

Relationship Between Degree of Depression and Sperm Analysis Results in Infertile Men

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Article Information	ABSTRACT
Article History: Submission: 06 December 2024 Revision: 18 July 2025 Reception: 09 August 2025	Introduction: Infertility remains a significant health issue in Indonesia. Many individuals with infertility also report experiencing depression. However, studies on the relationship between depression and infertility remain inconsistent. This study aims to determine the relationship between the severity of depression and sperm analysis results in infertile men. Method: This study was conducted from August to November 2024 at the Authentic Fertility Clinic in Makassar. The study design was an analytical survey using a <i>cross-sectional study</i> design. This study employed a quantitative method by measuring depression levels using the <i>Patient Health Questionnaire-9 (PHQ-9)</i> , which was then linked to sperm analysis results in infertile men. Data were collected through structured interviews with couples seeking to have children. Data analysis included univariate, bivariate, and multivariate analyses using SPSS version 16. Results: Depression in cases of infertility was predominantly mild, accounting for 61.54%. Sperm analysis in cases of infertility showed that the majority of respondents had oligoteratozoospermia, at 30.77%. Statistical analysis revealed no significant association ($p=0.457$). Conclusion: Most respondents experienced depression. There was no significant association between the severity of depression and sperm analysis.
Keywords: Depression, infertility, male, spermatozoa	
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INTRODUCTION

The incidence of infertility remains a significant health issue worldwide, including in Indonesia. Infertility is defined as the inability to conceive or have children in a fertile couple who have had regular sexual intercourse (2-3 times per week) without using

contraception for 12 months (Harismayanti, 2021). Men are the primary factor in many cases of infertility. The relatively high rate of infertility in men is attributed to disorders related to impaired sperm quality and quantity.

Infertility has been described as a threat to marital stability in developing countries. The psychosocial consequences of infertility, such as divorce or abandonment by a spouse, are common in some cultures, and the concept of living without children is considered impossible or even unthinkable (Mahfudah et al., 2019). Indonesia has a high biological need for infertility therapy, while the psychological and sociological needs for infertility services have not been optimized. Identifying and implementing strategies to improve access to *Assisted Reproductive Technology* (ART) is crucial (Annisa, 2017).

Infertility affects approximately 15% of male and female couples, with men contributing to approximately 40-60% of infertility cases. Sperm analysis is the initial step in diagnosing infertility in men. Several factors can affect semen quality, so a physical examination must be conducted to evaluate anatomical abnormalities, genetic issues, endocrine disorders, and varicocele. Additionally, depression is another factor that threatens reproductive health (Annisa, 2017).

Studies on the relationship between depression and infertility remain inconsistent, with some indicating that depression significantly weakens sperm motility and morphology in infertile men (Randanan, 2015). The negative effects of depression include increased cortisol levels and decreased levels of testosterone, progesterone, and prolactin. Regarding semen parameters, patients with hypospermia were more than twice as depressed as those with normal semen volume. Regarding depression, it was observed that patients with a history of infertility lasting one year or more had a nine-fold higher risk of depression (Barazani et al., 2014).

This study aims to determine the relationship between the degree of depression and semen analysis results in infertile men in Otentik.

LITERATURE REVIEW

Depression Variables Related to Infertility in Men.

Several studies have highlighted the close relationship between male infertility, psychological stress, and mental health outcomes. Hall and Burt, (2012) emphasized that male infertility can be influenced by various factors such as obesity, tobacco use, stress, and depression, which in turn may reduce testosterone levels and impair spermatogenesis. Similarly, (McHenry et al., 2014) demonstrated a significant association between testosterone levels, anxiety disorders, and major depressive disorders. Their findings revealed that men with hypogonadism characterized by reduced gonadal function and decreased testosterone levels were more likely to experience anxiety and depressive disorders compared to men with normal androgen levels.

Supporting this, (Janevic et al., 2014) found an inverse relationship between stress and sperm quality, showing that men who experienced multiple stressful events had a lower percentage of motile sperm and normal sperm morphology, although sperm concentration remained unchanged. In addition to individual stress, marital dynamics also play a crucial role. (Martins et al., 2014) showed that marital stability significantly influenced infertility-related stress, with men who remarried experiencing consistently higher stress levels throughout fertility treatment compared to those who remained with their initial partners.

Moreover, (Ozkan et al., 2015), in their study on Turkish men, found that while infertility did not cause erectile dysfunction or impair sexual function parameters, infertile men exhibited higher levels of depression than the control group. More recently, (Biggs,

Halliday, and Hammarberg, 2024) emphasized that infertility negatively impacts men's mental health, underlining the importance of providing adequate psychological and emotional support to men undergoing assisted reproductive technology. Together, these findings illustrate the multidimensional impact of infertility on men's psychological well-being and highlight the urgent need for integrated medical and psychological interventions.

Sperm Analysis Variables Related to Male Infertility

Research on male infertility has revealed various medical, psychological, and lifestyle-related factors that significantly affect men's reproductive health. Bennett *et al.*, (2012) noted that although Indonesia has 20 regulations governing infertility clinics with advanced technology, the utilization of these diagnostic services among married couples remains very low. On the biological side, (Petraglia, Serour, and Chapron, 2013) demonstrated that psychological stress in men can reduce sperm count, motility, and the percentage of normal sperm, ultimately affecting semen quality. Similarly, (Ahmadi *et al.*, 2014) highlighted how certain lifestyle factors, particularly mechanical trauma from activities such as cycling and occupations involving pressure on the pelvis and testicles, may decrease sperm count, while lifestyle modifications and exercise can improve semen quality in infertile men. Complementing these findings, (Katib, 2015) emphasized that disorders in spermatogenesis and sexual dysfunction directly influence fertility variables, further contributing to infertility outcomes. More recent studies have shifted greater attention to the psychological burden of infertility. (Kiani *et al.*, 2023) revealed a significant prevalence of depression among infertile men, stressing the importance of addressing mental health concerns during infertility treatment. In the same context, (Kooli *et al.*, 2023) reported that men with hypospermia were more than twice as likely to experience anxiety compared to those with normal semen volume, and men with infertility lasting more than a year faced a ninefold higher risk of depression. Collectively, these studies underscore the multifactorial nature of male infertility, highlighting not only the medical and lifestyle dimensions but also the pressing need to integrate psychological support into infertility care.

METHOD

The research design used in this study was an analytical survey using a *cross-sectional study* design, which is a research design that measures or observes risk factors/exposure and disease at the same time (once) with the aim of analyzing the facts and data needed to support the discussion of the research, in solving and answering the main problems raised.

The study population consists of 28 individuals. The sample for this study comprises 26 male infertile patients who underwent examinations at the Otentik Clinic in Makassar City during the period of August to November 2024. To determine the sample, the researcher employed the *Total Sampling* technique. The research protocol has obtained ethical approval from the Research Ethics Committee of the University of Muslim Indonesia with number: 426/A.1/KEP-UMI/VIII/2024.

The inclusion criteria for this study were infertile men; married; willing to participate in the study; and willing to sign an *informed consent form*. The exclusion criteria were testicular abnormalities; erectile dysfunction; and comorbid conditions such as diabetes mellitus, renal dysfunction, liver dysfunction, and others. The data collection methods used are 1) *Interviews* related to the research objectives and obtaining consent through *informed consent*; 2) *Observation*, which involves collecting data through direct observation of physiological needs, safety needs, social needs, esteem needs, and self-actualization needs to obtain data related to this study; 3) *Questionnaires*, which involved distributing a list of questions to respondents; 4) Sperm analysis examinations for the

research subjects; 5) Data analysis and document review, which involved collecting research data and reviewing books, reports, journals, or scientific articles related to the research topic. , statistical analysis was conducted using computerized systems with SPSS version 25 using *the chi-square test*.

RESULTS AND DISCUSSION

Data collection was conducted from August 29 to November 2, 2024. The sample consisted of all infertile patients who visited Otentik (Pharmacy and Doctor's Practice) in Makassar and underwent sperm analysis. The dependent variable was depression, while the independent variables were smoking, conflict resolution, intimate communication, role equality, leisure time, financial management, sex, environment, physical activity, and religion. The researchers successfully obtained 26 male infertile participants who had never had children, had never impregnated a woman, and had not experienced pregnancy for at least 12 months despite regular sexual intercourse without contraception.

Table 1. Distribution of Respondent Characteristics (N= 26)

Variables	Categories	Frequency (n)	Percentage (%)
Age	22-30	5	19.23
	31-35	6	23.08
	36	12	46.15
	41-66	3	11.54
Occupation	Lecturer	1	3.85
	Teacher	2	7.69
	Sailor	1	3.85
	Nurse	1	3.85
	Farmer	1	3.85
	Private	9	34.61
	Military	1	3.85
	Private sector	10	38.46
	Bali	1	3.85
	Sanger	1	3.85
Ethnic	Bugis	15	57.69
	Javanese	1	3.85
	Makassar	6	23.07
	Mamasa/Mandar	1	3.85
	Toraja	1	3.85
	≤5 years	9	34.6
Length of Marriage	6-10 years	9	34.61
	>10 years	8	30.77
Lifestyle	Smoking	20	76.92
	Other	6	23.0
Previous medical history	Hypertension	1	3.85
	Mental disorders such as depression, anxiety, stress, etc.	1	3.85
	Others	2	92.3

The study began by asking potential participants for their willingness to read and sign *an informed consent form*. Following this, the researcher requested the respondents to complete a Depression Questionnaire consisting of 9 questions. After reviewing the

completed questionnaires, all participants met the criteria for inclusion in data processing and analysis.

Table 1 presents the sociodemographic and lifestyle characteristics of respondents with infertility. The majority were male in the 36–40 years age group (46.15%). In terms of occupation, most respondents were self-employed (38.46%), while ethnically, the largest proportion belonged to the Bugis ethnic group (57.69%). The duration of marriage among respondents was relatively evenly distributed. Regarding lifestyle, the majority of participants were active smokers. For history of previous illnesses, the most frequent response fell under the “other” category, which was not further specified in the questionnaire.

Table 2. Distribution of Respondents Based on Depression Severity (N=11)

Depression Level	Scores	Frequency (n)	Percentage (%)
No depression, even minimal	0	2	7.69
Mild depression	5	1	61.54
Moderate Depression	10-14	8	30.77
Moderate Depression	15-19	0	0
Severe Depression	20-27	0	0

The distribution of depression among respondents was categorized into five levels: no depression, mild, moderate, severe, and very severe (Table 2). The findings indicate that mild depression was predominant, affecting 61.54% of the study participants.

Table 2 shows that the analysis of the relationship between depression and sperm analysis of the respondents in total obtained 16 respondents who had mild depression and the highest number occurred in respondents who had sperm analysis of *Oligoteratozoospermia* and *Asthenoteratozoospermia*, namely 5 respondents each. It can be concluded that the average respondent had mild depression, with 16 respondents (61.54%) out of 26 respondents. The statistical test results yielded a p-value of $0.457 > 0.05$, indicating that there is no significant relationship between depression and sperm analysis results among the 26 respondents. The null hypothesis is accepted, and the alternative hypothesis is rejected.

Table 3. Distribution of Respondents Based on Sperm Analysis (N= 26)

Sperm Analysis	n	
Oligoteratozoospermia	8	30.7
Asthenoteratozoospermia	7	26.92
Teratozoospermia	6	23.08
Oligoasthenoteratozoospermia	5	19.2

Table 3 illustrates the sperm analysis results of infertile men, which were categorized into four groups: oligoteratozoospermia, asthenoteratozoospermia, teratozoospermia, and oligoasthenoteratozoospermia. Among these, oligoteratozoospermia was the most common abnormality, accounting for 30.77% of cases.

Depression is a mood disorder characterized by deep feelings of sadness and loss of interest in things one once enjoyed. A person is diagnosed with depression if they have felt sad, hopeless, or worthless for at least two weeks, which may be attributed to the prolonged waiting period for respondents to conceive (El Kissi, Y. *et al. al.*, 2013). Generally, infertile men tend to hide their depression, which can threaten their health and reduce their quality of life. Considering the role of depression and its impact on public

health (Ediati *et al.*, 2015). Depression can also be defined as a condition that suppresses an individual's psychological state and health in achieving an opportunity where there are limitations or obstacles (Gulevich *et al.*, 2015).

Table 4. Relationship between Depression Severity and Sperm Analysis Results in Male Infertility Cases in Makassar City

Depression Level	Sperm Analysis				Total	P-value
	Oligo Terato zoospermia	Astheno terato zoospermia	Terato zoospermia	Oligo astheno terato zoospermia		
	n (%)	n (%)	n (%)	n (%)	N (%)	
None to minimal depression	1 (50)	1 (50)	0	0	2 (100)	0.457
Mild depression	5 (31.25)	2 (12.5)	5 (31.25)	4 (25)	16 (100)	
Moderate depression	2 (25)	4 (50)	1 (12.5)	1 (12.5)	8 (100)	
Moderate depression	0	0	0	0	0 (0)	
Severe Depression	0	0	0	0	0 (0)	

Work-related stress is an important dimension of stress measurement that reflects different domains of stress due to life events and stress perception, and it is expected to have implications for better job placement programs. The results of this study in the analysis are also related to work tension, total testosterone, and semen quality, which are important for male reproductive quality (Gunes, Al-Sadaan, and Agarwal, 2015). Psychosocial stress also appears to influence sperm parameters in male fertility, which is difficult to isolate because there may be confounders such as depression tendencies and subjects' concerns about becoming obese, drinking alcohol, and smoking. The causal relationship between psychosocial stress and gonadal function should be considered based on psychological levels and the association between depression and low testosterone levels (Kliesch, 2014).

The mechanism by which stress affects semen quality occurs through neuroendocrine factors that influence spermatogenesis. Stress increases glucocorticoid levels, which reduce testosterone hormone secretion from Leydig cells, the process responsible for spermatogenesis. Clinical evidence suggests that testosterone has *anxiolytic* and antidepressant benefits, potentially improving mood and mental health in both women and men (McHenry *et al.*, 2014). Other mechanisms that may explain the study results include stress increasing plasma seminal reactive oxygen species levels, leading to oxidative stress that affects semen quality and fertility (Mascarenhas *et al.*, 2012).

During the guided interviews using a questionnaire, some respondents stated that in the early years of marriage (<5 years), they were stressed and even depressed due to the prolonged wait for a child. However, by the time their marriage had lasted >5 years, most respondents had accepted and come to terms with their situation of not having children, though feelings of stress/depression resurfaced when they were in the presence of family members, relatives, or neighbors who asked them, "Why don't you have children yet? Why has it taken so long to have children? Are you healthy? When relatives get married and have children within a year, why don't you?" Such questions and situations sometimes brought them back to a state of sadness and stress, even leading to mental health issues that could result in depression. However, at the Otentik clinic, most respondents appeared relaxed when discussing their situation during initial consultations and throughout the treatment/therapy process.

The statistical test results yielded a p-value of $0.457 > 0.05$, indicating no significant correlation between stress levels and sperm analysis results from the 26 respondents. This study aligns with the findings of the research (Barazani *et al.*, 2014). This study found an inverse relationship between stress scores. Men who experienced stress in their past lives had lower percentages of normal sperm motility and morphology compared to those without stressful events in their lives, but sperm concentration was normal between the two groups, regardless of stress history. This study aligns with research showing that psychosocial stress is inversely related to testosterone levels in *cross-sectional* observational studies, and various studies on the relationship between testosterone and stress have yielded conflicting findings (Andriani, A., Nita, S. *et al.* 2015).

Male fertility issues are complex and the process is not yet fully understood, influenced by various factors. Large-scale studies are needed before definitive conclusions can be drawn about the possible relationship between psychopathology and psychopharmacological agents and male fertility. In this context, doctors continue to face therapeutic dilemmas in balancing psychiatric treatment for male patients with poor sperm quality (Parmadi and Pratama, 2020). During the laboratory research, sperm analysis was conducted manually. To obtain accurate results, it is recommended to perform the examination three times over a three-month period, with semen collection on different days, such as Monday, Friday, and Sunday to obtain accurate conclusions from the sperm analysis results. This is because different days have different workloads, which can influence daily activities and psychological conditions, thereby affecting the results of the sperm analysis. It is important to note that depression is only one of many factors that can contribute to infertility in an individual. Comprehensive and ongoing examinations are essential for establishing a diagnosis.

CONCLUSION

The results of the study on the relationship between depression levels and sperm analysis in cases of male infertility in Makassar City can be summarized as follows: There is no significant association between depression and sperm analysis. The management of infertile couples is a complex medical issue involving multiple disciplines of medicine and public health, requiring comprehensive consultation and examination. The process is not yet fully understood and is influenced by various factors. Large-scale studies are needed before definitive conclusions can be drawn.

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