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ANALYSING THE CHARACTERISTICS OF SUCCESSFUL DELIVERIES WITH IN VITRO FERTILIZATION AND THE TOTAL TREATMENT COST AT TU DU HOSPITAL IN HO CHI MINH CITY, VIETNAM

Hoang-Thy Nhac-Vu

University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam
e-mail: hoangthynhacvu@uphcm.edu.vn

Abstract

A cross-sectional study was carried out on the medical data of the couples having successful fertility treatment by in vitro fertilization at Tu Du Hospital in Ho Chi Minh City, Vietnam from 06/2014 to 12/2015. The study included 295 cases that met the inclusion-exclusion criteria. The mean age of wives was 31.0 ± 4.3 years old. And the mean age of husbands was 34.4 ± 5.5 years old. The success rate of the fertility treatment after 1 treatment cycle was 90%. The rates of primary and secondary infertility in the study were 70% and 30% respectively. The study showed that there was a significant difference in the ovulation induction days and the origin of eggs and sperms of primary infertility group compared with secondary infertility group. Couples which had different characteristics would consume the significantly different cost. This research aimed to examine the features of couples seeking in vitro fertilization treatment at Tu Du Hospital, analysed the structure of treatment cost and determined factors affecting the total treatment cost, which contributed to general information about infertility treatment particularly in Vietnam and worldwide generally.

Key words: infertility, in vitro fertilization, treatment cost.

1. Introduction

Infertility is a global problem which affects one fourth of couples who wanted to have a baby [1]. Indeed, infertility in women was the fifth highest serious global disability (among rural population under 60 years old) and infertility should be considered as a disease that couples had great challenges to find an effective therapy [2]. Currently, in vitro fertilization has become a standard treatment for subfertility since the first successful in vitro fertilization [3]. The success of in vitro fertilization is affected by many factors such as infertility duration, infertility causes, and fertility of females. These factors play an important role in choosing proper therapeutic regimen and the cost of a successful in vitro fertilization. Tu Du Hospital is one of the hospitals in Ho Chi Minh City that has applied assisted reproductive technologies. A half of subfertility couple was treated by in vitro fertilization with a success rate between 30 - 42%. This ratio is quite high compared to other places particularly in Vietnam and in the world generally. Until 2015, there had been no detailed statistics of successful infertility treatment cases at Tu Du hospital, especially successful in vitro fertilization cases. Therefore, reports of in vitro fertility pregnancies were interesting for medical staff at Tu Du hospital as well as other places. In response to this, we conducted a study to examine the characteristics and the cost of the cases of successful pregnancies and deliveries via in vitro fertilization method at Tu Du Hospital.

2. Material and Method

A cross-sectional study used data collected from the medical documents of all successful deliveries with in-vitro-fertilisation at Tu Du Hospital from 06/2014 to 12/2015. All couples whose wives became pregnant with in vitro fertilization were included, cases which did not begin receiving in vitro fertilization treatment at Tu Du Hospital or were interrupted during treatment procedure regardless of any etiology were eliminated. Thereby, there were totally 295 cases. Information of characteristics of couples getting pregnant with in vitro fertilization was determined from the medical records and was categorized as before treatment procedure (e.g., female and male age, duration of infertility, infertility classification), during treatment period (e.g., ovulation induction regimen, time of ovulation induction, source of eggs, sperm-delivery technique, number of lost embryos, number of treatment cycles), and outcomes (e.g., gestational age at delivery, the number of live births, birthweight). The structure of the total cost of successful infertility treatment with in vitro fertilization was described by the characteristic of treatment procedure (the cost for preparing eggs and sperm and the cost for preparing embryos and embryo transfer) and cost characteristic (testing cost, drug cost, and health service cost). These charac-

teristics were described by frequency and percentages for categorical variables; by the mean (standard deviation) for quantitative variables. The comparison was examined by Chi-square test or ANOVA with TUKEY test, which was performed over a threshold of 5% significant and confidence intervals and was calculated delayed at 95%. We conducted our study using R statistical software (version 3.1.3).

3. Results

Among 295 couples, mean (±SD) female and male ages were 31.0 (±4.3) and 34.4 (±5.5) years old, respectively. Primary infertility was the most common (69.8%). Mean infertility duration was 5.3 (±3.1) years. 89.8% of women had one treatment cycle; 10.2% of women had two or three cycles. Factors which were not significantly associated with infertility classification were the duration of infertility (P=0.29), ovulation induction regimen (P=0.97), the number of treatment cycles (P=0.54), number of successful births (P=0.09). On the other hand, ovulation induction duration (P=0.02), the source of eggs (P=0.01), sperm delivery technique (P=0.01) were significantly associated with infertility classification. (Table 1)

According to the property of the treatment, the cost of preparing eggs accounted for most of the total cost (9887.9; 33.5 ± 41.1 million average VND) while the cost of preparing sperms was lowest (462.4; 1.6 ± 1.4 million average VND). According to the characteristics of the cost, the cost of drugs accounted for the most with a total of 9385.9 million VND for the whole sample, 31.8 ± 41.2 million average VND. (Table 2).

There were differences in the total cost of treating infertility by maternal age, ovulation induction duration, FSH drug regimen, the source of eggs and sperm delivery techniques ($P < 0.05$). (Table 3).

4. Discussion

During the period from 06/2014 to 12/2015, there were 295 couples treated successfully infertility via in vitro fertilization at Tu Du Hospital. Most couples in our study were young with 40% of women under 26 years old. Our study showed that the proportion of primary infertility couples was 2 times higher than secondary infertility couples. This result was different from previous studies on the proportion of 2 types of infertility [4]. In addition, there were no differences in the treatment outcome respect between primary and secondary infertility groups, which was similar to the result of a systematic study [5]. At Tu Du hospital, the success rate of in vitro fertilization after only one cycle of treatment was very high (89.8%) and the number of intrauterine pregnancies was not be diminished compared to the number of embryos transferred to

Table 1. Prevalence of and factors associated with infertility classification (n=295)

	Primary infertility (n=206) (%)	Secondary infertility (n=89) (%)	Total (n = 295) (%)	P-value
Duration of infertility (years)				0.29
1 - 3	66 (32.0)	27 (30.3)	93 (31.5)	
4 - 5	58 (28.2)	26 (29.2)	84 (28.5)	
6 - 7	43 (20.9)	12 (13.5)	55 (18.6)	
8 - 18	39 (18.9)	24 (27)	63 (21.4)	
Ovulation induction regimen				0.97
Long-term	12 (5.8)	6 (6.7)	18 (6.1)	
Short-term	194 (94.2)	83 (93.3)	277 (93.9)	
Ovulation induction group (days)				0.02
<10	72 (35)	20 (22.5)	92 (31.2)	
10	88 (42.7)	37 (41.6)	125 (42.4)	
>10	46 (22.3)	32 (36)	78 (26.4)	
Source of eggs				0.01
Patient	180 (87.4)	87 (97.8)	267 (90.5)	
Donor egg	26 (12.6)	2 (2.2)	28 (9.5)	
Sperm-delivery technique				<0.01
No intervention	156 (75.7)	87 (97.8)	243 (82.4)	
TESE technique	50 (24.3)	2 (2.2)	52 (17.6)	
Number of cycles				0.54
1	187 (90.8)	78 (87.6)	265 (89.8)	
2-3	19 (9.2)	11 (12.4)	30 (10.2)	
Lost embryos				0.51
No	197 (95.6)	87 (97.8)	284 (96.3)	
Yes	9 (4.4)	2 (2.2)	11 (3.7)	
Number of successful live birth				0.09
Single	159 (77.2)	77 (86.5)	236 (80)	
Twins	47 (22.8)	12 (13.5)	59 (20)	

Table 2. The structure of total fertility treatment cost

Structure of total cost	Cost (million VND)	(%)
	16883.3	(100)
According to the property of the treatment		
Total preparing egg cost	9887.9	(58.6)
Total preparing sperm cost	462.4	(2.7)
Total preparing embryos and embryo transfer cost	6533.0	(38.7)
According to the characteristics of the cost		
Total testing cost	1333.2	(7.9)
Total drug cost	9385.9	(55.6)
Total health service cost	6165.1	(36.5)

the uterus (96.3%). This result showed that embryo quality and the health of women entering treatment at Tu Du Hospital were controlled well leading to positive results. The study showed that the cost of a successful pregnant cases fluctuated, between 29.0 and 474.2 million VND. Therefore, it is necessary to have more studies that focus on identifying and predicting the cost of infertility treatment via in vitro fertilization techniques at the hospital in the future. Our study showed that the cost of in vitro fertilization treatment of women under 32 years old was different from older women (P=0.05), while the age of husbands did not significantly different between groups treatment cost (P=0.05). These results also were noted in a previous study that the egg quality and the ability to create embryos reduced when women were getting older, while the age of husbands did not clearly affect the quality of sperms [6]. Couples using different FSH regimens and different FSH drugs consumed the significantly different cost. FSH-drug regimen affected the total cost by impacting the cost of preparing eggs and embryos. Type of FSH-drugs affected the total cost by impacting the cost of preparing eggs. This has also been noted in several previous studies [6], [7], [8]. In addition, prior studies [6], [9] indicated that ovulation induction regimen is the factor affecting the cost of treatment. However, this had not been recognized in our study (P=0.13). The research which was previously conducted showed that there were differences between the total cost of treating infertility with in vitro fertilization and fertility classifications, between the total cost and duration of infertility [10], [11] or between total costs and routine tests [12].

The comparison of the results of this study with other studies had some limits because of the differences in research methods. The studies published in our country focused much on the clinical and sub-clinical characteristics of the couples who received in vitro fertilization treatment, therefore it is difficult to compare to our results. The results of this study could be considered as one of

Table 3. Comparing the total cost of treating infertility characteristics between groups in each independent variable

Characteristics	Overall cost gap		95% Confidence interval	P
Age of wife (years)	[≥32] – [<32]	2.8	(0.6–4.9)	0.01
Age of husband (years)	[≥35] – [<35]	1.8	(-0.3–4)	0.09
Duration of infertility (years) (1-3/ 4-5/ 6-7/ 8-18)	4-5 years – 1-3 years	0.6	(-3.1–4.2)	0.98
	6-7 years – 1-3 years	2.6	(-1.5–6.7)	0.36
	8-18 years – 1-3 years	2.9	(-1.1–6.8)	0.24
	6-7 years – 4-5 years	2.0	(-2.2–6.2)	0.60
	8-18 years – 4-5 years	2.3	(-1.7–6.3)	0.46
	8-18 years – 6-7 years	0.3	(-4.1–4.7)	1.00
Infertility classification	Primary - Secondary	1.4	(-1–3.7)	0.24
Type of routine tests	Hormonal tests - AMH tests	-1.3	(-5.1–2.4)	0.48
Ovulation induction regimen	Long-term - Short-term	-3.6	(-8.3–1.1)	0.13
Ovulation induction duration group (days) (<10 />10 /10)	>10 days – <10 days	7.2	(3.9–10.4)	<0.01
	10 days – <10 days	3.2	(0.3–6)	0.03
	10 days – >10 days	-4.0	(-7.1–-0.9)	<0.01
FSH-drug regimen (single FSH / FSH + LH/ Mix protocol/ Other)	FSH + LH – single FSH	4.5	(1.4–7.7)	<0.01
	LH (Menopur) + other FSH– single FSH	-5.0	(-8.7–-1.3)	<0.01
	Other – single FSH	-9.2	(-0.0–1.7)	0.13
	LH (Menopur) + other FSH – FSH + LH	-9.5	(-12.7–-6.4)	<0.01
	Other – FSH + LH	-13.7	(-24.4–-3)	<0.01
	Other – LH (Menopur) + other FSH	-4.2	(-15.0–6.7)	0.75
Source of eggs	Donor egg – Patient	5.4	(1.8–8.9)	<0.01
Sperm-delivery technique	No intervention – TESE	-6.8	(-9.5–-4)	<0.01

the initial analysis and can be used as a reference for subsequent studies.

5. Conclusion

This research provided information about the characteristics of couples before and during the treatment procedure, as well as the cost of a successful infertility treatment. Therefore, the hospital has a review of successful infertility treatment cases in order to make effective and efficient plans for their treatment protocols.

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