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RESEARCH**Semen Quality of Infertile Men and Correlation with Demographic Characteristics**Muhammad Iqbal¹, Hudila Rifa Karmia², Alvarino³

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Abstract

Introduction: Infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. There are 2 types of infertility, the first one is primary infertility is the inability to have any pregnancy, while secondary infertility is the inability to have a pregnancy after previously successful conception. In Indonesia infertility affects 10–15% of reproductive-age couples. Infertility can be caused by both men and women. The causes of male infertility are divided into three major categories: pretesticular, testicular, and post-testicular causes.

Objective: To analyze semen quality of infertile men and its correlation with demographics characteristics.

Methods: This was an analytic observational study with cross-sectional retrospective study design on 92 infertile men. The study began in May 2021 to December 2021 in the Obstetrics and Gynecology Clinics at BMC Hospital Padang.

Results: The correlation between age and marital duration was positively correlated ($r = 0,558$), with a weak correlation and there is statistically significant relationship between age and marital duration. Age and sperm concentration was positively correlated ($r = 0,048$), with a weak correlation. Marital duration and sperm concentration was positively correlated ($r = 0,052$), with a weak correlation. The correlation between age and progressive motility and non- progressive motility percentage were positively correlated ($r = 0,009$ and $0,035$), with a weak correlation. The correlation between age and progressive immotile sperm percentage were negatively correlated ($r = - 0,030$), with a weak correlation.

Conclusion: There was a positive correlation between age and sperm concentration, and progressive and non progressive motility with a weak correlation. There was a positive correlation between age and marital duration with a strong correlation. There was negative correlation between and sperm immotility with a weak correlation.

Keywords: male infertility, semen, age, marital duration

INTRODUCTION

Infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.¹ There are 2 types of infertility, the first one is primary infertility is the inability to have any pregnancy,



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while secondary infertility is the inability to have a pregnancy after previously successful conception.² Worldwide in 2010, 48.5 million couples are unable to have a child, of which 19.2 million couples are unable to have a first child (primary infertility), and 29.3 million couples are unable to have an additional child (secondary infertility).³ In Indonesia infertility affects 10–15% of reproductive-age couples.⁴

Infertility can be caused by both men and women. The causes of male infertility are divided into three major categories: pretesticular, testicular, and post-testicular causes. The pre-testicular causes of infertility may be defined as abnormal hormonal regulation of the testicle. The testicular causes of infertility are chromosomal abnormalities, systemic diseases, impaired androgen action, testicular injury, cryptorchidism, varicocele and idiopathic, while post testicular causes of infertility consist disorders of the ejaculatory tract, impaired sperm function and sperm motility.⁵

Disorders of the testes cause a decrease in the diameter of the seminiferous tubules and decrease in the number of Leydig cells and Sertoli cells, causes disruption of reproductive hormone function which will later cause disruption of spermatogenesis. Impaired spermatogenesis will cause abnormalities in sperm (concentration, morphology, and motility). Thus, based on these findings, we intended to conduct a study to see whether there was a correlation between characteristics of infertile men and quality of sperm in the semen of infertile men.

METHODS

This research was an analytic observational study with cross-sectional retrospective study design. The research was conducted from May 2021 to December 2021 in the Obstetrics and Gynecology Clinics at BMC Hospital Padang with a total sample of 92 participants. Samples to be taken are infertile man who come to Obstetric and Gynecology Clinics that meet the inclusion criteria. The inclusion criteria are patients with a complete semen analysis report and willing to be research respondents by giving an informed consent. Normality test was performed using the Kolmogorov Smirnov test ($n < 100$). If the data is normally distributed, the Pearson Correlation test is used, while if it is not normal, Spearman's Rank Correlation test is used

Before this research began, an ethical clearance was submitted to the Research Ethics Commission Team of the Faculty of Medicine, Andalas University, and had received an ethical clearance statement number.

RESULTS

Characteristics of study subjects based on age, marital duration, sperm motility, concentration, and morphology shown in Table 1 below:



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Table 1. Participant Characteristics and Research Variables

Subject Characteristics	n	Mean ± SD	%
Age (years)	92	33.83 ± 4.685	
Marital duration (years)	92	5.36 ± 2.922	
Sperm Concentration (mio/ml)	92	42.8 ± 45.564	
Sperm Motility (%)	92		
Progressive	1	5.54 ± 7.911	
Non-progressive	9	26.67 ± 13.929	
Immotile	82	67.13 ± 17.396	
Sperm Morphology			
Normal	0		
Abnormal	92		100

In our study, a sample of 92 men was considered. Based on table 1, the mean age of the participants in this study was 33.83 ± 4.685 years (healthy reproductive age) and the mean of marital duration was 5.36 ± 2.922 years. The mean sperm concentration of the participants was in normal range according to World Health Organization. More than three quarters participants had immotile sperm analysis. All of the participants (100%) had abnormal head morphology in sperm analysis. Therefore sperm morphology not included in Pearson Correlation test.

Table 2. Correlation between Participant Characteristics and Research Variables

Age		Marital Duration
	n	92
	r	0,558
	p	<0,001
Age		Sperm Concentration
	n	92
	r	0,048
	p	0,651
Marital Duration		Sperm Concentration
	n	92
	r	0,052
	p	0,620
Age		Motility



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	Progressive
n	1
r	0,009
p	0,929
	Non-progressive
n	9
r	0,035
p	0,737
	Immotile
n	82
r	-0,030
p	0,776

Based on table 2, it is known that there is a positive correlation between age and marital duration ($r = 0,558$), with a weak correlation and there is significant relationship between age and marital duration. Correlation between age and sperm concentration was positively correlated ($r = 0.048$), which means that if participants get older, sperm concentration will also increase) but had weak correlation. There is also positive correlation between marital duration and sperm concentration ($r = 0,052$), which means that the longer marital duration, sperm concentration also increase but with a weak correlation.

Based on table 2, there is also positive correlation between age and progressive motility and non-progressive motility percentage ($r = 0.009$ and 0.035), which means that the older participants, the higher the percentage of progressive and non progressive sperm motility but with a weak correlation. The correlation between age and progressive immotile sperm percentage were negatively correlated ($r = -0,030$), which means that the older participants, the higher the percentage of immotile sperm but with a weak correlation.

DISCUSSIONS

1. Correlation of Age and Sperm Concentration

Based on the results of this study, it is known that the correlation between age and sperm concentration was positively correlated ($r = 0.048$), which means that the older participants, the higher the sperm concentration with a weak correlation. The result of the analysis showed there is no significant differences between age and sperm concentration ($p > 0.05$).

In line with study by Veron et al that found sperm concentration was found positively correlated ($r = 0.01903$) to age.⁵ A meta-analysis review by Johnson et al. found age- associated declines in semen volume, percentage motility, normal morphology and unfragmented cells, but not in sperm concentration. In contrast to the result of a study conducted by Pasqualotto et al sperm concentration decrease with age and identified an age threshold of > 45 years for



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sperm concentration and motility reduction.^{6,15} Stone et al. reported that sperm concentration declined after 40 years of age.⁷

To explain the age-dependent changes in semen quality, two issues should be considered. First, cellular or physiological changes due to ageing have been described in testicles, seminal vesicles, prostate, and epididymis. Age-related narrowing and sclerosis of the testicular tubular lumen, decreases in spermatogenic activity, increased degeneration of germ cells, and fewer and less functional Leydig cells have been reported in autopsies of men who died from accidental causes.^{14,16} Smooth muscle atrophy and a decrease in protein and water content, which occur in the prostate with ageing, may contribute to decreased semen volume and sperm motility. Also, the epididymis, a hormonally sensitive tissue, may undergo age-related changes. This hormonal or epididymal senescence may lead to decreased sperm motility in older men. Second, increasing age implies more frequent exposure to exogenous damage or disease. Older men are more likely to have smoked for a longer period than younger men, or to have had such illnesses as urogenital infections.^{6,17}

2. Correlation of Age and Sperm Motility

Based on the results of this study, it is known that the correlation between age and progressive motility and non-progressive motility percentage were positively correlated ($r = 0.009$ and 0.035), which means that the older the participants, the higher the percentage of progressive and non progressive sperm motility with a weak correlation. In contrast this study found negatively correlation between age and immotile sperm percentage. The result of the analysis showed there is no significant differences between age and the percentage of progressive, non-progressive and immotile sperm ($p > 0.05$). In contrast to the result of a study conducted by Collodel et al found an increasing age was correlated to a decreasing sperm progressive motility ($r = -0.232$, $p = 0.007$).⁸ Winkle et al also found that sperm motility decreased with increasing age.⁹ Darbadi et al also found semen volume, sperm normal morphology, and progressive motility were decreased in > 45 years old participants.^{10,18} The differences in the correlation in this study may be due to differences of mean age between the studied populations and weak correlation between age and sperm motility in recent study.

3. Correlation of Age and Marital Duration

Based on the results of this study, it is known that there is a positive correlation between age and marital duration, with a correlation coefficient 0,558 (strong correlation) and there is significant relationship between age and marital duration ($p < 0.01$), which means that the older the participants, the longer the marital duration. The mean age of the participants was 33.83 ± 4.685 years which means in healthy reproductive age but the mean marital duration of the participants was 5.36 ± 2.922 years and still don't have a child. According to World Health Organization infertility is defined as failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.^{1,19}



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4. Correlation of Marital Duration and Sperm Concentration

Based on the results of this study, it is known that there is a positive correlation between age and marital duration, with a correlation coefficient 0,052 (weak correlation), which means that the longer the marital duration, the higher the sperm concentration. There is no significant relationship between age and marital duration ($p=0.052$). The longer marital duration tends to be an older couple, in contrast with these study findings, a study conducted by Pasqualotto et al, sperm concentration decrease with age and identified an age threshold of > 45 years for sperm concentration and motility reduction.^{6,20} The differences in the correlation in this study may be due to differences of mean age between the studied populations and weak correlation between marital duration and sperm concentration in recent study.

CONCLUSION

From the results of this study can be concluded that there was a positive correlation between age and sperm concentration, and progressive and non progressive motility with a weak correlation. There was a positive correlation between age and marital duration with a strong correlation. There was negative correlation between and sperm immotility with a weak correlation.

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