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Multivariate Analysis Of Infertility Risk Factors In Fertile Age Couples

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ABSTRACT

Infertility is a reproductive health problem that impacts the biological, psychological, and social aspects of couples of childbearing age (PUS). Various factors such as age, body mass index (BMI), history of infection, hormonal disorders, and lifestyle are suspected to play a role in the occurrence of infertility. This study aims to analyze the risk factors for infertility in couples of childbearing age using a multivariate approach. The study used a case-control design with a sample of 120 respondents (60 infertility cases and 60 fertile controls). Data were collected through structured interviews and medical record reviews. Analysis was performed using multiple logistic regression to determine the dominant risk factors. The results showed that the wife's age ≥ 35 years (OR=3.8; $p=0.002$), a history of reproductive tract infections (OR=4.5; $p=0.001$), an abnormal BMI (OR=2.9; $p=0.010$), and the husband's smoking habit (OR=3.2; $p=0.005$) were significant risk factors for infertility. The dominant factor was a history of reproductive tract infections. It is concluded that infertility is multifactorial and requires a comprehensive approach in its prevention and treatment.

Keywords: Infertility, Fertile Age Couples, Logistic Regression, Risk Factors





1. Introduction

Infertility is defined as the inability of a couple to conceive after 12 months of regular unprotected sexual intercourse. Globally, infertility affects approximately 10–15% of couples of childbearing age. In Indonesia, infertility remains an under-recognized issue due to cultural factors and limited access to reproductive health services.

Infertility can be caused by female factors, male factors, a combination of both, or unexplained factors. Commonly associated risk factors include advanced age, hormonal disorders, obesity, reproductive tract infections, exposure to environmental toxins, and smoking.

A multivariate approach is needed to identify dominant risk factors after controlling for other potentially confounding variables. Logistic regression analysis allows for the determination of the odds ratio of each risk factor to the occurrence of infertility.

This study aims to analyze the risk factors for infertility in couples of childbearing age using a multivariate approach to obtain an overview of the dominant influencing factors.

2. Research Methods

This study used a case-control design.

a. Population and Sample

The population is fertile age couples who check themselves at the fertility clinic and Community Health Center X.

- Case group: 60 couples with a diagnosis of infertility
- Control group: 60 couples with a normal fertility history

Total sample: 120 respondents

b. Inclusion Criteria

- Age 20–45 years
- Married ≥ 1 year
- Willing to be a respondent

c. Research Variables

Independent variables:

- Wife's age
- BMI
- History of reproductive tract infections
- Hormonal disorders
- Husband's smoking habit
- Stres

Dependent variable:

- Infertility incidents



**d. Instrument**

- Structured questionnaire
- Medical record data
- Laboratory examination

e. Data analysis

- 1) Univariate analysis
- 2) Bivariate analysis (chi-square)
- 3) Multivariate analysis using multiple logistic regression

3. Research Results And Discussion**a. Research result**

The total number of respondents was 120 fertile couples consisting of 60 infertility cases and 60 fertile controls.

1) Respondent Characteristics

| Characteristics | Case (%) | Control (%) |
|------------------------------------|----------|-------------|
| Wife's age ≥ 35 years | 55 | 25 |
| Abnormal BMI | 50 | 28 |
| History of reproductive infections | 48 | 18 |
| Husband is an active smoker | 52 | 27 |
| High stress | 35 | 22 |

The case group showed higher proportions of almost all risk factors than the control group.

2) Bivariate Analysis

| Risk Factors | OR | Crude 95% CI | p-value |
|----------------------|-----|--------------|---------|
| Age ≥ 35 years | 3.5 | 1.6–7.4 | 0.004 |
| Abnormal BMI | 2.7 | 1.3–5.8 | 0.015 |
| History of infection | 4.2 | 1.9–9.0 | 0.001 |
| Smoke | 3.0 | 1.4–6.3 | 0.008 |
| High stress | 1.8 | 0.8–4.0 | 0.090 |

Variables with $p < 0.25$ were entered into multivariate analysis.

3) Multivariate Analysis (Multiple Logistic Regression)

The final logistic regression model shows:

| Variables | OR | Adjusted 95% CI | p-value |
|------------------------------------|-----|-----------------|---------|
| History of reproductive infections | 4.5 | 1.9–10.2 | 0.001 |





| Variables | OR | Adjusted 95% CI | p-value |
|---------------------|-----|-----------------|---------|
| Age ≥ 35 years | 3.8 | 1.6–8.9 | 0.002 |
| Smoke | 3.2 | 1.4–7.5 | 0.005 |
| Abnormal BMI | 2.9 | 1.3–6.7 | 0.010 |

Model Feasibility Test

- Hosmer-Lemeshow test: $p = 0.72$ (model fit)
 - Nagelkerke $R^2 = 0.41$
- The model explains 41% of the variation in infertility incidence.
History of reproductive infections is the most dominant factor.

b. Discussion

The results of the study show that infertility in couples of childbearing age is multifactorial and influenced by a combination of biological and behavioral factors.

1) History of Reproductive Tract Infection (Dominant Factor)

A history of infection increases the risk of infertility by 4.5 times after controlling for other variables. Infections such as pelvic inflammatory disease can cause:

- Fallopian tube adhesions
- Fallopian tube cilia damage
- Reproductive tract obstruction

This damage disrupts the transport of ova and sperm, thus reducing the chances of fertilization. These results are consistent with the pathophysiological theory of tubal infertility.

2) Age ≥ 35 Years

A wife's age ≥ 35 years increases the risk of infertility by 3.8 times. Biologically:

- Decreased ovarian reserve
- Decreased oocyte quality
- Increased risk of aneuploidy

Decreased oocyte quality leads to lower chances of implantation and increased conception failure.

3) Abnormal BMI

An abnormal BMI increases the risk 2.9 times. Obesity causes:

- Insulin resistance
- Ovulation disorders
- Estrogen imbalance

While underweight can cause hormonal disorders of the hypothalamus-pituitary-ovary.

4) Smoking Habit in Husband





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Smoking increases the risk 3.2 times. Nicotine and free radicals cause:

- Decreased sperm motility
- Sperm DNA damage
- Increased oxidative stress

This affects the quality of spermatogenesis.

5) Multivariate Model Interpretation

The Nagelkerke R^2 value of 0.41 indicates that 41% of infertility events can be explained by the variables in the model, while the remainder is influenced by other factors such as:

- Genetic factors
- Environmental exposure
- Immunological disorders

The fit model (Hosmer-Lemeshow $p > 0.05$) shows that logistic regression is quite good at explaining the relationship between risk factors.

➤ **Epidemiological Implications**

Infertility cannot be explained by a single factor. Preventive interventions must be comprehensive, including:

- Reproductive infection screening
- Education on ideal pregnancy planning age
- Weight control
- Smoking cessation program

The preconception approach is an important strategy to reduce the risk of infertility.

➤ **Clinical Implications**

- Screening for reproductive infections should be a routine screening in PUS.
- Premarital and preconception counseling needs to be strengthened.
- Healthy lifestyle promotion programs can reduce the risk of infertility.

4. Conclusion And Suggestions

a. Conclusion

Significant multivariate risk factors for infertility include age ≥ 35 years, abnormal BMI, history of reproductive tract infections, and smoking. The dominant factor was a history of reproductive tract infections.

b. Suggestion

- 1) Increased screening for reproductive infections in PUS.
- 2) Healthy lifestyle education and quitting smoking.
- 3) Preconception counseling for couples of childbearing age.
- 4) Further research with cohort design.





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Reference

1. Agarwal A, et al. Male infertility. *Lancet*. 2015;385:164–178.
2. Anurogo, D., Rahmat, RA, & Pannyiwi, R. (2025). Identification of Endophytic Fungi in Traditional Medicinal Plants in South Sulawesi. *JIMAD: Multidisciplinary Scientific Journal*, 3(2), 77–82. <https://doi.org/10.59585/jimad.v3i1.862>
3. Boivin J, et al. International infertility prevalence. *Hum Reprod*. 2007;22:1506–1512.
4. CDC. Infertility overview. Atlanta; 2022.
5. Cunningham FG, et al. *Williams obstetrics*. 2018.
6. Darwis, A., Syahridayanti, S., Pratiwi, C., & Wahyuni, S. (2025). Touch Therapy Or Light Massage That Stimulates The Body To Release Endorphine Compounds (Endorphine Massage) For Labor In Mothers In Active Phase Of In-Partu With Pain In The First And Second Periods. *International Journal of Health Sciences*, 3(2), 193–199. <https://doi.org/10.59585/ijhs.v3i2.643>
7. Ganoko, MA, Saleh, MA, & Amiruddin, T. (2024). Characteristics of Coronary Heart Disease Patients Hospitalized at Dr. La Palaloi Maros Regional Hospital from January 2022 to December 2023. *Barongko: Journal of Health Sciences*, 3(1), 54–64. <https://doi.org/10.59585/bajik.v3i1.471>
8. Inhorn MC. Global infertility. *Reprod Health*. 2015;12:20.
9. Mascarenhas MN, et al. Global infertility rates. *PLOS Med*. 2012;9:e1001356.
10. Notoatmodjo S. *Health research methodology*. 2020.
11. Niederberger C. Male infertility. *Nat Rev Urol*. 2017;14:675–690.
12. Maheshwari A. Female age and fertility. *Hum Reprod Update*. 2008;14:59–68.
13. ASRM Practice Committee. Infertility definitions. *Fertile Sterile* . 2020;113:533–535.
14. Pannyiwi, R., Azis, MNSA, & Rahmat, RA (2025). Analysis of Nurses' Obstacles in Implementing Therapeutic Communication in Healthcare Environments. *Barongko: Journal of Health Sciences*, 4(1), 231–243. <https://doi.org/10.59585/bajik.v4i1.921>
15. Sharma R, et al. Lifestyle factors and infertility. *Reprod Biol Endocrinol*. 2013;11:66.
16. WHO. Infertility fact sheet. Geneva; 2023.
17. WHO. Sexual and reproductive health. Geneva; 2022.
18. Wahyuni, T., Achmad, VS, Pannyiwi, R., & Rahmat, R. A. (2025). The Relationship Between Nurse's Knowledge about Ventilators and Compliance in Preventing Ventilator - Associated Pneumonia (VAP) in the ICU. *International Journal of Health Sciences*, 3(4), 704–710. <https://doi.org/10.59585/ijhs.v3i4.892>
19. Zegers-Hochschild F, et al. International glossary. *Hum Reprod*. 2017;32:1786–1801.

