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Infertility Causing Factors & the Success Rate of in Vitro Fertilization (IVF) in One of Fertility Center of Surabaya City, Indonesia

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Abstract

The success rate of in Vitro Fertilization (IVF) with ICSI depends on married couples factors such as maternal age, causes of infertility from the married couples, embryo status, reproductive history, lifestyle, ethnicity, and type of medical examination of infertility. The success rate of IVF was different among countries, rating from 21.4% to 51.7% meaning that the couples succeeded having a child, while in Indonesia the rate was unknown.

Objective: To analyze infertility causing factors in married couples who underwent IVF and the success rate of IVF in one fertility center in Surabaya, Indonesia. Method: This observational study was conducting during January to December 2017. All couples who visited the fertility center,the female ≤ 39 years old, and the couples finished medical examination in the study place were asked to participate this study. Their characteristics (female age and duration of marriage), type infertility causing factors as well as the success rate.

Results: Among 154 married couples, 64.3% of the female and 44.8% of the male had one or more abnormality in their reproductive status, while 26.6% of both (the couples) had the abnormalities, and 17.5% of both (the couples) had no abnormality (unexplained infertility). The success rate of IVF, meaning the female got pregnancy, was 37.7%.There was no significant association between male factors, female factors, more over the number of abnormalities were not associate to success rate. When correspondents divided in to 2 groups, having one or more abnormalities group vs. no abnormalities group (unexplained abnormality), we found that the success rate did not differ significantly between the two groups; suggesting additional examination were needed to predict the other factors for increasing the success rate in this study place.

Keyword: *Infertility, Success RateIn Vitro Fertilization (IVF), Indonesia.*

Introduction

Infertility is a problem in the reproductive system that is described by the failure to get a pregnancy after 12 months or more in which the couples have sexual intercourse at least 2-3 times per week regularly without using contraception.[1] Infertility occurs in 10-15% of couples[2], while in Indonesia was 12.5%. Infertility causing factorsin married coupleswere 35% male factors, 35-50% female factors, 5% unusual problems, 10% unexplained infertility.[2] In Vitro Fertilization (IVF) is one of Assisted reproductive technologies (ART) that commonly used in infertility therapy. ART is used if other medicines failed to treat caused of infertility.[3] Unfortunately, IVF is not always succesful[4], it depends on variability factors such as maternal age, caused of

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infertility, embryo status, reproductive history, lifestyle, ethnicity, and type of medical examination.[5,6,7] The IVF outcome based on live birth rates in the South-East Asian, African-Caribbean, and Middle-Eastern were 38%, 23.3%, 21.4%, respectively in contrast to the live birth rates in white European population 43.8% and America was 51.7%.[6] However, in Korea, the pregnancy rate of IVF with ICSI was 34.1%.[8]The success rate of IVF in developed and developing countries can be comparable, although each country had different factors that influence the success rate of IVF. So, this study was important to analyzed the different causes of infertility that can influence the success rate of IVF in developed and developing countries.

Material and Method

Data collection from participants were gotten after they signed the informed consent. The protocol of this study was approved by the Health Research Ethic Committee Fertility Center in Surabaya, Indonesia.

The fertility center in Surabaya, Indonesiais a private hospital. Patients who visited this hospital come from many region of Indonesia, such as Surabaya, East Java, Kalimantan, Sulawesi and many east regions of Indonesia. Theirbackground of Fertility center patients were middle-high socio-economic background. This observational study was conducting during January to December 2017. All couples who visited the fertility center and fulfilled inclusion criteria were asked to participate this study. The inclusion criteria were married couples who recorded in medical record; married couples had complete medical examination of sperm, ovarian, tuba, and uterus factors; married couples who underwent IVF; and female age ≤ 39 years old. Their characteristics (female age and duration of marriage), type of medical examination, infertility causing factors, and the success rate were recorded and analyzed.

This study used an observational analytic research. The data were collected from medical record of married couples who underwent IVF therapy at the fertility center in Surabaya Indonesia, in the period of January 2017 to December 2017. Samples were taken from population using total sampling method. The total of samples was 154 married couples who underwent IVF according to the inclusion criteria. Medical records were compiled based on the inclusion and exclusion criteria.

Variablesin this study were infertility causing factors of male, infertility causing factorsof female, and in vitro fertilization (IVF).Infertility causing factors of male infertility was defined from normal and abnormal sperm analysis.Infertility causing factorsof female infertility was defined from normal and abnormal ovarian, tuba, uterus, and endometriosis medical examination. In vitro fertilization (IVF) was defined based on pregnancy rate,success if the titer of β-hCG is ≥ 25 mIU/mland failedif the titer of β-hCG is < 25 mIU/ml.The data analysis was tested by Chi-square test to analyze relation between infertility causing factorsin married couples with the success rate of IVF.

Findings: Total of 213 medical records obtained, 154 medical records met fulfilled inclusion criteria. In samples that were used to analyze infertility causing factors in married couples with the success of IVF, the most frequent female age were 30-39 year and female factors were the most frequent cause of the infertility [Table 1]. Fallopian tube disorders were the most frequent infertility disorder followed by uterus disorders and endometriosis [Table 3]. Meanwhile in male factors, oligoasthenoteratozoospermia (OAT) were the most frequent cause of the infertility [Table 3].The success rate of IVF based on pregnancy rate was 37.7% [Table 4]. Infertility causing factors in married couples were 17.5% unexplained infertility, 18.2% male factors, 37.7% female factors, 26.6% both factors [Table 5]. Analysis showed that there was no significant relation between infertility causing factors in married couples with the success of IVF (p = 0.586) [Table 5].When correspondents divided in to 2 groups, having one or more vs. no abnormalities (unexplained abnormality), we found that the success rate did not differ significantly (p = 0.216) [Table 6].There was no differ significant between female age and number of abnormalities in the success rate of IVF [Table 7, Table 8].

Table 1: Characteristic and Status of Infertility factors of Respondents

Characteristics	n	%
Female age	32.6±4(20-39)*	
20-29 years	36	23,4
30-39 years	118	76,6
Duration of Marriage	6.3±3.9(0.5-22)*	
≤5years	69	47
6-10 years	59	40.1
>10 years	19	12.9

Note: *Mean±SD (minimum-maximum)

Table 2: Status of Infertility factors

Factors	n	%
Male		
Normal	85	55.2
Abnormal	69	44.8
Female		
Normal	55	35.7
Abnormal	99	64.3
Male and Female		
Normal	27	17.5
Abnormal	127	82.5

Table 3: Status of Infertility factors based on sex and type of abnormality and pregnancy rate

Infertility causing factors	n	%
Male	154	
Normal of sperm analysis	85	55.2
One disorders of sperm analysis	42	27.3
Azoospermia	12	7.8
Oligozoospermia	10	6.5
Teratozoospermia	13	8.4
Astenozoospermia	7	4.6
Two disorders of sperm analysis	12	7.8
Astenoteratozoospermia	8	5.2
Oligoastenozoospermia	4	2.6
Three disorders of sperm analysis	15	9.7
Oligoastenoteratozoospermia (OAT)	15	9.7
Female	154	
Ovarian function disorders		
Normal	132	85.7
Abnormal	22	14.3
Fallopian Tube disorders		
Normal	111	72.1
Obstruction	43	27.9
Uterus disorders		
Normal	117	76
Abnormal	37	24
Endometriosis		
Normal	120	77.9
Endometriosis	34	22.1
Unexplained infertilty	27	17.5

Table 4: Frequency of IVF success

IVF Success	n	%
Success	58	37.7
Failed	96	62.3
Total	154	100

Table 5: Association between infertility causing factors in married couples with the success rate of IVF

Infertility causing factors	IVF Success				Total		p value*
	Success		Failed				
	n	%	n	%	n	%	
Male factors	10	6.5	18	11.7	28	18.2	0.586
Female factors	19	12.4	39	25.3	58	37.7	
Male and female factors	16	10.4	25	16.2	41	26.6	
Unexplained infertility	13	8.4	14	9.1	27	17.5	
Total	58	37.7	96	62.3	154	100	

Note: *Chi-Square Test

Table 6: Comparation of IVF success rate in normal vs. abnormal of married couples disorders

	IVF Success				Total		p value*
	Success		Failed				
	n	%	n	%	n	%	
No abnormalities	13	8.5	14	9	27	17.5	0.216
Have abormalities	45	29.2	82	53.3	127	82.5	
Total	58	37.7	96	62.3	154	100	

Note: *Chi-Square Test

The research from Monash University, Australia which states that motility is one of the most important parameters in determining fertility levels. Sperm concentration does not significantly influence fertility levels when the motility and morphology of abnormal sperm can be controlled.[9]Another study, at hospital in Bandung also stated that there was a significant relation between sperm motility and the success of IVF. However, there was no significant relation between sperm morphology and the success of IVF. Motility have role in the success of IVF, while morphology has no role in the success of IVF.[10]In this hospital, azoospermia that diagnosed was caused by obstruction. In this study, the percentage of IVF success in the male factors who had sperm abnormalities, it was found that azoospermia had the biggest percentage of IVF success (3.9%) if compared to other sperm abnormalities. In this hospital, azoospermia that diagnosed was caused by obstruction. This can occur because the therapy for male infertility in the Fertility Centerwas done by intracytoplasmic sperm injection (ICSI), but might different in other studies that using conventional IVF techniques. ICSI is processof selecting the most qualified sperm for fertilization with oocytes. So, we can found the best quality of sperm from the azoospermia that caused by obstruction.

In this study, the success of IVF in women 20-29 years (5.9%) and 30-39 years (31.8%). This study was different from research in the UK in 2010, the success of IVF in women under 35 years of age (32.2%), ages 35-37 (27.7%), ages 38-39 (20.8%), above the age of 40-42 years (13.6%), while the age of more than 43 years (<5%).[8]In contrast to previous studies, in this study using the age range of 20-29 years and 30-39 years, this was because infertile patients who underwent IVF the most frequent were more than 30 years of age. In this study also excluded the age of more than 39 years so that the study sample was reduced. A phenomenon that exists in Indonesia, in infertile couples who underwent IVF, the female age is mostly over 30 years old. It should be on screening or early detection, if for one year have been related to a husband and wife regularly and do not use any contraception but have not been pregnant, then it should be immediately consulted with an obstetrician. However, in fact, most married couples check up their fertility for more than 30 years because they are waiting for probability to get pregnant at less than 30 years of age by adhering to the socio-cultural conditions in eachregion.

Based on the results of the statistical test with chi-square, it was found that there was no significant relation between infertility causing factorsand the success of IVF.Infertility in married couples can be caused by 35% male factors, 35-50%female factors, 5% unusual problems, and 10% unexplained infertility.[2]Medical examinationof the causes of infertility in thisFertility Center includes sperm analysis, laparoscopy, HSG, ultrasound, and menstrual disorder history. Medical examinationof causes of infertility in abroad is almost the same as in Indonesia, however, there are additional of medical examination, post coitus cervical mucus tests, the aim of which is to determine the ability of sperm to reach the uterine cavity and the ability to survive cervical mucus.[2]In the other research explained that the post coital test (PCT) was a valuable test in daily practice, as a negative outcome is associated with a lower ongoing pregnancy rates (OPR) and higher need in IUI and ART (IVF). Moreover, the PCT was particularly useful in couples with male factors infertility.[7]

In vitro fertilization (IVF) is a technology that is still developing to continue to deal with infertility. Depending on the type of calculation used, the results may represent the number of confirmed pregnancies, called the pregnancy rate, or the number of live births, called the delivery rate. The success rate of IVF depends on various variable factors such as maternal age, causes of infertility, embryo status, reproductive history, and lifestyle factors.[5]However, in the other research found that ethnicity, GDP, utilization, and type of medical examination could be influence of IVF success rate.[5,6,7]

The success of IVF in this study was 37.7% at Fertility Center in 2017. In other research, the IVF outcome based on the ethnicity, live birth rates in the South-East Asian, African-Caribbean, Middle-Eastern and white European population were 38%, 23.3%, 21.4%, 43.8%.[6] This study is comparable with research in Taipei, which shows a pregnancy rate of 47.7% and a delivery rate was 33.6%,[12] and in Korea, the pregnancy rate of IVF with ICSI was 34.1%.[8] However, it was contrast with the research in USA shows a pregnancy rate was51.7%.[13] The relation between the causes of infertility in couples with the success rate ofIVF in this study or research from abroad still not be explained yet. If there are no abnormalities found in male and female, infertility is categorized as unexplained infertility.[14] However, the success of IVF in unexplained infertility is still not explained yet, too. Based a psychological perspective, research in New York shows that psychological stress affects the success of IVF. Much stress level of couples who underwentIVF

can affect success of IVF.[15]Many factors can influence the success of IVF, could be related caused by ethnicity or other factors.However, the analysis of the causes of infertility in the success of IVF still not be explained yet.

This study had a number of limitations. The total number of samples collected was still low if compared with the other study. It recommended to use a large sample size and investigate otherfactorsthat influencethe success rate of IVF or external factors of infertility in further study.

Conclusion

The conclusion of this study is that infertility causing factorsinfluences the success rate of IVF. However, this study has not yet established relation between infertility causing factorsin married couples with the success rate of IVF at theone of fertility center in Surabaya, Indonesia in 2017 with the success rate of IVF. The success rate of IVF depends on various variable factors such as maternal age, causes of infertility, embryo status, reproductive history, and lifestyle ethnicity, and type of medical examination.

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Ethical Clearance: Taken from Ethical Committee in Health Research Dr. Soetomo General Hospital Surabaya, Indonesia on 19 December 2018 (ref. no. 0853/KEPK/XII/2018).

Conflict of Interest: The authors declare thatthey have no competing interests.

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