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ORIGINAL RESEARCH

Measuring reproductive tourism through an analysis of Indian ART clinic Websites

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Objectives: India is fast becoming the most prominent player in the global industry of reproductive tourism, in which infertile people cross international borders to seek assisted reproduction technologies. This study was conducted to better understand the extent and manner in which Indian clinics seek foreign clients.

Methods: A systematic search of official Indian assisted reproduction technologies clinic Websites was undertaken, and instances noted where foreign clients were overtly targeted, and where maternal surrogacy was overtly offered.

Results: A total of 159 clinics with Web addresses were identified, though only 78 had functioning Websites. All were published in English, with the majority clustered in the states of Maharashtra (14) and Gujarat (9). Of the 78 functioning Websites, 53 (68%) featured some mention of maternal surrogacy services, and 42 (54%) made overt overtures to foreign clients. Qualitative appeals to foreigners included instructions for international adoption, visa application, and the legal parental disposition of the surrogate. All Maharashtran clinic Websites that mentioned surrogacy also overtly featured reproductive tourism. Preimplantation diagnosis services were not offered disproportionately by clinics mentioning reproductive tourism.

Conclusions: Based upon clinic online profiles, reproductive tourism comprises a substantial fraction of India's assisted reproduction technologies clinics' business focus, clustering around its most tourist-friendly locales, and surrogacy may be a strong motivator for international clientele.

Keywords: assisted reproduction, global health, social media, marketing, development, IVF, surrogacy, PGD

Introduction

Reproductive medical tourism (RT), also known as "cross border reproductive care,"[1] "reproductive exile,"[2] and a host of other names, is the phenomenon whereby individuals cross international borders to seek and receive assisted reproductive technologies (ARTs).[3] Reasons for such travel can include a lack of availability of the required services in the home country, and more affordable services being offered in the destination country. The latter factor is believed to be one of the primary drivers in the evolution of the Indian RT market.

In India, RT is but one player in a multibillion dollar panoply of well-developed medical tourism services; RT is thought to be worth up to half a billion US dollars annually.[4] Services offered by Indian clinics run the full gamut of state-of-the-art ARTs, including gamete donation, intrauterine insemination, in vitro fertilization, intracytoplasmic sperm injection, preimplantation genetic diagnosis (PGD) and maternal surrogacy.

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It is the latter service that sets India apart from its competitors in the West, given the very large number of economically depressed, fertile young women who can be called upon as potential surrogate mothers. As well, PGD may be an emerging service that might disproportionately attract foreign clientele.

The clientele of Indian fertility clinics is largely unknown, since there are no published studies of Indian patient demographics. However, it is thought that in addition to clients from India's own growing middle class, foreign clients make up a substantial component of clinic clientele. This assumption is supported by a plethora of anecdotal and lay evidence, as well as the marketing profiles of the clinics themselves. Browsing the Websites of several Indian clinics will reveal repeated instances where services for foreigners are overtly mentioned.[5]

The purpose of the present study was to systematically elucidate the Indian RT clientele by examining the nature of Indian clinics' online marketing presence. By searching for and reviewing Indian ART clinics with Websites, we aimed to describe the ways in which clinics use this medium to advertise to non-Indian potential clients, and to determine the proportion of clinics that overtly service foreigners, particularly with respect to maternal surrogacy.

Methods

A Google search was performed using various combinations, abbreviations, and spellings of the following keywords: India, assisted reproduction, artificial reproduction, in vitro fertilization, intracytoplasmic sperm injection, infertility, fertility, ART clinic, IVF clinic, infertility centre/center, IVF India, reproductive services, and surrogacy. The names of Indian states or union territories were coupled with these keywords during Web searches so that a wide representation of clinics across the country could be obtained. Links from each hit were also explored. Each resulting site was visually and qualitatively explored to determine whether it was the official site of an India-based fertility clinic. Websites for branch offices outside of India were disallowed. Clinics that exist as part of a general hospital were allowed, provided that they had their own dedicated Website. The language of the Website was not a barrier to inclusion in this study.

All resulting sites were reviewed to reveal the following characteristics about each clinic: the specific reproductive services offered, location, whether maternal surrogacy is overtly mentioned, some measurement of the size of the clinic (in terms of its scale of operation), and whether cost and success rates are mentioned. Special attention was given to clinics in the states of Maharashtra and Andhra Pradesh, known respectively as top foreign and domestic tourist destinations.[6] We defined an "overt" mention of surrogacy as any use of the word "surrogate" or "surrogacy." However, a distinction was made between those Websites that made it clear that surrogacy was an option for clients of that clinic, and those that simply mentioned surrogacy as being a popular aspect of assisted reproduction. This was assessed by qualitatively reading the text presented in each site.

Results

A total of 159 Websites seemingly representing Indian ART clinics were identified. Of those, 148 were found to be unique clinics, and 11 were branch offices or separate service Websites for the clinics already captured. Of the 148, only 78 sites were functional when accessed. While the clinics appear to be scattered all over the country, they cluster most prominently in the states of Maharashtra (35 URLs identified, 14 functioning) and Gujarat (21 identified, 9 functioning). The names, URLs, and locations of identified clinics with functioning Websites are listed in Table 1.

The costs, size, and services mentioned by each Website are summarized in Table 2 (with clinic ID numbers corresponding to those in Table 1), and the abbreviations used to describe services in Table 2 are explained in Table 3. Three possible conditions for maternal surrogacy were noted in Table 2: no mention (indicated by "NO"), a mention of the existence of surrogacy (indicated by "YES [A]"), and an overt mention of surrogacy as a treatment option offered at that clinic (indicated by "YES [B]").

The presence or absence of surrogacy or RT services is summarized in Figure 1. The number of clinics that overtly claimed to offer surrogacy services was 37 (47%), while those having a passing mention of such services was 16 (21%), for a combined percentage of 68% of clinics whose Websites featured at least some aspect of maternal surrogacy. Interestingly, 57 Websites (86%) included some reference to RT services. Of those, 20 (26%) sites made passing mention, in a variety of contexts, of medical or RT; 20 (26%) featured mention of RT via patient testimonials or success stories; and 42 (54%) overtly featured vacation or travel packages in coordination with fertility services, or made other overtures to foreign clientele, such as providing instructions for international adoption, visa application, and the legal parental disposition of the surrogate, as it applies in international contexts.

Additionally, 26 clinics (33%) advertised PGD services on their Website. Of these, only three (21%) were in the

Table 1 List of 78 Indian ART clinics with functioning Websites

Indian state, territory, or region	ID	City	Name of Clinic	URL	Date of last visit
Andhra pradesh	1	Hyderabad	Dr Padmaja IVF Center	www.drpadmajaivf.com	Nov 9, 2011
	2	Hyderabad	Dr Rama's Institute for Fertility	www.fertilityindia.com	Nov 9, 2011
	3	Hyderabad	Kiran Infertility Centre PVT Ltd (KIC)	www.kiranivfgenetic.com	Nov 9, 2011
	4	Visakhapatnam	Krishna IVF Clinic – Center for Assisted Reproduction	www.krishnaivf.com	Nov 11, 2011
	5	Hyderabad	Oasis Centre for Reproductive Medicine	www.oasisindia.in	Nov 9, 2011
	6	Karimnagar	Padmaja Fertility Center	www.padmajafertility.com	Nov 11, 2011
Assam	7	Guwuhati	Institute of Human Reproduction	www.ihrindia.com	Nov 24, 2011
Chandigarh	8	Chandigarh	Bedi Infertility Center and Nursing Home	www.ivfbedi.com	Nov 24, 2011
	9	Chandigarh	Jindal IVF and Sant Memorial Nursing Home	www.ivfchandigarh.com	Nov 11, 2011
Chattisgarh	10	Raipur	Ayush Fertile Hope ICSI Test Tube Baby Centre	www.aayushivfraipur.com	Nov 24, 2011
	11	Raipur	Raipur Fertility Research Centre	www.raipurivf.com	Nov 11, 2011
Delhi	12	New Delhi	Delhi IVF and Fertility Research Centre	www.delhi-ivf.com	Nov 11, 2011
	13	New Delhi	Gaudium IVF and Gynae Solutions – IVF Surrogacy Centre	www.ivfsurrogacycentre.com	Nov 11, 2011
	14	New Delhi	International Fertility Centre	www.internationalfertilitycentre.org	Nov 24, 2011
	15	New Delhi	Kjivf Test Tube Babies and Laparoscopy Center	www.kjivf.com	Nov 24, 2011
	16	New Delhi	Moolchand Fertility and IVF	www.moolchandfertility.com	Nov 15, 2011
	17	New Delhi	Southend Fertility and IVF Centre	www.southendivf.com	Nov 15, 2011
	18	New Delhi	Surrogacy Centre India	www.surrogacycentreindia.com	Nov 15, 2011
Gujarat	19	Anand	Akanksha Infertility Clinic	www.ivfcharotar.com	Nov 15, 2011
	20	Ahmedabad	Bhavishi Fertility Institute	www.ivfclinic.com	Nov 24, 2011
	21	Ahmedabad	Mayflower Women's Hospital	www.mayflowerhospital.com	Nov 25, 2011
	22	Surat	Me and Mummy Hospital and IVF Centre	www.meandmummyindia.com	Nov 15, 2011
	23	Valsad	Nadkani IVF	www.nadkarniivf.info	Nov 25, 2011
	24	Ahmedabad	Pulse Women's Hospital	www.pulse-hospital.com	Nov 15, 2011
	25	Navsari	Ramaben Hospital	www.ramabenhospital.in	Nov 15, 2011
	26	Ahmedabad	Reshambai Fertility Hospital	www.reshambaiivf.org	Nov 25, 2011
	27	Ahmedabad	Vani-IVF Center	www.vani-ivf.com	Nov 25, 2011
Haryana	28	Ambala Cantt	Loomba IVF Centre	www.loombaivf.com	Nov 25, 2011
Karnataka	29	Bangalore	Advanced Fertility Centre	www.afcivf.com	Nov 16, 2011
	30	Bangalore	Bangalore Assisted Conception Centre (BACC)	www.baccweb.com	Nov 16, 2011
	31	Bangalore	Cherish Centre for Reproductive Medicine	www.cherishmedical.com	Nov 27, 2011
	32	Bangalore	Gunasheela IVF Centre	www.gunasheelaivf.com	Nov 27, 2011
	33	Bangalore	Life Infertility Clinic	www.lifeclinicivf.com	Nov 16, 2011
	34	Bangalore	Sure Fertility Centre	www.surefertility.com	Nov 16, 2011
Kerala	35	Kochi	Bourn Hall Clinic	www.bournhall-clinic.com	Nov 16, 2011
	36	Kodungallur	Craft Hospital and Research Centre	www.craftivf.com	Nov 27, 2011
	37	Thiruvananthapuram	Samad Hospital – Infertility and Test-Tube Baby Centre (3 centers in India)	www.samadhospital.com	Nov 16, 2011
	38	Kochi	Vijaya Fertility Clinic IVF and Endoscopic Centre	www.vijaya-ivf.com	Nov 16, 2011

(*Continued*)

Table 1 (*Continued*)

Indian state, territory, or region	ID	City	Name of Clinic	URL	Date of last visit
Madhya pradesh	39	Indore	Disha Fertility and Surgical Centre	www.dishafertility.com	Nov 16, 2011
	40	Jabalpur	Ideal Fertility Centre	www.drbanerji-fertilityclinic.com	Nov 16, 2011
Maharashtra	41	Jalgaon	Ashay Hospital and Test Tube Baby Centre	www.ashaytesttubebabycentre.com	Nov 16, 2011
	42	Mumbai	Babies and Us Fertility IVF and ICSI Centre	www.infertilityindia.com	Nov 18, 2011
	43	Mumbai	Bombay Fertility Clinic and IVF Centre	www.drjatinshah.com	Nov 18, 2011
	44	Mumbai	Center for Human Reproduction, Dr LH Hiranandani Hospital	www.hiranandanihospital.org/excellence_ivf.htm	Nov 27, 2011
	45	Mumbai	Department of Assisted Reproduction (IVF) and Genetics	www.ivfclinicindia.com	Nov 27, 2011
	46	Mumbai	Fertility Clinic and IVF Centre	www.ivfcentremumbai.com	Nov 18, 2011
	47	Mumbai	Gynaecworld	www.gynaecworld.com	Nov 18, 2011
	48	Aurangabad	Jilla Hospital – Infertility Maternal and Child Care Center	www.jillahospital.com	Nov 18, 2011
	49	Mumbai	Malpani Infertility Clinic	www.drmalpani.com	Nov 18, 2011
	50	Mumbai	Morpheus Art Fertility Centers (7 centers in India)	www.morpheus-art.com	Nov 27, 2011
	51	Pune	Mother Hope Fertility Clinic	www.motherhopefertility.com	Nov 19, 2011
	52	Mumbai	Rotunda – the Centre for Human Reproduction	www.surrogacymumbai.com	Nov 19, 2011
	53	Mumbai	Shruti Nursing Home	www.latestinivf.com	Nov 27, 2011
	54	Mumbai	Southern Cross Fertility and IVF Centre	www.southerncrossfertility.com	Nov 19, 2011
Puducherry	55	Thattanchavady	Srishti Assisted Fertility and Advanced Laparoscopy (Safal) Center	www.fertility-clinic.in	Nov 19, 2011
Punjab	56	Jalandhar	Amarjeet Fertility Centre	www.amarjeetfertilitycentre.com	Nov 19, 2011
	57	Jalandhar	Santaan Fertility and Test Tube Baby Centre	www.santaan-ivf.com	Nov 19, 2011
	58	Amritsar	Satjot Human Reproduction and Research Centre	www.satjotfertility.com	Nov 21, 2011
	59	Jalandhar	Shivam Infertility and IVF Centre	www.shivamivfcentre.com	Nov 21, 2011
	60	Ludhiana	Sofat Infertility and Women Care Centre	www.sofatinfertility.com	Nov 27, 2011
	61	Jalandhar	Virk Fertility Centre	www.virkinfertilitycentre.com	Nov 21, 2011
Rajasthan	62	Jaipur	Aastha Fertility Care	www.aasthafertility.com	Nov 21, 2011
	63	Jaipur	Baheti Hospital and Centre for Reproductive Health Care	www.baheti-ivf.com	Nov 21, 2011
	64	Jaipur	Genesis Fertility Centre	www.ivfinindia.com	Nov 21, 2011
	65	Udaipur	Indira IVF and Infertility Centre	www.indiraivf.com	Nov 27, 2011
	66	Udaipur	Neelkanth IVF Centre	www.neelkanthivfcentre.com	Nov 27, 2011
	67	Udaipur	RK Hospital and Infertility (IVF) Center	www.rkivf.com	Nov 28, 2011
	68	Bikaner	Pratap Prasuti Grih	www.prataphospital.com	Nov 28, 2011
	69	Jaipur	Shivani Fertility and Mother Care	www.jaipurivf.com	Nov 21, 2011
	70	Jaipur	Vivekanand Hospital and Fertility Centre	www.vivekanandfertility.com	Nov 21, 2011
Tamil Nadu	71	Palani	Iswarya Fertility Centre and Women's Hospital (4 centers in India)	www.iswaryafertility.com	Nov 28, 2011
	72	Chennai	Miracle Advanced Reproductive Centre	www.reproductivecentre.com	Nov 21, 2011
	73	Chennai	Prashanth Fertility Research Centre	www.pfrcivf.com	Nov 28, 2011
	74	Chennai	Shrushti Fertility Research Centre	www.motherababy.com	Nov 22, 2011
	75	Kanyakumari	Sudha Sundar Fertility Clinic	www.sudhasundarfertility.com	Nov 28, 2011
Uttar Pradesh	76	Agra	Malhotra Test Tube Baby Centre	www.malhotrahospitals.com	Nov 22, 2011
Uttarakhand	77	Dehradun	Saini IVF Fertility Research Centre	www.sainiivf.com	Nov 28, 2011
West Bengal	78	Kolkata	Genome – the Fertility Clinic	www.neotiahospital.com/genome/default.php	Nov 22, 2011

Table 2 Services advertised on each clinic's Website (see legend below)

Clinic ID (see Table 1)	Services offered (see Table 3 for explanation of codes)	Surrogacy services offered*	Other remarks**
1	IVF, IUI, ICSI, AH, GD/ED, BC	Yes [B]	RT: 0 Size: 3 Cost: 0
2	IUI, IVF, ICSI, GIFT, SSR, CP, GD/ED, LAH, BC, CCC, PGD	Yes [B]	RT: 2, 3 Size: 3 Cost: 0
3	IVF, IUI, ICSI, BC, GD, CP, SSR, ES	Yes [B]	RT: 2 Size: 1, 3 Cost: 0
4	IUI, IVF, ICSI, AH, CP, SSR, PGD	No	RT: 3 Size: 1, 3 Cost: 0
5	IVF, IUI, ICSI, ET, SSR, CP, AH, IVM	Yes [B]	RT: 3 Size: 3 Cost: 1
6	IUI, IVF, ICSI, ET, CP, GD/ED, SSR, LAH, BC, CCC, PGD, ES	Yes [B]	RT: 0 Size: 3 Cost: 0
7	IUI, IVF, ICSI, ET, SSR, GIFT, CP, LAH, GD, PGD	No	RT: 3 Size: 3 Cost: 1
8	IUI, IVF, ICSI, ET, SSR, GIFT, ZIFT, CP, GD/ED	No	RT: 1 Size: 3 Cost: 1
9	IUI, IVF, ICSI, CP, SSR, AH, BC	No	RT: 1, 3 Size: 2, 3 Cost: 1
10	IUI, IVF, ICSI, SSR, CP, BT, GD/ED, AH, ES	Yes [B]	RT: 0 Size: 3 Cost: 1
11	IUI, IVF, ICSI, CP, EF, GD, ES	Yes [B]	RT: 3 Size: 3 Cost: 1
12	IUI, IVF, ICSI, PGD, CP, BC, LAH, GD/ED, FET	Yes [B]	RT: 1, 2 Size: 1, 3 Cost: 1
13	IUI, IVF, ICSI, BC, AH, CP, GD, SSR	Yes [B]	RT: 1 Size: 2, 3 Cost: 1
14	IUI, IVF, ICSI, GD, LAH, CP, BT, PGD	Yes [B]	RT: 3 Size: 3 Cost: 1
15	IUI, IVF, ICSI, SSR, GIFT, GD/ED, CP, ES	Yes [A]	RT: 3 Size: 3 Cost: 1
16	IUI, IVF, ICSI, IVM, GD, IMCI, FERC, BC, BT, LAH, SSR, PGD	Yes [B]	RT: 2, 3 Size: 3 Cost: 0
17	IUI, IVF, ICSI, ET, GIFT, CP, SSR, GD/ED	Yes [B]	RT: 1, 2 Size: 3 Cost: 0
18	IUI, IVF, IVM, ICSI, SSR, LAH, BC, GD/ED, CP, PGD	Yes [B]	RT: 2, 3 Size: 2, 3 Cost: 1

(*Continued*)

Table 2 (*Continued*)

Clinic ID (see Table 1)	Services offered (see Table 3 for explanation of codes)	Surrogacy services offered*	Other remarks**
19	IUI, IVF, ICSI, LAH, CP, PGD	Yes [B]	RT: 2, 3 Size: 2, 3 Cost: 0
20	IUI, IVF, ICSI, SSR, BC, LAH, GD/ED, CP, PGD, ES	Yes [B]	RT: 2, 3 Size: 3 Cost: 0
21	IUI, IVF, ICSI, ET, SSR, CP, PGD	No	RT: 1, 3 Size: 3 Cost: 0
22	IUI, IVF, ICSI, ET, BT, GD, AH, SSR, GIFT, FERC	Yes [A]	RT: 0 Size: 3 Cost: 0
23	IUI, IVF, ICSI, GIFT, ZIFT, SSR, GD/ED, CP, AH, BC	Yes [A]	RT: 3 Size: 2, 3 Cost: 1
24	IVF, ICSI, GD, CP, SSR, LAH, BC	Yes [B]	RT: 2, 3 Size: 2, 3 Cost:1
25	IUI, IVF, ICSI, CP, SSR	No	RT: 0 Size: 3 Cost: 0
26	IUI, IVF, ICSI, SSR, AH, CP, GD/ED	Yes [A]	RT: 0 Size: 3 Cost: 0
27	IUI, IVF, ICSI, SSR, CP, GD, PGD	Yes [B]	RT: 0 Size: 3 Cost: 1
28	IUI, IVF, ICSI, SSR, CP, GD, PGD	Yes [A]	RT: 1 Size: 2, 3 Cost: 1
29	IUI, IVF, ICSI, ET, SSR, IVM, BC/BT, AH, CP	No	RT: 0 Size: 3 Cost: 0
30	IUI, IVF, ICSI, ET, SSR LAH, BT, GD/ED, CP, GIFT, PGD	Yes [A]	RT: 1 Size: 1, 2, 3 Cost: 0
31	IUI, IVF, ICSI, SSR, GD/ED, BC, LAH, CP	No	RT: 0 Size: 2, 3 Cost: 0
32	IUI, IVF, IVM, ICSI, ET, SSR, BT, FET, LAH, GD/ED	No	RT: 1 Size: 3 Cost: 0
33	IUI, IVF, ICSI, IVM, ET, CP, FET, GD,	No	RT: 1, 2 Size: 3 Cost: 0
34	IUI, IVF, ICSI, FET, CP, SSR	No	RT: 0 Size: 3 Cost: 1
35	IUI, IVF, ICSI, CP, FET, GD/ED, ES	Yes [A]	RT: 1, 3 Size: 3 Cost: 0
36	IUI, IVF, IVM, ICSI, SSR, FET, AH, PGD	No	RT: 2, 3 Size: 1, 2, 3 Cost: 1
37	IUI, IVF, ICSI, ET, BT, SSR, LAH, GD	Yes [A]	RT: 3 Size: 3 Cost: 1

(*Continued*)

Table 2 (*Continued*)

Clinic ID (see Table 1)	Services offered (see Table 3 for explanation of codes)	Surrogacy services offered*	Other remarks**
38	IUI, IVF, ICSI, SSR, CP	No	RT: 0 Size: 1, 2, 3 Cost: 0
39	IUI, IVF, ICSI, SSR, GD/ED, CP	Yes [A]	RT: 0 Size: [n/a] Cost: 0
40	IUI, IVF, ICSI, SSR, GD, CP, BT	No	RT: 3 Size: 3 Cost: 1
41	IUI, IVF, ICSI, AH, GD/ED, SSR, CP, BT, PGD, ES	Yes [A]	RT: 1, 3 Size: 3 Cost: 0
42	IUI, IVF, ICSI, GD/ED, LAH, BC, SSR, CP, PGD, ES	No	RT: 1 Size: 3 Cost: 0
43	IUI, IVF, ICSI, ET, BT, GD/ED	Yes [B]	RT: 3 Size: 1, 3 Cost: 0
44	IUI, IVF, ICSI, SSR, AH, BT, CP, GD/ED, ES	Yes [B]	RT: 2, 3 Size: 3 Cost: 1
45	IUI, IVF, ICSI, SSR, CAT, LAH, BC, CP, GD/ED, PGD	Yes [A]	RT: 3 Size: 3 Cost: 0
46	IUI, IVF, ICSI, ET, SSR, LAH, BC, CP, GD/ED,	Yes [B]	RT: 2, 3 Size: 3 Cost: 0
47	IUI, IVF, ICSI, SSR, FET, CP, GD/ED,	Yes [B]	RT: 3 Size: 3 Cost: 0
48	IUI, IVF, ICSI, SSR, CP, GD	Yes [A]	RT: 1, 3 Size: 1, 3 Cost: 1
49	IUI, IVF, ICSI, SSR, PGD, CP, LAH, GD/ED, BT	Yes [B]	RT: 2, 3 Size: [n/a] Cost: 1
50	IUI, IVF, ICSI, SSR, CP, GD	Yes [A]	RT: 1, 3 Size: 1, 3 Cost: 1
51	IUI, IVF, ICSI, SSR, BT, CP, GD/ED	No	RT: 0 Size: 2, 3 Cost: 0
52	IUI, IVF, ICSI, ET, SSR, BT, BET, CP, LAH, GD/ED,	Yes [B]	RT: 2, 3 Size: 3 Cost: 0
53	IUI, IVF, ICSI, ET, BT, AH, GD/ED, CP, PGD	No	RT: 0 Size: 3 Cost: 1
54	IVF, ICSI, GIFT, ZIFT, TET, FET, AH, CP, BT	No	RT: 0 Size: 2, 3 Cost: 0
55	IUI, IVF, IVM, ICSI, IMSI, SSR, FERC, GD/ED, CP, LAH, BC	No	RT: 1 Size: 3 Cost: 0
56	IUI, IVF, ICSI, GIFT, LAH, GD/ED	No	RT: 0 Size: 3 Cost: 0

(*Continued*)

Table 2 (*Continued*)

Clinic ID (see Table 1)	Services offered (see Table 3 for explanation of codes)	Surrogacy services offered*	Other remarks**
57	IUI, IVF, ICSI, ET, GD/ED	No	RT: 0 Size: 3 Cost: 0
58	IUI, IVF, ICSI, ET, SSR, CP, GD/ED,	Yes [A]	RT: 3 Size: 3 Cost: 0
59	IUI, IVF, ICSI, SSR, CP, GIFT, ZIFT, GD/ED	No	RT: 3 Size: 3 Cost: 0
60	IUI, IVF, ICSI, SSR, CP	No	RT: 0 Size: 3 Cost: 0
61	IUI, IVF, ICSI, GIFT, ZIFT, SSR, AH	Yes [B]	RT: 2, 3 Size: 1, 3 Cost: 1
62	IUI, IVF, ICSI, SSR, FET, CP	No	RT: 0 Size: 3 Cost: 1
63	IVF, ICSI, SSR, GD/ED, BT, CP	No	RT: 1, 3 Size: 3 Cost: 1
64	IUI, IVF, SSR, GD/ED, CP, AH, ES	Yes [B]	RT: 1, 3 Size: 3 Cost: 0
65	IUI, IVF, ICSI, SSR, LAH, CP, GD/ED, BC/BT, PGD	No	RT: 1 Size: [n/a] Cost: 1
66	IUI, IVF, IVM, ICSI, BC, CP, ES	Yes [B]	RT: 0 Size: 3 Cost: 0
67	IUI, IVF, ICSI, SSR, GD/ED, CP, BC	Yes [B]	RT: 0 Size: 2, 3 Cost: 0
68	IUI, IVF, ICSI, SSR, CP, BC, GD/ED,	Yes [A]	RT: 1, 3 Size: 3 Cost: 0
69	IUI, IVF, ICSI, ET, SSR, CP, PGD, ES	Yes [B]	RT: 3 Size: 3 Cost: 0
70	IUI, IVF, ICSI, SSR	No	RT: 3 Size: 3 Cost: 0
71	IUI, IVF, ICSI, ET, CP, BC, LAH, GD/ED, ES	Yes [B]	RT: 0 Size: 1, 2, 3 Cost: 0
72	IUI, IVF, ICSI, IVM, SSR, CP, BC, GD/ED, AH, PGD, ES	Yes [B]	RT: 3 Size: 3 Cost: 1
73	IUI, IVF, ICSI, IMSI, AH, BT, CP, GD/ED, PGD	Yes [B]	RT: 2, 3 Size: 2, 3 Cost: 1
74	IUI, IVF, ICSI, ET, SSR, GD/ED, PGD	Yes [B]	RT: 2, 3 Size: 2, 3 Cost: 0
75	IUI, IVF, ICSI, CP, PGD	No	RT: 0 Size: [n/a] Cost: 0

(*Continued*)

Table 2 (*Continued*)

Clinic ID (see Table 1)	Services offered (see Table 3 for explanation of codes)	Surrogacy services offered*	Other remarks**
76	IUI, IVF, ICSI, SSR, CP, BC, GD/ED, AH, PGD	Yes [B]	RT: 1 Size: 3 Cost: 0
77	IUI, IVF, IVM, ICSI, ET, SSR, GD/ED, CP	Yes [B]	RT: 3 Size: 2, 3 Cost: 0
78	IVF, ICSI, ET, SSR, CP, AH, GD/ED	Yes [A]	RT: 2, 3 Size: 1, 2, 3 Cost: 0

Notes: *A = mention, B = overt claim or offer; **RT: 0 = no mention on Website, 1 = mentioned somewhere on Website (ie, reproductive services offered to non-Indian infertile couples), 2 = mention through advertising of patient feedback letters, success stories, or testimonials, 3 = advertising of special treatment packages/services for overseas patients and/or suggestions for accommodation, transport, or sightseeing; Size: 1 = mention of the number of procedures done in a specified time period and/or the number of successful pregnancies, 2 = mention of the number of patients seen at clinic to date or in a specified time period, and/or the number of successful deliveries, 3 = mention of the members of the clinical staff; cost: 0 = no indication of cost, 1 = cost of some or all services mentioned.
Abbreviation: RT, reproductive medical tourism.

high volume area of Maharashtra, and four (44%) in Gujarat; whereas four of the five (80%) Tamil Nadu clinics, and three of the six (50%) Andhra Pradesh clinics offered PGD.

Among the clinics advertising RT with overt overtures to foreigners, ten (23%) were in the Maharashtra area, five (12%) each were in the states of Gujarat and Rajasthan, four (10%) were in New Delhi, and three (7%) were in each of Andhra Pradesh and Tamil Nadu.

Table 3 Explanation of ART service codes used in Table 2

Service abbreviation	Actual service
AH (LAH)	Assisted hatching (laser-assisted hatching)
BC	Blastocyst culture
BT	Blastocyst transfer
CAT	Cumulus-aided embryo transfer
CCC	Cumulus cell coculture
CP	Cryopreservation (includes sperm, embryo, and oocyte freezing)
ED	Embryo donation
ES	Egg sharing
ET	Embryo transfer
FERC	Frozen embryo replacement cycle
FET	Frozen embryo transfer
GD	Gamete donation
GIFT	Gamete intrafallopian transfer
ICSI	Intracytoplasmic sperm injection
IMSI	Intracytoplasmic morphologically-selected sperm injection
IUI	Intrauterine insemination
IVF	In vitro fertilization
IVF-ET	In vitro fertilization – embryo transfer
IVM	In vitro maturation
PGD	Preimplantation genetic diagnosis
TET	Tubal embryo transfer
SSR	Surgical sperm retrieval
ZIFT	Zygote intrafallopian transfer

Abbreviation: ART, assisted reproductive technologies.

Amongst the 14 clinics in Maharasthra, ten Websites mentioned surrogacy services and all ten (100%) also overtly talked about RT opportunities. Amongst the six clinics in Andhra Pradesh, five (83%) mentioned surrogacy services and four (67%) mentioned RT.

Discussion

Our approach in this study was to examine solely the online presence of Indian ART clinics to gain a sense of the extent to which efforts were being made to attract foreign clientele. Our methods reflect those of several earlier writers in a variety of therapeutic areas.[7–9] Almost universally, those writers found that online representations of clinical services suffered from imprecise or often misleading information, due in part to their lack of the most recent, peer-reviewed information.

The non-governmental organization Sama's report[5] on the advertising techniques used by Indian fertility clinics was the first comprehensive overview of language, imagery,

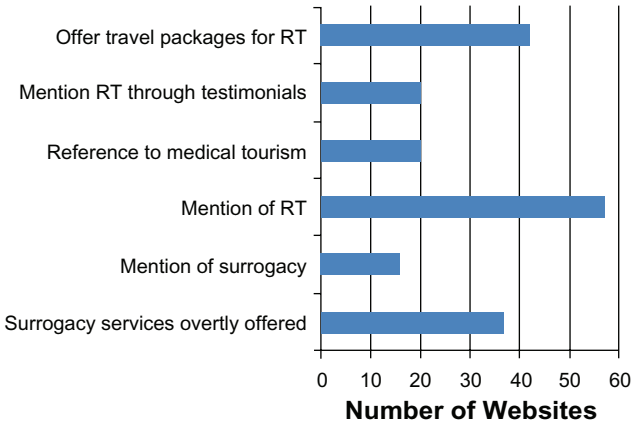

Figure 1 The availability of maternal surrogacy and reproductive medical tourism (RT) services in Indian clinics, based upon examination of 78 Websites.

and strategies used by ART providers to attract clientele to their clinics. It was suggested from their analysis that, within a purely capitalist milieu, the communication of risk and potential ethical missteps took a back seat to the generation of new business. They pointed to such questionable strategies as the publication of what they referred to as "milestones" (eg, implantation rates) in lieu of actual success rates (eg, rate of deliveries of healthy, live babies), as an effort to increase the perception of ART as being more successful than the objective science might otherwise suggest, an observation recapitulated in our earlier work.[10]

Given the heavily commercialized environment in which Indian ART clinics must operate, the temptation to present only that information most attractive to potential clientele is great indeed. The aforementioned use of milestones in lieu of success rate data is but one manifestation of this failing. Full transparency would require a listing of both milestones and success rates that are disaggregated according to underlying causes of infertility,[11] as well as some mention of the risks associated with ART, such as multiple pregnancies and extensive use of pharmaceuticals.[12]

Unlike Sama's more exhaustive analysis of advertising strategies,[5] we sought to examine the extent of RT in India solely through clinic online presence. To that end, it was not surprising that the state of Maharashtra, the nation's financial center, would prove to be the source of a plurality of clinics overtly offering tourism services or information alongside ART services. All but three of the 14 Maharasthran Websites advertised a tourism connection to their services, with a majority of clinics situated in Mumbai, known for its tourist infrastructure and globally-advertised cultural products, such as Bollywood movies.

India's top tourist destination for foreigners tend to be the states of Maharashtra (5.1 million foreigners in 2010), Tamil Nadu (2.8 million), the territory of Delhi (1.9 million), Uttar Pradesh (1.7 million), Rajasthan (1.3 million), and West Bengal (1.2 million).[7] In terms of domestic tourism, Andhra Pradesh and Maharasthra were the top destinations in 2010.[7] Consequently, these areas were of particular interest to us.

Therefore, it was not surprising that three out of five Tamil Nadu clinics examined, four out of seven Delhi clinics, three out of four Keralan clinics, and the sole West Bengali clinic were among those showing an overt courting of foreign tourists seeking ART. These are high proportions, which suggest that there may be a relationship between those regions' foreign tourist traffic and their provision of ART services. Our focus on Maharashtra supports this supposition, as all ten of that state's clinics that mention surrogacy also advertise RT, suggesting that surrogacy is one of the main attractors of the foreign clientele being sought.

Another suspected attractor was PGD, known to be only limitedly available in some countries, due to both its relative newness on the technological landscape, and its ethical issues.[13] But only three clinics in Maharashtra offer PGD, whereas four out of five clinics in Tamil Nadu, and three out of six clinics in Andhra Pradesh offer it. This suggests that PGD may not be a factor motivating international RT. But, given the domestic tourist traffic to Tamil Nadu and Andhra Pradesh, it is possible that PGD might be perceived as a service to be marketed to Indians more than to foreigners.

Our findings are suggestive, but not conclusive. To date, barriers to the understanding of the motivators and extent of RT in India have been substantial. Lack of pooled national patient data and an understandable reluctance on the part of clinics to open their patient data to analysis of this sort, compel us to rely on proxy measurements of international service usage. It is not even known from which countries Indian RT clients typically arise, though India as a whole is most likely to be visited by tourists from the USA and UK.[14] What we can say at this point is that, based upon our analyses of clinic online profiles, it seems that RT comprises a substantial fraction of India's ART business focus, clustering around its most tourist-friendly locales, and that surrogacy is a strong motivator for international clientele.

Disclosure

The authors report no conflicts of interest in this work.

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