seeking medical care (>65%) did not show any systematic differences in countries (Australia, UK, Russia and India), sample size, year of survey, definition of seeking care, age etc. when compared with the remaining 12 surveys that gave relatively lower rates.

Although we have shown that demand for infertility services is similar across countries, it is likely that availability will be markedly different. Our review shows that although 56% seek help, only 22% obtain it. This discrepancy is likely due to allocation of healthcare resources and country-specific healthcare regulations. For example, in a recent world report on the availability of assisted reproductive technologies, the number of cycles per million varied considerably, with a 1000-fold difference between countries with the highest (Israel, 3263 cycles) and lowest (Guatemala, 2 cycles) values (Adamson *et al.*, 2006). If all 40.5 million women who sought treatment actually received it (i.e. if demand was fully met), then the number of children born would be ~6 million (based on 15% efficacy across all treatments). However, the actual figure is likely to be closer to 1.5 million since only 22% actually obtain treatment. We are confident that our final estimates are valid: 9% prevalence of infertility and ~50% demand for medical services, but we know that values are affected by study variations in operational definitions. In the case of current infertility, we need to take into account that 'current' referred to different time periods, from 1988 to 2005. As noted previously, western nations have shown a fairly stable rate of infertility during this time period (Stephen and Chandra, 2006), whereas less developed nations have shown remarkable changes in public health care initiatives, patterns of childbearing and most likely infertility rates as well (WHO, 2001; Rutstein and Shah, 2004). We had too few studies to do a time analysis, and this would be worth investigating when more population surveys are available. Indeed, estimates are, in some cases, based on few studies, in particular there is a paucity of studies on current prevalence of infertility compared with availability of lifetime surveys. The lack of studies is especially noticeable with regard to the number of infertile people actually receiving treatment.

This report shows data from a worldwide perspective, but we now need epidemiological national data to show to what extent these figures apply to various countries. It would be important to meet this need because the policy context for the availability of treatment is determined at a national, and not an international, level.

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