Research Article

External Validation of Endometriosis Fertility Index (EFI) in an Indonesian Population: A Two-Centre Prospective Study

Validasi Eksternal Endometriosis Fertility Index (EFI) pada Populasi Indonesia: Sebuah Studi Prospektif

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Abstract

Objective: To externally validate EFI in an Indonesian population.

Methods: A prospective study was performed in 59 reproductive aged women diagnosed with both endometriosis and infertility who underwent laparoscopic surgery in Dr. Cipto Mangunkusumo and Carolus Hospital during the period of December 2012 to June 2016. Subjects were followed up for two years.

Results: Statistical analyses suggested that younger age, infertility duration ≤ 3 years, higher LF score, and AFS score below 71 were significantly associated with pregnancy (p<0.001, p<0.001, p=0.035, p<0.001, respectively). Pregnant subjects had significantly higher median EFI score compared to the not pregnant group [EFI score 7 (5-9) vs 4 (1-8), p<0.001)].

Conclusion: Higher EFI score was significantly associated with higher pregnancy rate.

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Keywords: endometriosis, fertility, index, infertility, laparoscopy, pregnancy

Abstrak

***Tujuan**: Untuk memvalidasi eksternal penggunaan EFI di Indonesia.*

***Metode**: Studi prospektif ini dilakukan pada 59 perempuan usia reprodruktif yang terdiagnosa dengan endometriosis dan infertilitas yang menjalani operasi laparoskopi di Rumah Sakit Umum Pusat Rujukan Nasional Dr. Cipto Mangunkusumo dan Rumah Sakit Carolus pada periode Desember 2012-Juni 2016. Subyek di follow-up selama 2 tahun.*

***Hasil**: Analisis statistik menunjukkan bahwa usia muda, durasi infertilitas ≤ 3 tahun, skor least function (LF) yang tinggi, dan skor American Fertility Society (AFS) < 71 memiliki hubungan yang signifikan dengan kehamilan (p<0,001; p<0,001; p=0,035; p<0,001). Subyek yang menjadi hamil selama periode follow up memiliki median skor EFI yang lebih tinggi dibandingkan dengan subyek yang tidak hamil [skor EFI 7 (5-9) vs 4 (1-8), p<0,001)].*

***Kesimpulan**: Skor EFI yang lebih tinggi berkaitan secara signifikan dengan tingkat kehamilan yang lebih tinggi.*

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***Kata kunci**: endometriosis, fertilitas, indeks, infertilitas, kehamilan, laparoskopi*

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INTRODUCTION

Endometriosis is a benign growth of endometrial glands and stroma outside uterine cavity associated with both pelvic pain and infertility. Due to its relationship with infertility, numerous scoring systems were proposed.[1] Existing various scoring systems suggested decreased fecundability as disease progressed, but failed to show significant differences between groups.[2] The American Fertility Society (AFS) created a scoring system where endometriosis was classified based on lesion sites: peritoneum, ovary, and tube.[3] This scoring system was later revised; the revised scoring system included addition of number and size of endometriosis implant in peritoneum and ovarium, ovarium and fallopian tube attachment, as well as the extent of attachment and obliteration of Douglas cavity. This revised scoring system was renamed into r-AFS. Numerous studies[2,4-7] suggested that the application of r-AFS was inefficient in predicting pregnancy rate. In addition, different pregnancy rates between groups were observed.

In 2010, Adamson created a simple, validated clinical tool that predicted pregnancy rates in patients with surgically documented endometriosis

who attempted non-IVF conception.[8] This study is aimed to externally validate EFI in an Indonesia population.

METHODS

A prospective study design was used. This study was conducted at Dr. Cipto Mangunkusumo and Carolus Hospital during the period between December 2012 and June 2016.

A total of 59 reproductive aged (range: 20-40 years old) women diagnosed with both endometriosis and infertility who underwent laparoscopic surgery were included in this study. The exclusion criteria were having partners with sperm disorders (according to the standard of 2010 World Health Organization Criteria For Semen) and sex frequency less than twice a week.

The subjects were followed up for two years. During the observational period, we contacted the subjects periodically to find out the pregnancy status. Subjects who became pregnant were further re-evaluated to determine the date of the first day of the last menstrual period.

Statistical analysis was made with the use of SPSS 22 for Windows. Chi Square test and Fisher exact test were used for qualitative variables, while Student's t-test, Kolmogorov-Smirnov test, and Mann Whitney test were used for continuous variables.

RESULTS

Participation of the subjects

From December 2012 to June 2016, 59 subjects were included. Eight were lost to follow up. The mean age of the subjects was 34.2 ± 5.0 years old. Twenty (39.2%) subjects were recruited from Dr. Cipto Mangunkusumo Hospital, while 31 (60.8%) subjects were recruited from Carolus Hospital.

Pregnancy

From December 2012 to June 2016, 18 (35.3%) subjects became pregnant. One (2%) patient receiving IVF treatment reported successful pregnancy. The distribution of EFI score and pregnancy rate is presented in Table 1.

Table 1. EFI Score and Pregnancy Rate during the Two-Year Observational Period (n=51)

EFI score	Total subjects (n)	Pregnant subjects (n)	Pregnancy rate (%)
0-3	16	0 / 16	0
4	11	0 / 11	0
5	4	2 / 4	50.0
6	4	1 / 4	25.0
7 - 8	14	13 / 14	92.9
9 - 10	2	2 / 2	100

Demographic characteristics of the subjects and their pregnancy status

Demographic characteristic of the subject is presented in Table 2. Statistical analyses suggested that younger age, infertility duration ≤ 3 years, higher LF score, and AFS score below 71 were significantly associated with pregnancy ($p<0.001$, $p<0.001$, $p=0.035$, $p<0.001$, respectively). Relationship between the characteristic of the subjects in EFI score and their pregnancy status is presented in Table 3. Pregnant subjects had significantly higher median EFI score compared to the not pregnant group [EFI score 7 (5-9) vs 4 (1-8), $p<0.001$)].

Table 2. Demographic Characteristics of the Subjects

Characteristics	Pregnant N=18	Not Pregnant N= 33	All Patients N=51	p
Age (years)	30.9 ± 3.4	36.0 ± 4.8	34.2 ± 5.0	<0.001[a]
Infertility Duration (years)	2.0 (1.0-5.0)	4.0 (1.0-13.0)	4.0 (1.0-13.0)	<0.001[b]
Hospital				
Dr. Cipto Mangunkusumo (%)	6 (33.3)	14 (42.4)	20 (39.0)	0.52[c]
Carolus (%)	12 (66.7)	19 (57.6)	31 (61.0)	

a= t-test; b=Mann-Whitney; c= chi-square

Table 3. Relationship between the Characteristic of the Subjects in EFI Score and their Pregnancy Status

Characteristics	Pregnant		Not Pregnant		p
	b	%	n	%	
Age (%)					
≤ 35 years old	16	51.6	15	48.4	0.025[a]
36-39 years old	2	14.3	12	85.7	
≥ 40 years old	0	0	6	100	
Infertility duration (%)					
≤ 3 years	16	66.7	8	33.3	<0,001[b]
> 3 years	2	7.4	25	92.6	
Previous pregnancy (%)					
Primary infertility	17	37.0	29	63.0	0.64[c]
Secondary fertility	1	20.0	4	80.0	
Least function (LF) score (%)					
High (7-8)	3	75.0	1	25.0	0.035[a]
Moderate (4-6)	15	45.5	18	54.5	
Low (1-3)	0	0	14	100	
Endometriosis AFS score (%)					
< 16	4	44.4	5	55.6	0.70[c]
≥ 16	14	33.3	28	66.7	
AFS total score (%)					
< 71	16	59.3	11	40.7	<0.001[b]
≥ 71	2	8.3	22	91.7	

a=Kolmogorov-Smirnov; b=Chi-Square; c= Fisher-exact

DISCUSSION

In this study, 83.3% subjects who reported successful pregnancy had EFI score ≥ 7. Adamson and Pasta[8] suggested that subjects with EFI score ≥ 6 had pregnancy rate of ≥ 50% during the first 24 months. Boujenah et al[9] suggested a validation on French population and the results were in line with the study conducted by Adamson and Pasta.[5]

Macer and Taylor[10] concluded that mechanical disorders including pelvic adhesion may lead to pelvic anatomy distortion and decreased fecundity. Other factors including inflammatory cytokine, angiogenic and growth factors, and genetic also affect fertility in endometriotic patients. Adamson and Pasta[8] suggested that LF score had great importance in predicting pregnancy rate. Tomasetti et al[11] suggested that the end-of-surgery LF score was the most important contributor to the EFI score. No subjects with low LF score (0-3) reported successful pregnancy in this study.

In this study, we found that one patient was successfully pregnant by IVF method. Wang et al[12] found that EFI could predict pregnancy rate in patients with endometriosis who attempted IVF conception.

In conclusion, we found that higher EFI score is significantly associated with pregnancy rate. Further studies are required to determine the prediction value of EFI score to cover larger subjects with endometriosis in Indonesia.

CONCLUSION

The pregnancy rate of infertile subjects with endometriosis during the first two years after laparoscopic surgery was 35.3%. Higher EFI score was significantly associated with higher pregnancy rate. Further studies are required to analyze the survival rate of pregnant subjects based on EFI score.

Conflicts of interest

The authors declare no conflict of interest.

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