Cross-border reproductive care use by women with infertility in Hong Kong: cross-sectional survey

Dorothy YT Ng *, Ellen MW Lui, SF Lai, Tracy SM Law, Grace CY Wong, Ernest HY Ng

ABSTRACT

Objectives: Cross-border reproductive care (CBRC) is an increasingly common global phenomenon, but there is a lack of information regarding its frequency among residents of Hong Kong. This study aimed to evaluate the use of CBRC and the factors affecting its use among residents of Hong Kong.

Methods: This cross-sectional questionnaire study collected data from 1204 women with infertility who attended Hong Kong Hospital Authority and Family Planning Association infertility clinics.

Results: In total, 178 women (14.8% of all respondents) had used CBRC. Among respondents who had not used CBRC, 36.3% planned to use or would consider it. The main factors influencing the likelihood of using CBRC among women with infertility in Hong Kong use were long waiting times in the public sector and high cost in the private sector. Taiwan was the most preferred destination for CBRC (69.6% of respondents). Most information concerning CBRC was accessed via the internet. More than two thirds of respondents believed that the government in Hong Kong should formulate some regulations or guidance regarding CBRC.

Conclusion: Nearly one in six women with infertility in Hong Kong had used CBRC. Among women who had not used CBRC, more than one third planned to use or would consider it. The main factors influencing the likelihood of CBRC use were long waiting times in the public sector and high cost in the private sector. These results will help clinicians to more effectively counsel patients considering CBRC and facilitate infertility services planning by authorities in Hong Kong.

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New knowledge added by this study

- Nearly one in six women with infertility in Hong Kong has used cross-border reproductive care (CBRC). Among women who have not used CBRC, more than one third plan to use CBRC or would consider using CBRC.
- The main factors influencing the likelihood of using CBRC instead of local reproductive care included long waiting times in the public sector and high cost in the private sector.
- More than two thirds of respondents believe that the authorities in Hong Kong should formulate some regulations or guidance regarding CBRC.

Implications for clinical practice or policy

- Clinicians should remind patients about the implications of the number of embryos transferred during CBRC and the potential risk of multiple pregnancy.
- The safety of women in Hong Kong who travel abroad for fertility treatment is jeopardised by the current lack of uniform clinical and safety regulations in other parts of the world.
- To ensure fair access to infertility care in Hong Kong, local health authorities should implement more effective measures to manage long waiting lists in the public sector.

Introduction

Cross-border reproductive care (CBRC) is an increasingly popular global trend in reproductive medicine, whereby patients travel out of their home country to receive fertility treatment.[1,2] This phenomenon has also been referred to as "reproductive tourism", "reproductive travel", "health travel", and "reproductive exile".[3,4] Among these terms, CBRC has a relatively neutral meaning and is used in the present study to avoid stigmatisation.

Thus far, CBRC has been described in Europe, North America, Middle East, Australia, and Japan.[1-11]

A survey in Europe in 2010 showed that there were 24 000 to 30 000 cycles of CBRC annually, which involved 11 000 to 14 000 patients.[12,13] Because 525 640 total treatment cycles were performed during the same period, approximately 5% of the fertility care was estimated to involve CBRC. In the US, nearly 4% of all fertility treatment provided was delivered to non-US residents; this comprised approximately 6000 cycles.[13,14] The reasons for CBRC use in Europe[12] included avoidance of legal restrictions at home (eg, fertility treatment for single and lesbian women in France and pre-implantation genetic testing in Germany), avoidance of lengthy waiting lists at home (eg, for egg donation in the United Kingdom), lower treatment cost, and treatment within a more favourable framework (eg, gamete donation with donor anonymity).

The aim of the present study was to evaluate the use of CBRC and its influencing factors in Hong Kong.

香港不育婦女跨境生殖保健使用情況：橫斷面調查

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目的：跨境生殖保健在全球日益普遍，但香港居民缺乏有關其使用情況的資訊。本研究旨在評估跨境生殖保健的使用情況以及影響香港居民使用的因素。

方法：這項橫斷面問卷調查收集1204名於香港醫院管理局和香港家庭計劃指導會診所就診的不育婦女的數據。

結果：共178名婦女（佔所有受訪者14.8%）曾使用跨境生殖保健服務。在未使用跨境生殖保健的受訪者中，有36.3%計劃使用或會考慮使用。影響香港不育婦女考慮使用跨境生殖保健的主要因素包括公立醫院輪候時間過長和私家醫院費用昂貴。台灣是跨境生殖保健的首選目的地（佔受訪者69.6%）。大部分受訪者透過互聯網獲取跨境生殖保健的相關資訊。超過三分之二受訪者認為香港政府應就跨境生殖保健制定一些法規或指南。

結論：香港近六分之一的不育女性曾使用跨境生殖保健服務。在未使用過跨境生殖保健的女性中，超過三分之一計劃使用或會考慮使用。影響使用跨境生殖保健的可能主要因素包括公立醫院輪候時間過長和私家醫院費用昂貴。研究結果有助臨床醫生更有效為考慮跨境生殖保健的患者提供諮詢，並促進有關部門規劃不孕婦女的生育服務。

Methods

Participants

Women with infertility who attended infertility clinics in the Hospital Authority (ie, Queen Mary Hospital, Pamela Youde Nethersole Eastern Hospital, Kwong Wah Hospital, and Prince of Wales Hospital) and the Family Planning Association (FPA) from 1 February 2017 to 31 March 2019 were recruited to participate in the study. Women who could not read English or Chinese were excluded from the study. All participants provided written informed consent to participate. The study was approved by the Institutional Review Boards of all participating centres, including the Hong Kong East Cluster Ethics Committee (HKECREC-2018-014); The University of Hong Kong Hong Kong West Cluster Clinical Research Ethics Committee (UW 18-266); Kowloon Central/Kowloon East Cluster Clinical Research Ethics Committee (KC/KE-18-0073/ER-4); North Territories East Cluster Clinical Research Ethics Committee (NTEC-2018-0384); and the Ethics Panel and the Health Services Subcommittee of the FPAHK (OA1-2).

Questionnaire development and distribution

A search of the literature was conducted using PubMed using the terms "cross border reproductive care", "reproductive travel", "infertility", and "Hong Kong". It revealed no existing validated questionnaires concerning CBRC use in Hong Kong. Most questions in our questionnaire were adapted from another questionnaire focused on CBRC.[5] The questionnaire content focused on three main areas: (1) demographic information, (2) reproductive history and attitudes concerning fertility, and (3) factors affecting the use of CBRC. The questionnaire was evaluated and revised by specialists in Obstetrics and Gynaecology and subspecialists in Reproductive Medicine, all of whom worked in the Hospital Authority. It was then piloted by administration to five patients in the clinic with the aim of ensuring that patients could understand the questionnaire.

Women with infertility who attended infertility clinics in the Hospital Authority or FPA were invited to participate in the study. The questionnaire was distributed by clinic nurses to clinic attendees. Participation was voluntary and patients were invited to complete the questionnaire without assistance while awaiting medical consultation. The questionnaire required approximately 20 minutes to complete. Completed questionnaires were returned to the clinic nurse at the end of the consultation.

Statistical analysis

Calculations were performed using SPSS Statistics for Windows, version 25.0 (IBM Corp, Armonk [NY], US). Associations between attitudes towards CBRC and background variables (total monthly household income, education level, years of attempting conception, and age) were explored using the Chi squared test. P values <0.05 were considered to indicate statistical significance. Logistic regression was used to investigate whether respondent age, education level, years of attempting conception, and total monthly household income were associated with CBRC use.

Results

Respondent characteristics

In total, 1204 questionnaires were returned (Table 1): 175 (14.5%) from Pamela Youde Nethersole Eastern Hospital, 510 (42.4%) from Queen Mary Hospital, 293 (24.3%) from Kwong Wah Hospital, 146 (12.1%) from Prince of Wales Hospital, and 80 (6.6%) from the FPA. The mean age (±standard deviation) of the respondents was 34.7±6.8 years. Among the 1204 respondents, 913 women (76.6%) had primary infertility and 279 women (23.4%) had secondary infertility. Thirty one women had an existing child. All respondents indicated that they were married; the shortest duration was 0.2 years. This finding was presumably influenced by the marriage requirement for intrauterine insemination (IUI) and in vitro fertilisation (IVF) in Hong Kong. Concerning the duration of attempted conception, 863 women (72.0%) had been actively trying for fewer than 5 years, 311 women (26.0%) had been actively trying for 5 years to fewer than 10 years, 22 women (1.8%) had been actively trying for 10 years to fewer than 15 years, and two women (0.2%) had been actively trying for 15 years or more.

There were missing data in our study involving non-responses to some questionnaire components. The missing data exhibited a random pattern and did not cluster around a particular question. Because the number of missing values was small (<5%), these values were omitted from further analyses.

Reproductive history and attitudes concerning fertility

Overall, 1051 respondents (87.3%) reported unremarkable medical histories. The cause of infertility was unexplained in 516 respondents (43.0%, 516/1200), related to the male partner in 216 respondents (18.0%, 216/1200), caused by a tubal factor in 181 respondents (15.1%, 181/1200), and caused by anovulation in 103 respondents (8.6%, 103/1200). The remaining respondents noted that infertility was attributed to endometriosis, other factors, or unknown (ie, no previous consultation). Notably, 578 respondents (48.0%, 578/1204) or their partners were unwilling to accept adoption. When asked to rank the importance of having a child, 382 respondents (31.7%, 382/1204) reported a score of 10/10 (very important). Furthermore, 300 respondents (24.9%, 300/1204) reported that having a child was very important to their marital relationship (score of 10/10). Finally, 351 respondents (29.2%, 351/1204) felt that having a child was very important to their family members (score of 10/10).

Use of cross-border reproductive care and factors affecting its use

In total, 178 women (14.8% of total respondents) had used CBRC (Table 2). Among respondents who had not used CBRC, 36.3% (372/1026) were planning or would consider it. The 550 respondents who had previously used CBRC, were planning for CBRC, or would consider CBRC were then asked to choose one reproductive technology that they preferred for use in CBRC; 54.4% selected non-donor IVF as their treatment of choice. In all, 40.6% of these respondents showed interest in IUI; only 0.6% showed interest in oocyte donation, 0.2% showed interest in sperm donation, and 0.4% showed interest in surrogacy for CBRC.

The two main factors positively influencing its use (ie, motivational factors) were long waiting times in the public sector and high treatment costs in the private sector, reported by 80.9% (445/550) and 12.0% (66/550), respectively, of the respondents who had used or would consider CBRC. Only 0.5% (3/550) of the respondents reported law evasion as a positive influence for the use of CBRC.

Most respondents indicated that Taiwan was their preferred destination (69.6%; 383/550); China was the second most preferred destination (25.8%; 142/550).

Most respondents who had used or would consider CBRC (61.1%; 336/550) felt that it was difficult to allocate time for CBRC. In total, 14.5% of these respondents (80/550) had a suspicion of substandard medical technology in the destination countries. Some respondents were worried about a language barrier and the lack of communication between local doctors and doctors in the destination countries.

Source of information

Respondents accessed information concerning CBRC through multiple channels (Table 2). Among the respondents who had used or would consider CBRC, more than half (57.1%; 314/550) accessed information from the internet; 32.7% (180/550) obtained relevant information from their friends. Notably, only 4.0% of these respondents (22/550) obtained information concerning CBRC from professional sources (eg, local fertility clinics).

Fertility treatment during cross-border reproductive care

Among respondents who had used or would consider CBRC (n=550), 340 (61.8%) indicated that they had received local counselling from their home country to assist in CBRC treatment. Among the 178 respondents who had previously used CBRC, 67 (37.6%) had some involvement from local doctors in their home country during CBRC treatment.

Among respondents who had engaged in CBRC and reached the point of embryo transfer (n=59), 40 (67.8%) had undergone transfer of two embryos. Surprisingly, 10 women (16.9%) had undergone

TABLE 1. Demographic characteristics of the respondents (n=1204)

Characteristic	No. (%)
Age of patients, y (n=1204)	
<35	660 (54.8%)
35-39	532 (44.2%)
40-44	12 (1.0%)
Patient education level (n=1198)	
Primary school	9 (0.8%)
Secondary school	452 (37.7%)
Associate degree or diploma	120 (10.0%)
University level or above	617 (51.5%)
Missing data	6
Husband education level (n=1196)	
Primary school	9 (0.8%)
Secondary school	462 (38.6%)
Associate degree or diploma	121 (10.1%)
University level or above	604 (50.5%)
Missing data	8
Patient working status (n=1199)	
Part-time	95 (7.9%)
Full-time	952 (79.4%)
Unemployed	138 (11.5%)
Other	14 (1.2%)
Missing data	5
Husband working status (n=1198)	
Part-time	28 (2.3%)
Full-time	1126 (94.0%)
Unemployed	35 (2.9%)
Other	9 (0.8%)
Missing data	6
Total monthly household income, HK$ (n=1196)	
<10 000	23 (1.9%)
10 001-50 000	771 (64.5%)
50 001-100 000	348 (29.1%)
>100 000	54 (4.5%)
Missing data	8
Patient smoking status (n=1195)	
Yes	66 (5.5%)
No	1058 (88.5%)
Ex-smoker	71 (5.9%)
Missing data	9
Husband smoking status (n=1195)	
Yes	253 (21.2%)
No	808 (67.6%)
Ex-smoker	134 (11.2%)
Missing data	9
Religion (n=1193)	
None	846 (70.9%)
Christian	184 (15.4%)
Catholic	43 (3.6%)
Buddhism	86 (7.2%)
Taoism	12 (1.0%)
Other	22 (1.8%)
Missing data	11
Patient health status (n=1190)	
Healthy	1061 (89.2%)
Long-term illness with specialty follow-up	119 (10.0%)
Long-term illness without specialty follow-up	10 (0.8%)
Missing data	14
Husband health status (n=1191)	
Healthy	1080 (90.7%)
Long-term illness with specialty follow-up	97 (8.1%)
Long-term illness without specialty follow-up	14 (1.2%)
Missing data	13
Type of fertility (n=1192)	
Primary infertility	913 (76.6%)
Secondary infertility	279 (23.4%)
Missing data	12
Years of attempting conception (n=1198)	
0 to <5	863 (72.0%)
5 to <10	311 (26.0%)
10 to <15	22 (1.8%)
≥15	2 (0.2%)
Missing data	6

transfer of three embryos and three women (5.1%) had undergone transfer of four embryos.

Among the 178 respondents who had used CBRC, three (1.7%) had ovarian hyperstimulation syndrome and three (1.7%) had other types of complications. Overall, 70.2% of the respondents believed that the authorities in Hong Kong should formulate some regulations or guidance regarding CBRC.

Respondent characteristics influencing use of cross-border reproductive care

Associations between attitudes towards CBRC and background variables were also explored using the Chi squared test. Respondents who had a total monthly household income above >HK$100 000 were more likely to consider CBRC than those who

TABLE 2. Responses to questions about cross-border reproductive care

	No. (%) of respondents
Have you ever considered leaving Hong Kong for cross-border infertility treatment? (n=1204)	
Yes, I have used it (cross-border infertility treatment)	178 (14.8%)
I have plans to use it	53 (4.4%)
I would consider using it	319 (26.5%)
I will not consider using it	654 (54.3%)
If you have used, have plans to use, or would consider using cross-border infertility treatment, which treatment would you prefer? (n=550)	
Intrauterine insemination	217 (40.6%)
Non-donor in vitro fertilisation	291 (54.4%)
Pre-implantation genetic testing	8 (1.5%)
Sex selection	2 (0.4%)
Oocyte donation	3 (0.6%)
Sperm donation	1 (0.2%)
Embryo donation	0
Surrogacy	2 (0.4%)
Others	11 (2.1%)
Missing data	15
What factors affect your decision to consider cross-border infertility treatment? (n=550)	
Long waiting time in Hospital Authority centres	445 (80.9%)
High cost in private	66 (12.0%)
Lack of treatment options	4 (0.7%)
Higher success rate in cross-border clinic	8 (1.5%)
The kind of treatment option is not allowed in Hong Kong	3 (0.5%)
Dissatisfied with the treatment in Hong Kong	1 (0.2%)
Do not want others to know that I am receiving infertility treatment	0
Want to transfer more than three embryos	0
None of the above	23 (4.2%)
What factors have led you to hesitate cross-border infertility treatment? (n=550)	
Poor medical technology	80 (14.5%)
Difficult to arrange time to leave Hong Kong	336 (61.1%)
Lack of information	40 (7.3%)
Language barrier	9 (1.6%)
No coordination between overseas and local doctors	6 (1.1%)
Satisfied with local infertility treatment	10 (1.8%)
Overseas clinics lack supervision	8 (1.5%)
None of the above	61 (11.1%)
What is your preferred destination for cross-border infertility treatment? (n=550)	
China	142 (25.8%)
Taiwan	383 (69.6%)
Thailand	13 (2.4%)
Malaysia	1 (0.2%)
Singapore	1 (0.2%)
United States	4 (0.7%)
United Kingdom	0
Others	6 (1.1%)
Where did you obtain information about cross-border infertility treatment? (n=550)	
Educational talks by doctors	26 (4.7%)
Internet	314 (57.1%)
Local doctor or clinic	22 (4.0%)
Friends	180 (32.7%)
Books, magazines, newspapers	8 (1.5%)

had total monthly household income of ≤HK$100 000 (P<0.001). Respondents who had a university degree or above were also more likely to consider CBRC than those who had education below university level (P<0.001). Respondents who had been attempting conception for ≥5 years had a similar likelihood of CBRC use, compared with those who had been attempting conception for <5 years. Respondents aged ≥35 years had a similar likelihood of CBRC use, compared with those aged <35 years.

Logistic regression analysis of factors potentially associated with CBRC use revealed no relationships with respondent age, education, years of attempting conception, or total monthly household income.

Discussion

To the best of our knowledge, this is the first study concerning the use of CBRC and factors affecting its use in Hong Kong. Nearly one in six women with infertility had used CBRC and approximately one third of the respondents planned to use or would consider it. The main factors influencing the likelihood of CBRC use, instead of local reproductive care, included long waiting times in the public sector and high cost in the private sector. Over half of the respondents accessed information from the internet. More than two thirds of respondents believed that the authorities in Hong Kong should formulate some regulations or guidance regarding CBRC.

Comparison with other regions

It is difficult to compare the use of CBRC in Hong Kong with that in Europe (5%) and the US (4%); the methodologies have differed among studies and the extent of CBRC use in Hong Kong was not fully established in the present study. Where women in Europe frequently engage in CBRC for purposes of law evasion, women in Hong Kong appear to engage in CBRC primarily because of the long waiting lists for public fertility treatment. In a survey of European women, law evasion was a concern for 55% of women using CBRC (9% of patients in the UK, 65% in France, 71% in Italy, and 80% in Germany).[12] Specific assisted reproduction treatment, such as surrogacy or oocyte donation, is prohibited in some countries (eg, Italy, Germany, and Japan), but legal in other countries (eg, Belgium, India, and the US). We found that only 0.5% of women in Hong Kong travelled for purposes of law evasion. This may be partly explained by the legal availability of gamete donation and surrogacy in Hong Kong (although no treatment centres in Hong Kong an appropriate licence to offer surrogacy). Because of differences in cultural backgrounds, compared with prior studies, women in Hong Kong may be less interested in gamete donation (eg, in relation to their traditional Chinese beliefs).

Fertility treatment options

Surprisingly, many respondents in our study engaged in IUI during CBRC. Among respondents in this subgroup, the two main motivational factors were identical: long waiting times in the public sector and high treatment costs in the private sector. The waiting time for IUI in public hospitals within the Hospital Authority may be longer than many patients prefer; this includes the waiting time for the initial consultation, required examinations, and subsequent waiting list for IUI treatment. The treatment cost of IUI is much lower than that of IVF in the private sector, but may be prohibitive for many patients from lower and middle social classes. We also acknowledge possible misconceptions among our respondents, who may presume that IUI is always the first-line approach or must be performed prior to IVF.

Among women who had previously engaged in non-donor IVF during CBRC, 33.1% were aged <35 years. Among all the respondents who engaged in CBRC, 30% of the respondents were aged <35 years and had unexplained infertility. Given the large percentage of young women with unexplained infertility who actually engaged in IVF during CBRC, it is unclear whether there is an overtreatment problem or inappropriate use of IVF treatment during CBRC. However, the treatment of unexplained infertility is empirical. A recent Cochrane systemic review revealed insufficient evidence for differences in live birth between expectant management and the other four interventions (ovarian stimulation, IUI, stimulated IUI, and IVF).[15] For most couples, the American Society of Reproductive Medicine recommends that the preferred initial therapy is three or four cycles of ovarian stimulation with oral medications and IUI, followed by IVF for those unsuccessful with stimulated IUI treatments.[16] In contrast, the 2013 guidelines of the National Institute for Health and Care Excellence recommend IVF treatment for women with unexplained infertility who have not conceived after 2 years of regular unprotected sexual intercourse. Therefore, stimulated IUI and IVF are both appropriate treatment options for unexplained infertility as the first-line therapy after adequate counselling.[17]

Pre-implantation genetic testing is increasingly used to detect genetic abnormalities in embryos, thus allowing replacement with normal embryos. Pre-implantation genetic testing is useful when prospective parents either have or are carriers of a genetic disease that is potentially transmissible to their offspring. A small proportion of the patients in our study (1.5%) had engaged or were interested in CBRC for pre-implantation genetic testing. In Hong Kong, pre-implantation genetic testing is permitted for medical indications and is available in Queen Mary Hospital, Prince of Wales Hospital, and some private assisted reproduction centres. Because it is legal and available in Hong Kong, few of our respondents reported a desire to engage in CBRC for pre-implantation genetic testing. A small percentage of patients (0.4%) reported a desire to engage in CBRC for sex selection. Notably, sex selection of embryos for non-medical reasons is prohibited in Hong Kong and many Western countries; however, it is allowed in the US.

Destinations and sources of information

Our results found that the most popular CBRC destination for Hong Kong couples with infertility was Taiwan. This may be due to the presence of Taiwanese agencies established in Hong Kong who provide local couples with the option of going to Taiwan to undergo CBRC. It may also be associated with the close proximity, relatively lower costs, and potential family ties involving Taiwan.

Importantly, we found that the internet was the major source of information for women in Hong Kong seeking CBRC. Women who intended to go abroad sought information concerning CBRC primarily via the internet, rather than from their local doctors or fertility clinics. This phenomenon is consistent with the findings in another study, which reported that the internet was the main source of information for Swedish, German, and British women seeking CBRC.[12]

Multiple births

For respondents who had engaged in CBRC and reached the point of embryo transfer, the majority had undergone transfer of two embryos. An alarming result of our study was that one of the patients had undergone transfer of four embryos. High-order multiple pregnancies can potentially cause significant morbidity and mortality for the mother and the baby. To reduce the likelihood of multiple births, some countries/places (eg, the United Kingdom and Hong Kong) have placed restrictions on the number of embryos transferred during each cycle. A previous survey found that 14 countries had an upper limit of three embryos, 12 had a limit of four, and six had a limit of five.[18] This indicates that CBRC may pose an increasing challenge for obstetricians and paediatricians due to the increasing likelihood of higher multiple pregnancies from CBRC, which indirectly leads to a burden on the local healthcare system. Clinicians should remind patients about the implications of the number of embryos transferred during CBRC and the potential risk of multiple pregnancy.

Benefits and challenges involving cross-border reproductive care

Potential advantages to CBRC include that it provides

an equal opportunity for treatment, thus improving patient autonomy; however, that autonomy may come at a cost or involve law invasion. Cross-border reproductive care also illustrates the principle of freedom of patient movement, as set out in a 2008 Directive of the European Commission.[19]

The largest potential problem related to CBRC involves patient health and safety. In the context of assisted reproduction treatment, this could include multiple pregnancies, ovarian hyperstimulation syndrome, and infectious disease transmission. The lack of uniform clinical and safety regulations worldwide is further complicated by the lack of policies to govern CBRC. This could mean that patients are disadvantaged, such that they cannot receive information or services that are of a minimum quality standard. The lack of knowledge provided to patients could inhibit their ability to discover potential services. It is often difficult for a patient to assess the standard of quality of a fertility clinic in another country, in terms of infection screening measures, embryology laboratory quality, and risk management measures (eg, gamete and embryo handling). Therefore, patients assume greater risk when they engage in CBRC, compared with fertility treatment in their home country, because of the difference in accessible information. The safety of women in Hong Kong who travel abroad for fertility treatment is jeopardised by the current lack of uniform clinical and safety regulations in other parts of the world.

Strategies to reduce risks associated with cross-border reproductive care

Strategies to minimise the negative impact of CBRC should focus on each of the relevant stakeholders: patients, clinicians, and local regulatory bodies. First, patients who are interested in CBRC should obtain more information prior to engaging in CBRC. They should be aware of the potential complications and the success rate in the destination country centre, then make informed choices for themselves when embarking on fertility treatment in another country. Second, clinicians must educate their patients about the potential risks of CBRC. Clinicians who are collaborating with doctors in other countries to facilitate in CBRC should formulate a clear plan concerning the role of patient management, ensuring that patients' best interests are respected. Clinicians should also resume care of a patient who has returned after receiving CBRC treatment, especially if that patient has encountered complications from fertility treatment during CBRC. Third, in Europe, the European Society of Human Reproduction and Embryology has published a good practice guide for CBRC for centres and practitioners.[2] Such guidelines can help regulators and policy makers create a framework to enable centres to abide by these rules. The Hong Kong SAR Government can also formulate guidance for clinicians and publish advice for patients who are considering CBRC, particularly highlighting the potential problems of CBRC. Over two thirds of respondents in the present study believed that authorities in Hong Kong should formulate some regulations or guidance regarding CBRC.

Limitations and implications

This study had a number of limitations. First, it included patients with infertility who were not pregnant at the time of consultation. Patients who had a successful pregnancy following CBRC would not attend infertility clinics; hence, they would not be included in our sample. This could have led to an underestimation of the use of CBRC. Second, this study only involved heterosexual couples who were legally married, which was a prerequisite for receiving assisted reproduction in Hong Kong. The study did not include single women, single men, or same-sex couples in Hong Kong who probably engaged in CBRC for gamete donation or surrogacy. Third, the infertility centres in this study cannot be considered representative of all infertility centres in Hong Kong. A relatively small number of patients were recruited. A territory-wide study should be performed to further evaluate the state of CBRC in Hong Kong.

Notably, the European Society of Human Reproduction and Embryology recognises that ideal reproductive care involves fair access to good quality treatment in a patient's home country.[2] To ensure fair access to infertility care in Hong Kong, the waiting lists in the public sector should be shortened. Based on the results of this questionnaire study, the current CBRC trend in Hong Kong will presumably continue until the local health authorities implement more effective measures to manage the long waiting lists in the public sector. Patient education on this topic should also be improved.

Conclusion

Nearly one in six women with infertility in Hong Kong had used CBRC. Among women who had not used CBRC, more than one third had planned to use or would consider it. The main factors influencing the likelihood of using CBRC instead of local reproductive care included long waiting times in the public sector and high cost in the private sector. These results will help clinicians to more effectively counsel patients considering CBRC and facilitate infertility services planning by authorities in Hong Kong.

Author contributions

Concept or design: DYT Ng, EHY Ng.
Acquisition of data: All authors.

Analysis or interpretation of data: DYT Ng, EHY Ng.
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All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Ethics approval

The study was approved by the Institutional Review Boards of all participating centres, including the Hong Kong East Cluster Ethics Committee (HKECREC-2018-014); The University of Hong Kong Hong Kong West Cluster Clinical Research Ethics Committee (UW 18-266); Kowloon Central/ Kowloon East Cluster Clinical Research Ethics Committee (KC/KE-18-0073/ER-4); North Territories East Cluster Clinical Research Ethics Committee (NTEC-2018-0384); and the Ethics Panel and the Health Services Subcommittee of the FPAHK (OA1-2).

All participants provided written informed consent to participate in the questionnaire study.

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