Women's Perception on Subfertility Service in Hong Kong

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Objectives: To assess the knowledge, attitude, and practice among women in Hong Kong on subfertility service and treatment.
Methods: This cross-sectional survey was conducted in Department of Obstetrics and Gynaecology of Pamela Youde Nethersole Eastern Hospital, a local regional hospital in Hong Kong. Women aged from 20 to 50 years attending gynaecological clinic and subfertility clinic from June 2013 to October 2013 were invited to complete an anonymous questionnaire.
Results: During the study period, 503 questionnaires collected at the gynaecology outpatient clinic and subfertility clinic were considered valid for analysis. Overall, 113 (22.5%) women had sought advice from subfertility service before while 36 (7%) had undergone subfertility treatment before. Nearly half of the women did not know that fertility was affected by age. Although two-thirds of the participants were aware that the success rate of subfertility treatment dropped with advancing female age, two-thirds of them thought that assisted reproductive technology such as in-vitro fertilisation could overcome the effect of ageing.
Conclusion: This study showed that women in Hong Kong were not aware of the significance and prevalence of subfertility, the subfertility service available, and the importance of the effect of age on fertility and the success rate of assisted reproduction. Early and comprehensive counselling on complications and success rate of subfertility treatments is necessary, so as to allow an informed choice when couples decide to postpone their parenthood.
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Introduction

Subfertility is defined as the failure to conceive after regular unprotected sexual intercourse for 1 year in the absence of known reproductive pathology[1]. It is estimated that subfertility affects one in six couples in the United Kingdom[1]. Assisted reproductive technology (ART) are methods used to achieve pregnancy by artificial or partially artificial means and comprise of ovarian stimulation, intrauterine insemination, in-vitro fertilisation (IVF), donor insemination, and cryopreservation of gametes or embryo.

Delaying childbearing is common nowadays; however, women may not be aware of the implication of this decision such as potential impact of age on their fertility and pregnancy complications at advanced age. Hong Kong's fertility showed a declining trend over the past 30 years, according to a feature article issued in the Hong Kong Monthly Digest of Statistics[2]. The crude birth rate, defined as the number of live births in a calendar year to the mid-year population, declined from 16.8 live births per 1000 population in 1981 to 7.0 in 2003 and then rebounded to 13.5 in 2011[2].

In the Hong Kong society, postponement of marriage and childbearing are considered a major cause of subfertility[3]. With higher education and better professional development, women play an increasingly important role in society. Many women chose to delay their marriage and childbearing till later part of their reproductive age[2,4], without full understanding that postponing their parenthood till mid-30s could have irreversible effect on their chances of getting pregnant, and the potential complications associated with advanced maternal age. A retrospective study conducted in Hong Kong showed that women aged ≥36 years had a significantly lower clinical pregnancy rate per initiated cycle of IVF versus younger women. It

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concluded that ageing has a significant deleterious effect on women's reproductive capability and that women should be encouraged to seek early medical advice and treatment for subfertility[5-7].

Women are encouraged to seek subfertility service early in order to improve their outcomes. According to the guideline issued by the National Institute for Health and Care Excellence[1], couples who do not conceive after 1 year of regular unprotected sexual intercourse should be offered specialist advice and counselling, and receive treatment from a specialist team as this is likely to improve the effectiveness of treatment as well as patient satisfaction. The guideline also suggested that people who are concerned about their fertility should be informed that female fertility declines with age and that the chance of live birth following IVF varies with female age, with the optimal age for IVF treatment ranging from 23 to 39 years[1].

A study exploring women's awareness and perceptions of delay in childbearing conducted by Maheshwari et al[4] showed that almost all participants in the study believed that women should be informed about the implications of delaying childbearing at an early age and that there was a need to provide accurate information to women in the childbearing age.

In Hong Kong, to our knowledge, no studies have been conducted to investigate the readiness of women to seek subfertility service and their awareness of services such as IVF and the associated outcomes. This is important as it would form a basis to direct future health education and promotion, and raise awareness among health care professionals about the needs of subfertile women, and enable them to provide more timely and comprehensive information to those in need of subfertility service[4,6].

The Hong Kong Government had proposed the population policy for public consultation while this study was being conducted. The Hong Kong statistics show that our total fertility rate remains low despite the encouraging rise from the trough of 0.9 child per woman in 2003 to 1.3 children per woman in 2012; however, this rate is hardly adequate to achieve the natural replacement level of 2.1 children per woman[2]. In view of the ageing population, the government wishes to provide a supportive environment for families to raise children, and ART has been proposed as one of the ways to promote childbearing in the subfertility group.

The objective of this study was to assess the knowledge, attitude, and practice among women in Hong Kong on subfertility service and treatment. Primary outcomes included knowledge on significance of subfertility, effect of age on fertility, knowledge on subfertility service and treatment available with the associated outcomes and complications, as well as factors affecting the women's decision to seek subfertility service.

Methods

This cross-sectional questionnaire study was conducted in a local regional hospital in Hong Kong. Women aged from 20 to 50 years attending gynaecology clinic and subfertility clinic from June 2013 to October 2013 in Department of Obstetrics and Gynaecology of Pamela Youde Nethersole Eastern Hospital (PYNEH) and who could read Chinese and English were invited to participate. Eligible women were recruited in the gynaecology and subfertility clinics by nurses at their first visit or subsequent follow-up. Written consent was obtained from these women. This study was approved by the Hong Kong East Cluster Ethics Committee and was conducted in full conformance with the International Conference on Harmonisation E6 guideline for Good Clinical Practice and the principles of the Declaration of Helsinki.

Participants in the study were asked to complete a self-administered questionnaire comprising 33 items (Appendices 1 and 2). This questionnaire was developed, piloted among women attending gynaecology clinic and subfertility clinic, and amended to facilitate data collection and improving the effectiveness. Written information including the objective and details of the study was provided to the participants before completing the questionnaire.

Sample size calculation was based on the formula comprising confidence level, prevalence rate of subfertility, and population prevalence rate. Assuming 95% confidence interval (CI), estimated prevalence rate of 0.15 (1 out of 6-7 couples), and margin of error as 0.05, the sample size was 196. Assuming a dropout rate of 20%, the final sample size deemed sufficient to identify those who would seek subfertility service was 245.

Demographic data of the participants were obtained from both the questionnaire and medical record of the participants. Primary outcome measures included knowledge of participants on subfertility service in Hong Kong, perception of the need for subfertility service, factors affecting their decision to seek advice and some overview of ART. As the participants' perception depended on their individual situations and need for future fertility,

this was also explored in the questionnaire. Significantly incomplete questionnaires and duplicated questionnaires were excluded from the analysis.

The data collected in this study were kept confidential. Only the researcher and designated staff of the Department of Obstetrics and Gynaecology of PYNEH were permitted access to the research materials.

All statistical analyses of data were done with PASW Statistics 18, Release Version 18.0.0 (SPSS, Inc., 2009, Chicago [IL], US). For categorical data, the Chi-square test and Fisher's exact test were used according to the data pattern. For continuous data with a highly skewed distribution, a non-parametric test (i.e. Mann-Whitney *U* test) was used. The critical level of statistical significance was set at 0.05. Statistically significant variables were adopted as potential predictors and entered into logistic regression to look for significant factors for willingness to seek subfertility service. The multiple logistic regression analysis (backward elimination procedure) was performed by including variables found to be significant at the level of $p<0.2$ by univariate analysis.

In order to investigate the structure of factors deterring subjects from seeking subfertility service, an exploratory factor analysis (i.e. principal component analysis) with varimax rotation was performed. An exploratory factor analysis was chosen (instead of a confirmatory factor analysis) because the factor structure of the instrument was still rather uncertain; hence, such factor analysis seemed more appropriate. The number of factors to be extracted was based on the results from the scree plots, and the Kaiser eigenvalue criterion (eigenvalues >1). Missing values were excluded listwise. The quality of the factor analysis models was assessed using Bartlett's test for sphericity and the Kaiser-Meyer-Olkin test.

Results

A total of 580 questionnaires were collected at the gynaecology outpatient clinic as well as subfertility assessment clinic during the study period. Two questionnaires were excluded because those were answered by participants not in the prescribed age range. Overall, 578 questionnaires which fulfilled the inclusion criteria were included, of which 75 were excluded due to significantly incomplete data (Figure). The response rate, defined as the number of completed questionnaires (n=503) divided by the number of eligible participants who fulfilled the inclusion criteria, was 87%. Thus, 503 questionnaires were available for analysis.

Of the 503 questionnaires available for analysis, 454 (90.3%) participants came from the gynaecology outpatient clinic whereas 49 (9.7%) were from the subfertility clinic. Their median age was 38 years. Overall, 189 (37.6%) participants wished to have children in future. The median age of those who wished to have children in future was 32 (range, 21-47) years. With regard to education, 188 (37.4%) had received tertiary education or above. A majority (84.3%) of the participants earned a monthly income of <HK$30,000 (Table 1). A monthly income of HK$30,000 was chosen as a cutoff for analysis because the median monthly domestic household income

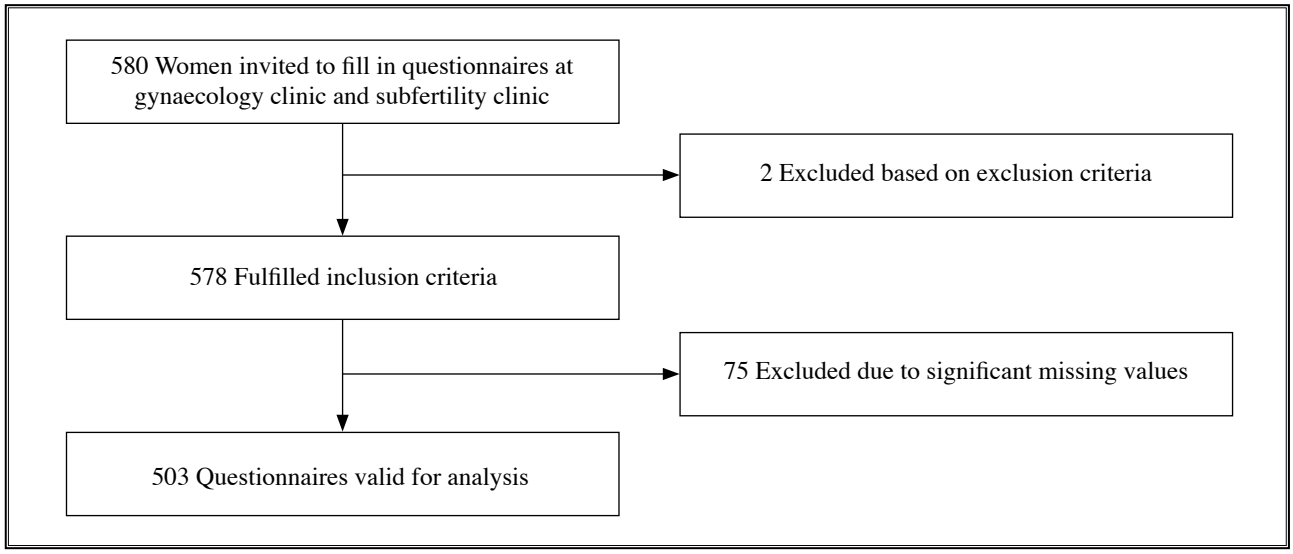

Figure. Flowchart illustrating the recruitment of women in the study

Table 1. Demographic data of study participants (n=503)

	Data
Mean age (years)	37.79
Median (range) age (years)	38 (32-44)
Place of recruitment	
Gynaecology outpatient clinic	454 (90.3%)
Subfertility clinic	49 (9.7%)
Marital status	
Married	362 (72.0%)
Single	135 (26.8%)
Others (e.g. divorced)	6 (1.2%)
Previous pregnancies	
Yes (can choose more than one answer)	307 (61.0%)
Live birth	258 (51.3%)
Miscarriage	86 (17.1%)
Termination of pregnancy	86 (17.1%)
Ectopic pregnancy	7 (1.4%)
No	196 (39.0%)
Plan for future pregnancy	
Yes	189 (37.6%)
No	291 (57.9%)
Missing data	23 (4.6%)
Education level	
No formal education	4 (0.8%)
Primary school	13 (2.6%)
Secondary school	294 (58.4%)
Tertiary level	158 (31.4%)
Master / Doctorate degrees	30 (6.0%)
Missing data	4 (0.8%)
Occupation	
Managers and administrators	15 (3.0%)
Professionals	62 (12.3%)
Associate professionals	50 (9.9%)
Clerks	125 (24.9%)
Service workers and shop sales	78 (15.5%)
Skilled agricultural and fishery	5 (1.0%)
Elementary occupations	14 (2.8%)
Students	5 (1.0%)
Housewives	93 (18.5%)
Unemployed / retired	14 (2.8%)
Missing data	42 (8.3%)
Monthly income (HK$)	
No income	62 (12.3%)
<10,000	125 (24.9%)
10,000-29,999	237 (47.1%)
30,000-50,000	42 (8.3%)
>50,000	12 (2.4%)
Missing data	25 (5.0%)
Religious belief	
None	303 (60.2%)
Buddhism	58 (11.5%)
Christianity	29 (5.8%)
Catholic	90 (17.9%)
Islam	3 (0.6%)
Others	2 (0.4%)
Missing data	18 (3.6%)
Method(s) of contraception used	
None	219 (43.5%)
Withdrawal method	28 (5.6%)
Calendar method	10 (2.0%)
Barrier method	173 (34.4%)
Hormonal contraception	22 (4.4%)
Intrauterine device	17 (3.4%)
Male or female sterilisation	15 (3.0%)
Others	7 (1.4%)
Missing data	12 (2.4%)
Attended or sought advice from subfertility service in Hong Kong before	
Yes (can choose more than one answer)	113 (22.5%)
Family Planning Association	35 (7.0%)
Public hospital	49 (9.7%)
Private doctor	47 (9.3%)
No	388 (77.1%)
Missing data	2 (0.4%)

in 2013 was around that amount according to government statistics[8].

Women who had had previous pregnancies were more willing to seek subfertility service than those who had not been pregnant before (55% vs. 45%; p<0.01) [Table 2]. This result was also consistent with the natural understanding that people who had family planning were more likely to consider ART than those who had no such plans (74% vs. 43%; p<0.001) [Table 3]. Those with tertiary or higher level of education were more likely to seek ART advice and consider ART than those with secondary or lower education level (32% vs. 16% for subfertility service, and 66% vs. 49% for ART consideration; both p<0.001) [Table 4]. It was also found that those with monthly income of ≥HK$30,000 were more likely to seek subfertility service and consider ART than those lower monthly income (43% vs. 20% for subfertility service [p<0.001], and 78% vs. 53% for ART service [p=0.02]) [Table 5].

Previous Experience with Subfertility Service

In our study, 113 (22.5%) women had sought advice from subfertility service in Hong Kong before (Table 1). These women were more likely to consider subfertility treatment in future than those who had never sought advice from subfertility service (80% vs. 48%; p<0.001) and those who wished to have children in future (89% vs. 67%; p<0.001) [Table 6]. Women who had plans of starting a family (odds ratio [OR], 3.33; 95% CI=2.20-5.05) and those who had consulted subfertility service before (OR, 2.93; 95% CI=1.73-5.00) were more willing to seek subfertility service than those who had not have immediate plans of starting a family and those who had never consulted subfertility service, respectively (Table 7).

Overall, 36 (7%) women had undergone a subfertility procedure or ART before. Among those women who had undergone ART before, the majority (58%) had obtained their information about ART via counselling with gynaecology specialists (Table 8). Women who had had subfertility treatment before were more likely than their counterparts to consider the same treatment (100% vs. 52%; p<0.001). This was true both for the whole study cohort as well as for the subgroup analysis among those who wished to have children in future (100% vs. 70%; p<0.001) [Table 9].

Readiness for Subfertility Service

As for the perception on subfertility service in Hong Kong, more than half of the participants (55.1%) thought

Table 2. Association between demographics and willingness to seek subfertility service (assuming that patients had not been able to conceive after trying for a certain period of time)*

Demographics	Not willing / not known to seek advice (n=226)	Willing to seek advice (n=277)	p Value
Median (range) age (years)	41 (35-45)	36 (32-42)	0.001
Place of recruitment			<0.001
Gynaecology outpatient clinic	226 (100%)	228 (82.3%)	
Subfertility clinic	0	49 (17.7%)	
Marital status			1
Married	162 (71.7%)	200 (72.2%)	
Single	61 (27.0%)	74 (26.7%)	
Others (e.g. divorced)	3 (1.3%)	3 (1.1%)	
Previous pregnancies			0.01
Yes	152 (67.3%)	155 (56.0%)	
No	74 (32.7%)	122 (44.0%)	
Education level†			<0.001
No formal education	1 (0.4%)	3 (1.1%)	
Primary school	10 (4.5%)	3 (1.1%)	
Secondary school	149 (66.8%)	145 (52.5%)	
Tertiary level	56 (25.1%)	102 (37.0%)	
Master / Doctorate degrees	7 (3.1%)	23 (8.3%)	
Missing data	3	1	
Monthly income (HK$)†			0.001
<10,000	68 (31.8%)	57 (21.6%)	
10,000-29,999	101 (47.2%)	136 (51.5%)	
30,000-49,999	10 (4.7%)	32 (12.1%)	
>50,000	2 (0.9%)	10 (3.8%)	
No income	33 (15.4%)	29 (11.0%)	
Missing data	12	13	
Religious belief†			0.67
None	136 (62.1%)	167 (62.8%)	
Buddhism	31 (14.2%)	27 (10.2%)	
Christianity	11 (5.0%)	18 (6.8%)	
Catholic	38 (17.4%)	52 (19.5%)	
Islam	2 (0.9%)	1 (0.4%)	
Others	1 (0.5%)	1 (0.4%)	
Missing data	7	11	

* Categorical data were analysed by Chi-square test or Fisher's exact test. Continuous data were analysed by Mann-Whitney *U* test

† Missing data were excluded from the calculation of percentages

Table 3. Effect of women's family planning on their willingness to consider assisted reproductive technology (n=480)

Willingness to consider assisted reproductive technology	Family planning		p Value
	Yes (n=189)	No (n=291)	
Yes	141 (74%)	125 (43%)	<0.001*
No	47 (25%)	163 (56%)	
Unknown	1 (1%)	3 (1%)	

* Fisher's exact test

Table 4. Effect of education level on women's readiness to seek subfertility service and willingness to consider assisted reproductive technology (n=497)

	Secondary education or below	Tertiary education or above	p Value
Readiness to seek subfertility service (n=497)			
Yes	51 (16%)	61 (32%)	<0.001*
No	258 (84%)	127 (68%)	
Willingness to consider assisted reproductive technology (n=499)			
Yes	151 (49%)	125 (66%)	<0.001†
No	157 (50%)	62 (33%)	
Unknown	3 (1%)	1 (1%)	

* Pearson Chi-square test
† Fisher's exact test

Table 5. Effect of monthly income on women's readiness to seek subfertility service and willingness to consider assisted reproductive technology (n=416)

	Monthly income		p Value
	<HK$30,000	≥HK$30,000	
Readiness to seek subfertility service (n=414)			
Yes	72 (20%)	23 (43%)	<0.001*
No	288 (80%)	31 (57%)	
Willingness to consider assisted reproductive technology (n=415)			
Yes	192 (53%)	42 (78%)	0.02†
No	167 (46%)	12 (22%)	
Unknown	2 (1%)	0	

* Pearson Chi-square test
† Fisher's exact test

Table 6. Effect of women's experience about seeking subfertility service on their likelihood of considering subfertility treatment in future

Group	Sought subfertility service before		p Value
	Yes	No	
Whole group (n=501)			
Will consider ART in future	90 (80%)	186 (48%)	<0.001*
Will not consider ART in future	22 (19%)	199 (51%)	
Unknown	1 (1%)	3 (1%)	
Those with family planning (n=187)			
Will consider ART in future	59 (89%)	81 (67%)	<0.001*
Will not consider ART in future	7 (11%)	39 (32%)	
Unknown	0	1 (1%)	

Abbreviation: ART = assisted reproductive technology
* Fisher's exact test

Table 7. Unadjusted and age-adjusted odds ratios for women's willingness to seek subfertility service

	Unadjusted odds ratio (95% confidence interval)	Age-adjusted odds ratio (95% confidence interval)	p Value
Had family planning	3.33 (2.20-5.05)	3.09 (1.87-5.11)	<0.001
Consulted subfertility service before	2.93 (1.73-5.00)	2.99 (1.76-5.06)	<0.001

Table 8. Attempted assisted reproductive technology and source of information

	Data
Attempted subfertility treatment or assisted reproductive technology before?	
Yes (can choose more than one answer)	36 (7%)
Ovarian stimulation (oral or injections)	28 (6%)
Intrauterine insemination	13 (3%)
In-vitro fertilisation with / without embryo cryopreservation	9 (2%)
Egg cryopreservation	1 (0.2%)
Sperm cryopreservation	0
Recipient of egg or sperm donation	0
Others	0
No	467 (93%)
How did they obtain information on subfertility service (can choose more than one answer)?	
Friends or peers	9 (25%)
Television / newspaper / websites	3 (8%)
Counselling by general practitioner or family doctor	5 (14%)
Counselling by gynaecology specialists	21 (58%)
Counselling by Family Planning Association	4 (11%)
Others	0

Table 9. Effect of women's experience of having subfertility treatment on their likelihood of considering subfertility treatment in future

Group	Had ART before		p Value
	Yes	No	
Whole group (n=503)			
Will consider ART in future	36 (100%)	241 (52%)	<0.001*
Will not consider ART in future	0	222 (47%)	
Unknown	0	4 (1%)	
Those with family planning (n=189)			
Will consider ART in future	27 (100%)	114 (70%)	<0.001*
Will not consider ART in future	0	47 (29%)	
Unknown	0	1 (1%)	

Abbreviation: ART = assisted reproductive technology

* Fisher's exact test

that the incidence of subfertility was less than one in six couples and 211 (42.9%) women agreed that couples should seek subfertility service if they did not conceive after 1 year of regular, unprotected sexual intercourse (Table 10).

When asked about factors that affected their decision to seek subfertility service, the most important factor was "failure to conceive naturally after trying for some years" (70.4%). Other factors included advanced maternal age

Table 10. Perception of need for subfertility service (n=503)*

	Data
Incidence of subfertility in heterosexual couples	
1 In 4	68 (13.5%)
1 In 5	48 (9.5%)
1 In 6	**77 (15.3%)**
1 In 8	68 (13.5%)
1 In 10	209 (41.6%)
Do not know	33 (6.6%)
Number of year(s) should wait before consulting subfertility service, when no pregnancy occurred after regular unprotected sexual intercourse (2-3 times per week) [n=492]	
1 Year	**211 (42.9%)**
2 Years	168 (34.1%)
3 Years	93 (18.9%)
4 Years	10 (2.0%)
5 Years	10 (2.0%)
Consider seeking subfertility service assuming that you have not been able to conceive after trying for the above period of time	
Yes	277 (55.1%)
No	222 (44.1%)
Unknown	4 (0.8%)
Factor(s) leading to the decision of seeking subfertility service (n=277)	
Advanced maternal age	166 (59.9%)
Advanced paternal age	47 (17.0%)
Failure to conceive naturally after trying for some years	195 (70.4%)
Family or peer pressure	50 (18.1%)
Recommendation by health care professional	48 (17.3%)
Advice or experience from friends who have had subfertility service before	21 (7.6%)
Previous tubal surgery / previous endometriosis or abnormal investigations results such as blocked tube	33 (11.9%)
History of miscarriage	26 (9.4%)
Others	7 (2.5%)
Statement(s) related to assisted reproductive technology you think is / are true concerning effect of age on pregnancy:	
Subfertility and age are not related (n=486)	
True	203 (41.8%)
False	**249 (51.2%)**
Do not know	34 (7.0%)
Delaying childbearing is associated with increased chance of miscarriage (n=490)	
True	**359 (73.3%)**
False	74 (15.1%)
Do not know	57 (11.6%)
Egg quality decreases with age (n=493)	
True	**404 (81.9%)**
False	31 (6.3%)
Do not know	58 (11.8%)
Risk of chromosomal abnormalities increases with age (n=485)	
True	**325 (67.0%)**
False	40 (8.2%)
Do not know	120 (24.7%)
Success rate of assisted reproductive technology drops as the age of female partner increases (n=487)	
True	**327 (67.1%)**
False	53 (10.9%)
Do not know	107 (22.0%)
Fertility is even lower at age >40 years, even with in-vitro fertilisation (n=490)	
True	**298 (60.8%)**
False	73 (14.9%)
Do not know	119 (24.3%)
Do you agree that assisted reproductive technology such as in-vitro fertilisation could overcome the effect of ageing? (n=495)	
Yes	335 (67.7%)
No	**160 (32.3%)**

* Rows in bold denote correct or recommended options

(59.9%), family or peer pressure (18.1%), recommendation by health care professional (17.3%), and advanced paternal age (17.0%) [Table 10].

Table 11 illustrates the factors that deterred women from seeking subfertility service. The most important deterrent factors were "personal belief that nature should take its course" (59%) and "lack of support from partner or partner's refusal to seek advice" (47%). When we grouped the deterrent factors into two main categories: "personal perception factors" and "resource factors" for further analysis, we found that "personal belief that nature should take its course" was the most important 'personal perception' factor while "cost involved in undergoing subfertility treatment" was the most important 'resource' factor.

Knowledge and Perception on Assisted Reproductive Technology

Concerning the perception about ARTs, more than half of the participants were correct in identifying that subfertility was affected by age, the fact that delaying childbearing would increase the risk of miscarriage and chromosomal abnormalities, and that fertility rate was even lower at age above 40 years, even with IVF. Overall, 327 (67.1%) women were aware that success rate of ART drops with advancing female age, and the majority (81.9%) of women knew that egg quality decreases with age. However, only 160 (32.3%) women were aware that ARTs such as IVF could not overcome the effect of ageing (Table 10).

Within our study, when asked about the knowledge on subfertility service and ART in Hong Kong, more than 60% of women reported that they had heard about the various ARTs. However, only 20% to 55% were aware of the potential complications associated with ARTs such as ovarian hyperstimulation syndrome, multiple pregnancy, miscarriage, and ectopic pregnancy. When compared with the counterparts, a significantly higher proportion of those who had attended or sought advice from subfertility service before knew that female aged over 40 years would affect pregnancy rate of IVF and were aware that ovarian hyperstimulation syndrome and multiple pregnancies were potential complications of ART. Only around 40% of the participants knew that there was an age limit for publicly funded subfertility treatment in Hong Kong (Table 12).

As for the opinion about the resources and provision of ART service, only 11 (2%) women were happy with the 30-to-36-month waiting time from referral to first IVF cycle. A majority of them (85%) thought that 24 months was the maximum waiting time they could accept. The maximum charge that the majority of women (74%) could accept for one cycle of IVF was below HK$20,000 (Table 13).

In all, 463 (94%) women agreed that couples should be seen together during subfertility counselling and treatment. Among those who had undertaken ART before, "doctors in charge of their subfertility service" (72%) and "specialised subfertility nurses" (72%) were both equally important in providing support to the couple, followed by family members (58%), support groups who had undertaken ART before (53%), friends (36%), clinical psychologist (22%), and social worker (8%) [Table 14].

We found that more than 80% of the participants in this study would like to have further information on subfertility service. Among these, 64% with fertility plan wished to have more counselling from their gynaecology specialists; 56% suggested acquiring more information

Table 11. Factors deterring women from seeking subfertility service

Factor	Data
Personal belief that nature should take its course (n=344)	204 (59%)
Lack of support from partner or partner's refusal to seek advice (n=340)	158 (47%)
Lack of information and source for referral (n=341)	35 (10%)
Long waiting time (n=340)	35 (10%)
Cultural difficulty in discussion on fertility issue (n=336)	29 (9%)
Cost involved in undergoing subfertility treatment (n=342)	25 (7%)
Religious reason (n=333)	22 (7%)
Social stigmatisation (n=337)	22 (7%)
Ethical concerns (n=336)	22 (7%)

Table 12. Knowledge on subfertility service and ART in Hong Kong*

	Data
Have you heard of the types of subfertility service or ART services available in Hong Kong, either in public or private sector?	
Ovarian stimulation (oral or injections) [n=474]	
Yes	301 (63.5%)
No	173 (36.5%)
IUI (n=479)	
Yes	397 (82.9%)
No	82 (17.1%)
IVF with embryo cryopreservation (n=481)	
Yes	403 (83.8%)
No	78 (16.2%)
Eggs cryopreservation (n=462)	
Yes	320 (69.3%)
No	142 (30.7%)
Sperm cryopreservation (n=462)	
Yes	336 (72.7%)
No	126 (27.3%)
Egg donation (n=458)	
Yes	291 (63.5%)
No	167 (36.5%)
Sperm donation (n=461)	
Yes	347 (75.3%)
No	114 (24.7%)
For women aged between 35 and 40 years, what do you think is the approximate pregnancy rate for each IVF-ET cycle in Hong Kong? (n=475)	
0-20%	75 (15.8%)
21-40%	**181 (38.1%)**
41-60%	170 (35.8%)
61-80%	46 (9.7%)
81-100%	3 (0.6%)
In your opinion, do you think that the following is / are factor(s) affecting the pregnancy outcome in IVF?	
Female age >40 years (n=486)	
Yes	**323 (66.5%)**
No	75 (15.4%)
Do not know	88 (18.1%)
Male age >40 years (n=476)	
Yes	146 (30.7%)
No	**230 (48.3%)**
Do not know	100 (21.0%)
Maternal smoking (n=485)	
Yes	**378 (77.9%)**
No	31 (6.4%)
Do not know	76 (15.7%)
Passive smoking (n=478)	
Yes	**328 (68.6%)**
No	43 (9.0%)
Do not know	107 (22.4%)
Body mass index of women >30 kg/m^2 (n=480)	
Yes	**224 (46.7%)**
No	47 (9.8%)
Do not know	209 (43.5%)

Abbreviations: ART = assisted reproductive technology; ET = embryo transfer; ICSI = intracytoplasmic sperm injection; IUI = intrauterine insemination; IVF = in-vitro fertilisation

* Rows highlighted in bold denote correct or recommended options

Table 12. (cont'd)

	Data
Duration of subfertility (n=481)	
Yes	**270 (56.1%)**
No	61 (12.7%)
Do not know	150 (31.2%)
Previous ovarian surgery (n=485)	
Yes	**274 (56.5%)**
No	49 (10.1%)
Do not know	162 (33.4%)
Do you think the following is / are potential complication(s) associated with ART?	
Ovarian hyperstimulation syndrome (n=487)	
Yes	**194 (39.8%)**
No	37 (7.6%)
Do not know	256 (52.6%)
Multiple pregnancy (n=488)	
Yes	**269 (55.1%)**
No	47 (9.6%)
Do not know	172 (35.2%)
Spontaneous miscarriage (n=488)	
Yes	**239 (49.0%)**
No	57 (11.7%)
Do not know	192 (39.3%)
Ectopic pregnancy (n=486)	
Yes	**177 (36.4%)**
No	88 (18.1%)
Do not know	221 (45.5%)
Breast cancer (n=486)	
Yes	70 (14.4%)
No	**136 (28.0%)**
Do not know	280 (57.6%)
Ovarian cancer (n=483)	
Yes	104 (21.5%)
No	**101 (20.9%)**
Do not know	278 (57.6%)
Structural congenital abnormality (n=482)	
Yes	**91 (18.9%)**
No	105 (21.8%)
Do not know	286 (59.3%)
Chromosomal abnormality with ICSI (n=482)	
Yes	**92 (19.1%)**
No	105 (21.8%)
Do not know	285 (59.1%)
Premature menopause (n=486)	
Yes	77 (15.8%)
No	**115 (23.7%)**
Do not know	294 (60.5%)
Are you aware of any age limit for publicly funded subfertility treatment in Hong Kong? (n=462)	
Yes	181 (39.2%)
No	281 (60.8%)
Are you aware of the following patient selection criteria for publicly funded IVF services in public hospital in Hong Kong?	
Couple needs to be legally married (n=492)	
Yes	**326 (66.3%)**
No	166 (33.7%)
There is no living child for the current marriage (n=484)	
Yes	**197 (40.7%)**
No	287 (59.3%)
Woman must not be more than 40 years old at the time the procedure is initiated (n=489)	
Yes	**130 (26.6%)**
No	359 (73.4%)

Table 13. Resources for and opinions about assisted reproductive technology services

Item	Data
Maximum waiting time (from referral to first IVF cycle) that you could accept (n=482)	
<12 Months	163 (34%)
12 To <18 months	140 (29%)
18 To <24 months	106 (22%)
24 To <30 months	25 (5%)
30 To 36 months	11 (2%)
>36 Months	37 (78%)
Will seek IVF service from private if the waiting time is longer than you accept (n=491)	
Yes	259 (53%)
No	232 (47%)
The maximum charge (HK$) you could accept for one cycle of IVF (n=483)	
<10,000	201 (41%)
10,000-20,000	158 (33%)
20,001-30,000	72 (15%)
30,001-40,000	18 (4%)
40,001-50,000	21 (4%)
>50,000	13 (3%)
Do you think couples should be seen together during subfertility counselling and treatment? (n=491)	
Yes	463 (94%)
No	28 (6%)
Studies showed that undergoing subfertility counselling and treatment could be stressful for couples, whom / where do you think the couple would like to have support from (can choose more than one answer)? (n=503)	
Family members	322 (64%)
Friends	174 (35%)
Support groups and peers	245 (49%)
Doctors in charge of their subfertility service	315 (63%)
Specialised subfertility nurses	228 (45%)
Clinical psychologist	166 (33%)
Social worker	80 (16%)
Do you think family planning and fertility counselling service should be given early routinely, such as during premarital counselling? (n=496)	
Yes	433 (87%)
No	63 (13%)
Do you wish to obtain more information on subfertility service in Hong Kong? (n=494)	
Yes (can choose more than one answer)	323 (65%)
Television / newspaper / websites	221 (45%)
Educational talks	108 (22%)
General practitioner or family doctor	92 (19%)
Gynaecology specialists	186 (38%)
Family Planning Association	161 (33%)
Others	8 (2%)
No	171 (35%)

Abbreviation: IVF = in-vitro fertilisation

Table 14. From where and whom women who had subfertility treatment wanted support (n=36)

	Data
Family members	21 (58%)
Friends	13 (36%)
Support groups and peers who had assisted reproductive technology treatment before	19 (53%)
Doctors in charge of their subfertility service	26 (72%)
Specialised subfertility nurses	26 (72%)
Clinical psychologist	8 (22%)
Social worker	3 (8%)

Table 15. Readiness to obtain more information on subfertility service for women who had family planning and their preferred method of communication of information (n=139)

	Data
Wish to obtain more information on subfertility service in Hong Kong	
Yes (can choose more than one answer)	121 (87%)
Television / newspaper / websites	78 (56%)
Educational talks	46 (33%)
General practitioner or family doctor	47 (34%)
Gynaecology specialists	89 (64%)
Family Planning Association	62 (45%)
Others	5 (4%)
No	18 (13%)

about ART via television, newspapers, and websites; 45% wished for more information on ART from the Family Planning Association; and around 33% for each hoped to obtain relevant information via both educational talks and their general practitioner (Table 15). Overall, 87% of women agreed that family planning and fertility counselling services should be routinely provided early, such as during premarital counselling (Table 13).

Discussion

To our knowledge, this is the first study in Hong Kong to investigate the knowledge and attitude of women on subfertility service in Hong Kong. The response rate in our study was 87%, which was acceptable as subfertility did not seem to be a common problem among our study participants. Overall, 55% of the women did not believe that subfertility affected one out of six couples, as reported by the Family Planning Association of Hong Kong[5]. More than 20% of women had sought advice from subfertility service before, while around 7% had experience in subfertility treatment. These results align with the report from the Centers for Disease Control and Prevention that approximately 10% of women (6.1 million) in the United States, aged 15 to 44 years, had difficulty getting pregnant[9].

Nearly 40% of participants in our study wished to have children in future, and the median age of these women was 32 years. This result was consistent with that from a cross-sectional study by Maheshwari et al[4] who investigated the awareness and perception of issues surrounding delay in childbearing; they suggested that subfertile women were more likely to have tried for their first pregnancy after the age of 30 years. The above study also showed that 85% of the women in the subfertile group were overly optimistic about the ability of IVF to overcome the effect of age on fertility[4,7]. This was also reflected in our study with more than two-thirds of participants having the misconception that ARTs such as IVF could overcome the effect of ageing, although 67.1% of the women knew that the success rate of fertility treatment dropped with advancing female age.

Epidemiological data have consistently shown

that fertility declines as early as in the middle of the third decade[10,11], and female age remains the most important determinant of success in an IVF programme[12,13]. In our study, only around 38% of women were aware that success rate for each IVF cycle was around 30% for age between 35 and 40 years; 46% of women overestimated the pregnancy rate with each IVF cycle. According to the statistics of the subfertility centre in Queen Mary Hospital, Hong Kong, in 2009, just over half of the patients undergoing subfertility treatment were aged between 36 and 40 years, while 5.5% were over the age of 40 years[14]. Lack of education and the misconception that IVF could overcome the effect of ageing are possible reasons for the lack of awareness among women in Hong Kong about the effect of age on fertility and success rate of IVF treatment.

In Hong Kong, there were three publicly funded IVF centres, with the waiting time from referral to first IVF cycle being a mean of 36 months[14,15]. Recruitment guideline in the Hospital Authority for IVF also limits public ART to those under the age of 40 years at the time of treatment[14], making many of those referred ineligible by the time they receive an appointment for their first IVF cycle. According to reports by the Council on Human Reproductive Technology[16], 4025 women had undergone IVF in 2011 and 4924 treatment cycles had been initiated. The number of people who had undergone ART increased from 4968 in the year 2009 to 8668 in the year 2010 and to 10,436 in the year 2011. Ongoing pregnancy rate was around 33% for those aged between 31 and 35 years; nearly 25% for those aged between 36 and 40 years; and even lower for those aged between 41 and 45 years, at only about 15%.

The majority of women in our study were unaware of the potential complications associated with ART[13,17]. In fact, complications of subfertility treatment were relatively uncommon. Report from Queen Mary Hospital[14] showed that 1.3% of women developed moderate-to-severe ovarian hyperstimulation syndrome among the 396 oocyte retrieval cycles in 2009, and 0.3% developed infections. The rate of multiple pregnancy was 23.8%[14]. Most of the women thought that the waiting time of 30 to 36 months from referral to first IVF cycle as in publicly funded IVG was not acceptable. While the option of fertility treatment in the private sector is available, this cannot be utilised by a majority of women as the cost (around HK$70,000 per cycle of IVF) far exceeds what most couples can afford.

Although one out of six couples would be in need of subfertility service[18], there are many barriers for obtaining subfertility service and undergoing subfertility treatment. Women with tertiary or higher level of education are more likely to seek ART advice and consider ART than those with secondary or lower education level. It was also found that those with monthly income of ≥HK$30,000 were more likely to seek subfertility service and consider ART than those with monthly income <HK$30,000. These data were consistent with the common belief in women that ART is expensive.

In fact, on investigating factors which acted as deterrents against seeking subfertility service, we found that many believed in "let nature takes its course". Although having children and whether to choose to seek subfertility counselling was the couples' choice, those who might still have a strong wish to start a family may be deterred by the lack of understanding about subfertility service and treatment. In reality, limitations exist in the provision of publicly funded subfertility service, including "cost involved in undergoing subfertility treatment", "lack of referral", and "long waiting time". Other social factors include cultural difficulty in discussing the fertility issue, social stigmatisation, ethical concerns, and religious considerations.

Married couples who fail to bear children are commonly stigmatised[19]. Social impact of subfertility cannot be underestimated. Many women perceive subfertility as a personal failure, a sign of incompleteness as a woman; it can even affect their marital relationship. While traditional Chinese culture is in favour of letting nature takes its course, many have ignored the importance of the irreversible factor on fertility, which is age.

A study by Loke et al[20] involving interviews of seven women and four men in Hong Kong showed that couples in subfertility treatment reported feelings of incompleteness, guilt, shame, and isolation from those with children. These couples regretted not having earlier treatment. A few were resentful that no one had ever mentioned about subfertility services to them. The study, thus, recommended that family planning be incorporated into premarital screening, and emphasised timely provision of support and counselling. This was concordant with our finding that support from the team involved in subfertility care, including from "doctors in charge of their subfertility service" and "specialised subfertility nurse", was of great importance to those who had undergone ART. Besides, family members, support groups, friends, clinical psychologist, and social worker also play a crucial role in providing psychosocial support for the couples. These findings underscore the importance of raising public awareness on subfertility.

Increasing the government subsidy for publicly funded subfertility service can be helpful. However, it is also important that doctors in primary care and gynaecologists to identify couples in need and provide timely referrals and treatment[6]. Our study found that, for those who had attended subfertility service or had undertaken subfertility treatment before, the majority had obtained information about ART from their gynaecologists.

More than 60% of participants in our study would like to have more information on subfertility service. The most preferred channel of communication for ART service was during consultation with their gynaecologists and health care professionals, followed by media publicity of subfertility service on television. Hence, the attitude of gynaecologists or primary care doctors towards promoting ART is important. A study by Bonetti et al[21] investigating the awareness and attitudes of professionals towards assisted reproduction found that almost all the 70 ART professionals would willingly undergo IVF if they were faced with a diagnosis of infertility. Gynaecologists or primary care doctors have an invaluable opportunity to discuss about family planning during consultation with their patients so as to allow timely referral and treatment for age-related subfertility problems[22].

There were some limitations in our study. Firstly, this cross-sectional study included a heterogeneous group of women recruited from both the gynaecology as well as subfertility clinics. Although women from the gynaecology clinic could provide a fair representation of the general population, there could be a bias when assessing their knowledge and attitudes on subfertility service as these are on a "need-to-know" basis. Those women who had naturally conceived before, those who had completed a family or who had no wish to have children in future would understandably have less knowledge and readiness to seek subfertility service. Since around 60% of participants had no wish to have children in future, this could affect the incentive for these women of completing the questionnaire and their perception on subfertility treatment.

On the other hand, subgroup analysis of those who wished to have children in future helped to demonstrate significant findings such as differences in the attitude and knowledge between those who had had ART before and those who had not. Moreover, one could argue that subfertility service, although serving only around one out of six couples, should be publicised by the government and be known to all Hong Kong citizens, as this could, in turn, help to raise the acceptance and understanding of ART among the public, and minimise social stigmatisation for those receiving fertility treatments.

Secondly, the view of the male counterparts on subfertility service was not addressed in this study. Male partners are equally important in making a decision on the issue of family planning and seeking subfertility service[20]. Our study demonstrated that "lack of support from partner or partner's refusal to seek advice" was one of the deterrent factors[20] and, thus, future studies could be performed to investigate the view of male partners on subfertility treatment. Furthermore, the view of health care providers on subfertility service was not explored in this study.

Thirdly, most of the participants in our study were of Chinese origin; there could be cultural bias by which Chinese women less readily accept ART as an alternative way of fulfilling their natural responsibility of passing on the family genes versus women from other ethnicities[20,23].

Conclusion

It is of no doubt that the success rate of subfertility treatment declines with age[16] and early advice and treatment bring better outcomes. Many subfertile couples wish they were told earlier of the availability of subfertility service[20]. Most of the participants in our study agreed that fertility counselling service should be routinely given early, for instance, at the time of premarital counselling. Therefore, it is not only the duty of the government to provide public education with regard to the optimal time for childbearing, but also, more importantly, the responsibility of health care professionals who might already have rapport with these women. During their consultations, gynaecologists could play an important role in exploring the fertility issue, which might be culturally sensitive and personally awkward for many couples, while respecting their decisions towards the subfertility service[6]. Early and comprehensive counselling on complications and success rates of subfertility treatments is also important, as this allows informed choice when couples decide to postpone their fertility plan. This, at the same time, would avoid giving couples a false sense of hope towards treatment outcomes.

To our knowledge, no study has been conducted to explore the perception and readiness of health care professionals in Hong Kong in promoting subfertility service. This is an important issue as it affects the accessibility of ART for couples in need. Education of health care professionals and encouraging gynaecologists to bring up the issue of subfertility during patient consultations could help to encourage open discussion and make timely,

informed choice. Future work is needed to determine the best way forward to provide education to the public and effective information of ART to couples in need. To that end, it is worth considering the use of public media, as well as exploring the cost-effectiveness of publicly funded subfertility treatment.

References

1. O'Flynn N. Assessment and treatment for people with fertility problems: NICE guideline. *Br J Gen Pract* 2014; 64:50-1.
2. Census and Statistics Department, Hong Kong Special Administrative Region. Hong Kong Monthly Digest of Statistics, feature article, November 2012. Available from: http://www.statistics.gov.hk/pub/B71211FB2012XXXXB0100.pdf. Accessed 16 Sep 2013.
3. Census and Statistics Department (2010b). Hong Kong Population Projection 2004-2033. Census and Statistics Department, Hong Kong Special Administrative Region. Available from: http://www.statistics.gov.hk/pub/B1120015022004XXXXB0100.pdf. Accessed 16 Sep 2013.
4. Maheshwari A, Porter M, Shetty A, Bhattacharya S. Women's awareness and perceptions of delay in childbearing. *Fertil Steril* 2008; 90:1036-42.
5. Lau WN, So WW, Yeung WS, Ho PC. The effect of ageing on female fertility in an assisted reproduction programme in Hong Kong: retrospective study. *Hong Kong Med J* 2000; 6:147-52.
6. Lok IH, Cheung LP, Haines CJ. Management of infertility. *Hong Kong Pract* 2003; 25:249-61.
7. Baird DT, Collins J, Egozcue J, et al. Fertility and ageing. *Hum Reprod Update* 2005; 11:261-76.
8. Census and Statistics Department, Hong Kong SAR Government. Hong Kong: The facts (June 2014). Available from: http://www.gov.hk/en/about/abouthk/factsheets/docs/population.pdf. Accessed 16 Sep 2013.
9. Infertility FAQs. Available from: http://www.cdc.gov/reproductivehealth/infertility. Accessed 16 Sep 2013.
10. Menken J, Trussell J, Larsen U. Age and infertility. *Science* 1986; 233:1389-94.
11. Leridon H. Can assisted reproduction technology compensate for the natural decline in fertility with age? A model assessment. *Hum Reprod* 2004; 19:1548-53.
12. Templeton A, Morris JK, Parslow W. Factors that affect outcome of in-vitro fertilisation treatment. *Lancet* 1996; 348:1402-6.
13. Land JA, Evers JL. Risks and complications in assisted reproduction techniques: Report of an ESHRE consensus meeting. *Hum Reprod* 2003; 18:455-7.
14. HKU-QMH care. Centre of Assisted Reproduction and Embryology. Available from: http://www.hku.hk/obsgyn/IVF/html_eng. Accessed 16 Sep 2013.
15. The Assisted Reproductive Technology Unit, Prince of Wales Hospital, Hong Kong. Available from: http://www.ivfhk.com. Accessed 16 Sep 2013.
16. Council on Human Reproductive Technology, Hong Kong. Available from: http://www.chrt.org.hk/eindex.html. Accessed 16 Sep 2013.
17. Wright VC, Chang J, Jeng G, Chen M, Macaluso M; Centers for Disease Control and Prevention. Assisted reproductive technology surveillance — United States, 2004. *MMWR Surveill Summ* 2007; 56:1-22.
18. Family Planning Association of Hong Kong. Available from: http://www.famplan.org.hk/fpahk/en/template. Accessed 16 Sep 2013.
19. Donkor ES, Sandall J. The impact of perceived stigma and mediating social factors on infertility-related stress among women seeking infertility treatment in Southern Ghana. *Soc Sci Med* 2007; 65:1683-94.
20. Loke AY, Yu PL, Hayter M. Experiences of sub-fertility among Chinese couples in Hong Kong: a qualitative study. *J Clin Nurs* 2011; 21:504-12.
21. Bonetti TC, Melamed RM, Braga DP, et al. Assisted reproduction professionals' awareness and attitudes towards their own IVF cycles. *Hum Fertil (Camb)* 2008; 11:254-8.
22. Bewley S, Davies M, Braude P. Which career first? The most secure age for childbearing remains 20-35. *BMJ* 2005; 331:588-9.
23. Sharara FI. Ethnic differences in fertility and assisted reproduction. *Springer*, 2013.

Appendix 1. Questionnaire of women's perception on subfertility service in Hong Kong (Chinese version)

香港婦女對輔助生育服務的認知及接受程度問卷	
姓名：_____ 年齡：_____	**Participant's label**
(A) **背景資料**	
1. **婚姻狀況：**	已婚 ☐　　未婚 ☐
2. **你以前有否懷孕？**	有 ☐　　沒有 ☐ 如有，多少次懷孕？ _____ 次 結果 _____ 次成功生產 _____ 次小產 _____ 次終止懷孕 _____ 次宮外孕
3. **你第一次懷孕的年齡是（不論成功與否）：**	_____ 歲
4. **你將來會生育嗎？**	會 ☐　　不會 ☐
5. **教育程度：**	沒有正式教育 ☐　　小學程度 ☐ 中學程度 ☐　　大專 / 大學程度 ☐ 碩士或博士 ☐
6. **職業：**	_____
7. **每月收入（港幣）：**	少於$10,000 ☐　　$10,000-$29,999 ☐ $30,000-$50,000 ☐　　多於$50,000 ☐
8. **宗教信仰：**	沒有 ☐　　佛教 ☐ 天主教 ☐　　基督教 ☐ 伊斯蘭教 ☐　　其他，請註明：_____
9. **現在使用的避孕方法：**	沒有 ☐　　體外射精 ☐ 安全期 ☐　　男 / 女性避孕套 ☐ 避孕丸 / 避孕針 ☐　　避孕環 ☐ 男 / 女性絕育手術 ☐　　其他，請註明：_____
10. **你有否徵詢過醫護人員有關輔助生育服務的問題？**	有 ☐　　沒有 ☐ 如有，你從哪裏得到相關答覆或建議？ 香港家庭計劃指導會 ☐ 公立醫院 ☐ 私人醫生 / 診所 ☐
輔助生殖技術（Assisted reproductive technology [ART]）是指採用醫療輔助手段幫助不育夫婦妊娠的技術，包括人工授精（IUI）和體外授精（IVF）、胚胎移植等技術。	
11. **你有否試過有關輔助生育程序或輔助生育技術？**	有 ☐　　沒有（請跳到第13條）☐ 如有，請問是哪一類服務（可選多項）？ 口服排卵藥 / 注射排卵針 ☐ 子宮內人工授精（IUI）☐ 體外授精（俗稱試管嬰兒 / 人工受孕 / IVF）及冷凍儲存胚胎 ☐ 冷凍儲存卵子 ☐ 冷凍儲存精子 ☐ 接受卵子 / 精子捐贈 ☐ 其他，請註明：_____
12. **你從甚麼途徑得知有關輔助生育服務的資訊？**	朋友 ☐ 電視 / 電台 / 報紙 / 網頁 ☐ 私家普通科醫生 / 家庭醫生 ☐ 婦產科專科醫生 ☐ 香港家庭計劃指導會 ☐ 其他，請註明：_____

Appendix 1. (cont'd)

(B) 關於輔助生育服務需要的認知	
13. 你認為不育情況在異姓夫妻中的發生率是多少？	每四對夫婦有一對 ☐ 每五對夫婦有一對 ☐ 每六對夫婦有一對 ☐ 每八對夫婦有一對 ☐ 每十對夫婦有一對 ☐
14. 你認為當夫婦在沒有避孕而有定期行房後未能懷孕，應等多少年才尋求輔助生育服務？	一年 ☐　二年 ☐　三年☐　四年 ☐　五年 ☐
15 在上述的情況下，你自己是否會考慮尋求輔助生育的意見？	是（請回答第16條問題）☐　否（請回答第17條問題）☐
16. 你決定尋求輔助生育服務的原因是什麼？（可選擇多於一項）	女性年齡漸長 ☐ 男性年齡漸長 ☐ 多年未能自然懷孕 ☐ 朋輩或家庭壓力 ☐ 醫護人員建議 ☐ 曾接受輔助生育服務的朋友經驗分享 ☐ 曾接受輸卵管手術，或曾有子宮內膜移位，或不正常的檢查報告（如輸卵管阻塞）☐ 過去曾小產 ☐ 其他，請註明：_____
17. 你不會尋求輔助生育服務的原因是什麼？（請填1-9：1為最重要，9最不重要）	(a) ____ 我選擇順其自然 (b) ____ 我擔心會被標籤或歧視 (c) ____ 我沒有有關輔助生育服務的足夠資料 (d) ____ 在傳統文化上難以與別人討論關於生育的問題 (e) ____ 沒有配偶支持，或配偶拒絕尋求協助 (f) ____ 我擔心會很昂貴 (g) ____ 基於個人宗教理由，我不接受輔助生育服務 (h) ____ 我認為輔助生育服務有違個人的道德標準 (i) ____ 過長的輪候時間 (j) ____ 其他，請註明：_____
18. 你認為下列哪一些有關女性年齡對懷孕及輔助生育的影響是對的？	對　不對　不知道
(a) 不育與年齡沒有關係	☐　☐　☐
(b) 年紀愈大，小產機會愈高	☐　☐　☐
(c) 卵子的質素會因年齡漸長而下降	☐　☐　☐
(d) 胎兒染色體有問題的機會，會隨着年齡增加	☐　☐　☐
(e) 輔助生育的成功率會因年紀漸大而下降	☐　☐　☐
(f) 如女性年齡大於四十歲，就算是經輔助生育協助，懷孕機會率會是相對低的	☐　☐　☐
19 你同意現今的輔助生育技術可以取代年紀漸大所產生對生育的影響嗎？	同意 ☐　不同意 ☐
20. 你認為自己現在自然懷孕的機會率有多少（0-100%）？	_____ %

Appendix 1. (cont'd)

(C) 對輔助生育服務及輔助生育技術的認識			
21. 你有沒有聽過以下各種在香港公營或私家診所 / 醫院的輔助生育技術？	有		沒有
(a) 口服排卵藥 / 注射排卵針	☐		☐
(b) 子宮內人工授精（IUI）	☐		☐
(c) 試管嬰兒 / 人工受孕（IVF），冷凍儲存胚胎	☐		☐
(d) 冷凍儲存卵子	☐		☐
(e) 冷凍儲存精子	☐		☐
(f) 卵子捐贈	☐		☐
(g) 精子捐贈	☐		☐
22. 你認為在香港，35-40歲婦女一次體外授精（IVF）及胚胎轉移的治療週期的妊娠率大概有多少？	0%-20% ☐ 61%-80% ☐	21%-40% ☐ 81%-100% ☐	41%-60% ☐
23. 你認為以下哪些因素會影響人工受孕IVF（俗稱試管嬰兒）的妊娠率？	會	不會	不知道
(a) 女性年齡 >40歲	☐	☐	☐
(b) 男性年齡 >40歲	☐	☐	☐
(c) 女性是吸煙者	☐	☐	☐
(d) 長期吸入二手煙	☐	☐	☐
(e) 女性的身體質量指數（BMI）多於 30 kg/m^2	☐	☐	☐
(f) 不育的年數	☐	☐	☐
(g) 之前曾接受卵巢手術	☐	☐	☐
24. 你認為以下這些是輔助生育技術的潛在併發症嗎？	會	不會	不知道
(a) 卵巢過度刺激	☐	☐	☐
(b) 多胞胎	☐	☐	☐
(c) 流產	☐	☐	☐
(d) 宮外孕	☐	☐	☐
(e) 乳癌	☐	☐	☐
(f) 卵巢癌	☐	☐	☐
(g) 胎兒先天性結構異常	☐	☐	☐
(h) 胎兒染色體異常	☐	☐	☐
(i) 過早停經	☐	☐	☐
25. 你知道政府資助的輔助生育服務的公家症有年齡上限嗎？	有 ☐　　沒有 ☐ 如有，是什麼年齡：_____ 歲		
26. 根據醫院管理局有關選擇體外授精 / 人工受孕（IVF）病人的指引，你知道政府資助的公家（publicly funded IVF service）病人的選擇有以下各項標準嗎？	知道		不知道
(a) 夫婦必須有合法婚姻	☐		☐
(b) 當前的婚姻未有健在的孩子	☐		☐
(c) 接受治療時，婦人的年齡必須不超過四十歲	☐		☐

Appendix 1. (cont'd)

由於體外授精 / 人工受孕（IVF）是一項昂貴的療程，加上資源有限，故接受人工受孕（IVF）的公家病人需有一段輪候時間。	
27. **你認為由轉介到第一次體外授精 / 人工受孕（IVF）最長可接受的輪候時間是多少？**	<12個月 ☐ 12-18個月 ☐ 18 - 24個月 ☐ 24-30個月 ☐ 30-36個月 ☐ >36個月 ☐
28. **如果實際的輪候時間較你能接受的為長，你會考慮轉為私家病人嗎？**	會 ☐ 不會 ☐
雖然公家症病人獲得醫院管理局的部份資助，但因應醫療成本不斷上升的情況下，公家症病人仍須自行繳付在療程期間的部份費用。	
29. **你認為一週期的體外授精 / 人工受孕（IVF）治療最高可接受的費用（公家症）是多少（港幣）？**	<$10,000 ☐ $10,000-$20,000 ☐ $20,001-$30,000 ☐ $30,001-$40,000 ☐ $40,001-$50,000 ☐ >$50,000 ☐
30. **你認為夫婦二人是否需要一同接受輔助生育服務及治療的輔導和講解？**	是 ☐ 否 ☐
31. **研究發現接受輔助生育技術治療的夫婦會面對一定程度的壓力，你認為夫婦會想從哪裏獲得支援？**	(a) 家人 ☐ (b) 朋友 ☐ (c) 有輔助生育經驗的夫婦組成的支援小組 ☐ (d) 負責他們輔助生育服務的醫生 ☐ (e) 輔助生育服務的專科護士 ☐ (f) 心理科醫生 ☐ (g) 社工 ☐
32. **有關家庭計劃及生育服務的輔導，你認為是否應涵括在常規的婚前輔導當中？**	是 ☐ 否 ☐
33. **你希望獲得更多有關香港輔助生育服務的資訊嗎？**	是 ☐ 否 ☐ 如是，希望從哪裏獲得？（可選擇多於一項） (a) 電視 / 報紙 / 網頁 ☐ (b) 講座 ☐ (c) 私人 / 家庭醫生 ☐ (d) 婦產科專科醫生 ☐ (e) 香港家庭計劃指導會 ☐ (f) 其他，請註明：_____
感謝你的參與！	

Appendix 2. Questionnaire of women's perception on subfertility service in Hong Kong (English version)

Name: _____
Age: _____
Please tick the appropriate boxes

Label

A. Background information

1. Marital status	Married ☐ Single ☐
2. Previous pregnancies	Yes ☐ → How many? _____ No ☐ (Please go to Question 4) If Yes → What is the outcome? And how many? _____ Live birth _____ Miscarriage _____ Termination of pregnancy _____ Ectopic pregnancy
3. At what age did you have your first pregnancy, regardless of outcome?	_____ years old
4. Do you have any plan for future pregnancy?	Yes ☐ No ☐

5. Education level
No formal education ☐ Primary school ☐ Secondary school ☐ Tertiary level ☐
Master / Doctor degrees ☐

6. Occupation
Business ☐ Clerk / sales / service industry ☐ Health care professional ☐ Professional ☐
Manager / administrative ☐ Skilled / non-skilled worker ☐ Teacher ☐ Housewife ☐
Others (e.g. student / retired), please state: _____

7. Monthly income (HK$)
<$10,000 ☐ $10,000-$29,999 ☐ $30,000-$50,000 ☐ >$50,000 ☐

8. Religious belief
None ☐ Buddhism ☐ Christianity ☐ Catholic ☐ Islam ☐
Others, please state _____

9. Which method(s) of contraception are you using?
☐ None
☐ Withdrawal method / coitus interruptus / extracorporeal ejaculation
☐ Calendar method / periodic abstinence
☐ Barrier method (including male and female condom, diaphragm, etc)
☐ Hormonal contraceptive pills / injectables
☐ Intrauterine device / intrauterine system
☐ Male or female sterilisation
☐ Others, please state _____

10. Have you attended or sought advice from subfertility service in Hong Kong before?
Yes ☐ No ☐
If yes, from where? ☐ Family Planning Association ☐ Public hospital ☐ Private doctor

Appendix 2. (cont'd)

Assisted reproductive technology (ART) involves surgically removing eggs from a woman's ovaries, combining them with sperm in the laboratory, and returning them to the woman's body or donating them to another woman.

11. Have you ever had or attempted subfertility procedure or ART before?

Yes ☐ No ☐ (please proceed to Question No. 13)

If yes, what type of service? (Tick one or more than one)

☐ Ovarian stimulation (oral or injections)
☐ Intrauterine insemination
☐ In-vitro fertilisation (IVF) with / without embryo cryopreservation
☐ Egg cryopreservation
☐ Sperm cryopreservation
☐ Recipient of egg or sperm donation
☐ Others, please state: _____

12. How did you obtain information on subfertility service? (Please tick one or more items)

☐ Friends or peers ☐ Television, newspaper or websites
☐ Counselling by general practitioner or family doctor ☐ Counselling by gynaecology specialists
☐ Counselling by Family Planning Association
☐ Others, please state: _____

B. Perception on need for subfertility service

13. What do you think is the incidence of subfertility in heterosexual couples?

☐ 1 ln 4 ☐ 1 ln 5 ☐ 1 ln 6 ☐ 1 ln 8 ☐ 1 ln 10

14. What do you think is the number of years one should wait before consulting subfertility service, when no pregnancy occurred after regular unprotected sexual intercourse (2-3 times per week)?

☐ 1 Year ☐ 2 Years ☐ 3 Years ☐ 4 Years ☐ 5 Years

15. In your opinion, would you consider seeking advice from subfertility service, assumed that you have not been able to conceive after trying for the above period of time?

☐ Yes (Proceed to Question No. 16) ☐ No (Proceed to Question No. 17)

16. Based on what factors would you decide on seeking advice from subfertility service? (Please tick one or more items)

☐ Advanced maternal age
☐ Advanced paternal age
☐ Failed number of years of trying to conceive
☐ Family or peer pressure
☐ Recommendation by health care professional
☐ Advice or experience from friends who have had subfertility service before
☐ Previous tubal surgery / previous endometriosis or abnormal investigations results such as blocked tube
☐ History of miscarriage
☐ Others, please state: _____

17. In your opinion, what are the deterrent factors for one from seeking advice from subfertility service? (Please rank 1 as most important factor and 9 as least important)

_____ Personal belief that let nature takes its course
_____ Social stigmatisation
_____ Lack of information and source for referral
_____ Cultural difficulty in discussion on fertility issue
_____ Lack of support from partner or partner refusal to seek advice
_____ Cost involved in undergoing subfertility treatment
_____ Religious reason
_____ Ethical concerns
_____ Long waiting time
_____ Other reasons, please state: _____

Appendix 2. (cont'd)

18. Which of the followings concerning effect of age on pregnancy and ART do you think is true?	**True**	**False**	**Do not know**
(a) Subfertility and age are not related	☐	☐	☐
(b) Delaying childbearing is associated with increased chance of miscarriage	☐	☐	☐
(c) Egg quality decreased with age	☐	☐	☐
(d) Risk of chromosomal abnormalities increased with age	☐	☐	☐
(e) Success rate of ART drops as the age of female partner increases	☐	☐	☐
(f) Fertility is even lower at age 40 years or above, even with IVF	☐	☐	☐

19. Do you agree that ART such as IVF could overcome the effect of ageing?
Yes ☐ No ☐

20. What do you think your chance of spontaneous pregnancy now is (0-100%)? _____ %

C. Knowledge on subfertility service and ART in Hong Kong

21. Have you heard of the following types of subfertility service or ART services available in Hong Kong, either in public or private sector?	**Yes**	**No**
(a) Ovarian stimulation (oral or injections)	☐	☐
(b) Intrauterine insemination	☐	☐
(c) IVF with embryo cryopreservation	☐	☐
(d) Eggs cryopreservation	☐	☐
(e) Sperm cryopreservation	☐	☐
(f) Egg donation	☐	☐
(g) Sperm donation	☐	☐

22. For women aged between 35 and 40 years, what do you think is the approximate pregnancy rate for each cycle of IVF and embryo transfer in Hong Kong?
☐ 0%-20% ☐ 21%-40% ☐ 41%-60% ☐ 61%-80% ☐ 81%-100%

23. In your opinion, do you think that the followings are factors affecting the pregnancy outcome in IVF?	**Yes**	**No**	**Do not know**
(a) Female age >40 years	☐	☐	☐
(b) Male age >40 years	☐	☐	☐
(c) Maternal smoking	☐	☐	☐
(d) Passive smoking	☐	☐	☐
(e) Body mass index of women >30 kg/m^2	☐	☐	☐
(f) Duration of subfertility	☐	☐	☐
(g) Previous ovarian surgery	☐	☐	☐

24. Do you think the followings are potential complications associated with ART?	**Yes**	**No**	**Do not know**
(a) Ovarian hyperstimulation syndrome	☐	☐	☐
(b) Multiple pregnancy	☐	☐	☐
(c) Spontaneous miscarriage	☐	☐	☐
(d) Ectopic pregnancy	☐	☐	☐
(e) Breast cancer	☐	☐	☐
(f) Ovarian cancer	☐	☐	☐
(g) Structural congenital abnormality	☐	☐	☐
(h) Chromosomal abnormality with intracytoplasmic sperm injection	☐	☐	☐
(i) Premature menopause	☐	☐	☐

Appendix 2. (cont'd)

25. Are you aware of any age limit for publicly funded subfertility treatment in Hong Kong?

Yes ☐ No ☐

If yes, at what age do you think it is? _____ years

26. Are you aware of the following patient selection criteria for publicly funded IVF services in public hospital in Hong Kong?	**Yes**	**No**
(a) Couple needs to be legally married	☐	☐
(b) There is no living child for the current marriage	☐	☐
(c) Woman must not be more than 40 years old at the time the procedure is initiated	☐	☐

Due to the limited resources in public hospitals, there is a waiting time for the first cycle of IVF.

27. What is the maximum waiting time (from referral to first IVF cycle) that you could accept?

☐ <12 Months ☐ 12-18 Months ☐ 18-24 Months ☐ 24-30 Months

☐ 30-36 Months ☐ >36 Months

28. Will you seek IVF service from private if the waiting time is longer than what you can accept?

Yes ☐ No ☐

Although public ART cycles are still heavily subsidised by the Hospital Authority, partial cost recovery is required to cope with the increase in cost of drugs and consumables and maintenance of the ART services.

29. In your opinion, what is the maximum charge (HK$) you could accept for one cycle of IVF?

☐ <$10,000 ☐ $10,000-$20,000 ☐ $20,001-$30,000

☐ $30,001-$40,000 ☐ $40,001-$50,000 ☐ >$50,000

30. Do you think couples should be seen together during subfertility counselling and treatment?

Yes ☐ No ☐

31. Studies showed that undergoing subfertility counselling and treatment could be stressful for a couple, whom / where do you think the couple would like to have support from? (Please tick one or more items)

☐ Family members
☐ Friends
☐ Support groups and peers who had experience of undergoing ART treatment before
☐ Doctors in charge of their subfertility service
☐ Specialised subfertility nurses
☐ Clinical psychologist
☐ Social worker

32. Do you think family planning and fertility counselling service should be given early routinely, such as during premarital counselling?

Yes ☐ No ☐

33. Do you wish to obtain more information on subfertility service in Hong Kong?

Yes ☐ No ☐

If yes, from where / whom? (Please tick one or more items)

☐ Television / newspaper / websites
☐ Educational talks
☐ General practitioner or family doctor
☐ Gynaecology specialists
☐ Family Planning Association
☐ Others, please state: _____

Thank you very much for your participation