International Journal of Nursing and Health Care Research
Bhoi NR, et al. Int J Nurs Health Care Res 7: 1600
www.doi.org/10.29011/2688-9501.101600
www.gavinpublishers.com

Research Article

Impact of Azoospermia on Quality of Life: Insights from a Multi-Centric Cross-Sectional Study

Nihar Ranjan Bhoi[1*], Nitiz Murdia[2], Vipin Chandra[3], Kshitiz Murdia[1], Isha Suwalka[4], Sandeep Kumar Panigrahi[5], Jyotiranjan Sahoo[5], Walmik Mistari[3], Neha Dhar[1], Amol Lunkad[1], A. Jhansi Rani[1], Tanya Singh[1], Varun[1], Akansha Jangid[1], Dayaniddhi Sharma[1], Pranchi Tandon[1], Madhulika Singh[1], Chandra Bhushan Singh[1]

[1]Department of Reproductive Medicine, Indira IVF Hospital Pvt Ltd, Udaipur, India

[2]Department of Embryology, Indira IVF Hospital Pvt Ltd, Udaipur, India

[3]Department of Clinical Lab and Operations, Indira IVF Hospital Pvt Ltd, Udaipur, India

[4]Department of Research and Publications, Indira IVF Hospital Pvt Ltd, Udaipur, India

[5]Community Medicine Department, Siksha O Anusandhan deemed to be University, IMS and SUM Hospital, Bhubaneswar, India

[*]**Corresponding Author:** Nihar Ranjan Bhoi, Head Research and Academics Department of Reproductive Medicine, Indira IVF Hospital Pvt Ltd, Udaipur, India

Citation: Bhoi NR, Murdia N, Chandra V, Murdia K, Suwalka I, et al. (2024) Impact of Azoospermia on Quality of Life: Insights from a Multi-Centric Cross-Sectional Study. Int J Nurs Health Care Res 7:1600. DOI: https://doi.org/10.29011/2688-9501.101600

Received Date: 17 August, 2024; **Accepted Date:** 17 December, 2024; **Published Date**: 20 December, 2024

Abstract

Purpose: This cross-sectional study aims to evaluate the Quality of Life (QoL) among infertile couples with azoospermia attending infertility clinics and to explore its associations with various socio-demographic, medical, and personal characteristics. The primary research question focuses on identifying the factors influencing QoL in this population, utilizing both the Fertility Quality of Life (Ferti QoL) questionnaire and WHOQOL-BREF for assessment. **Methods:** The study was conducted across multiple infertility clinics to ensure a diverse demographic and socio-economic representation. Participants included infertile couples undergoing in-vitro fertilization (IVF) treatment, with male infertility attributed to azoospermia. Data collection involved semi-structured questionnaires covering socio-demographic information, medical history, and QoL assessments. Statistical analyses comprised descriptive statistics, chi-square tests, t-tests, and multiple linear regression analyses to explore associations between the characteristics and QoL. **Results:** Preliminary findings from the study indicate a range of factors influencing the Quality of Life (QoL) among infertile male partners(n=719) with azoospermia. Age was found to negatively impact mind/body scores, with older participants reporting lower QoL in this domain (β=-2.00, p=0.164). Male participants exhibited lower levels of social interaction, which was attributed to the fear of being ostracized. Rural residents reported significantly lower QoL compared to their urban counterparts, highlighting the impact of residential status on overall well-being. Higher levels of education were associated with poorer social well-being scores

(β = -5.74, p = 0.001), suggesting that more educated individuals might face greater social and financial pressures. Occupation and annual family income also played crucial roles, with lower income and unemployment correlating with increased social and financial insecurity. The duration of infertility emerged as a significant predictor of QoL, with longer durations linked to poorer outcomes in multiple domains, including physical health, psychological well-being, and social relationships (β =-3.96, p<0.001). Unexplained infertility and a higher number of failed Assisted Reproductive Technology (ART) attempts were associated with increased emotional distress. Other significant predictors included religion (β=-5.84, p=0.004), Body Mass Index (BMI) (β=2.76, p=0.001), and years of infertility (β=-3.96, p < 0.001). Notably, education level and BMI showed minimal association with QoL in other domains. **Conclusion:** This study highlights that specific socio-demographic and medical factors significantly influence the QoL of infertile couples with azoospermia. Rural residence and prolonged infertility duration are associated with lower QoL, particularly in the domains of physical health, psychological well-being, and social relationships.

Keywords: QOL; Ferti QOL; Azoospermia; WHOQOL-BREF; In-Vitro Fertilization (IVF) treatment

Introduction

Overview of Azoospermia and Its Prevalence

Azoospermia, characterized by the absence of sperm in semen, is a significant cause of male infertility. It can be classified into obstructive and non-obstructive types, each with distinct etiologies and treatment approaches [1]. The prevalence of azoospermia varies across populations, with estimates ranging from 1% to 15% of infertile men. Understanding the prevalence and subtypes of azoospermia is crucial for diagnosing and managing infertility in affected individuals [2].

Infertility, including azoospermia, has been shown to have a profound impact on the Quality of Life (QoL) of affected individuals and couples [2]. The inability to conceive can lead to feelings of inadequacy, stress, anxiety, and depression, affecting various aspects of daily life, including relationships, self-esteem, and social interactions. Research [1,2] indicates that infertility-related stress can significantly impair QoL and psychological well-being, highlighting the need for comprehensive support and interventions for affected individuals.

While numerous studies have investigated the QoL of infertile couples, relatively few have specifically focused on **males affected by azoospermia**. Existing research [3] in this area has primarily explored the psychological and emotional impact of azoospermia on individuals and relationships. Studies [2,4] have reported decreased QoL scores among infertile men with azoospermia, with factors such as treatment outcomes, coping strategies, and social support influencing QoL outcomes. However, there remains a need for more comprehensive research specifically examining the QoL of **males affected by azoospermia**, including the impact on marital satisfaction, sexual function, and overall well-being [5-7].

Despite the growing recognition of the psychological burden of infertility, there are notable gaps in the literature regarding the QoL of infertile males with azoospermia. Existing research often lacks a comprehensive assessment of QoL domains specific to azoospermia and **specifically male infertility**. It may overlook the unique challenges **such males** face. Therefore, there is a pressing need for empirical studies that explore the QoL of **infertile males** with azoospermia in-depth, identifying key determinants and interventions to improve well-being. The current study aims to address these gaps by providing valuable insights into the QoL of **males** affected by azoospermia and informing targeted interventions to enhance their overall quality of life.

While previous research [8-11] has examined the impact of infertility on QoL, limited attention has been paid to the specific challenges faced by males affected by azoospermia. Given the emotional distress and social stigma associated with infertility, investigating QoL in this population is imperative. By identifying factors influencing QoL, healthcare providers can develop tailored interventions to address the unique needs of infertile males with azoospermia, thereby enhancing their overall well-being.

Objectives of the Study

- To assess the quality of life among infertile **males** with azoospermia attending infertility clinics.
- To explore the association of poor quality of life with different socio-demographic, medical, and personal characteristics of infertile individuals.
- To identify specific domains of QoL most affected by azoospermia and its implications for clinical practice and intervention strategies

Methods

Study Design

This study is designed as a prospective observational study aimed at assessing the outcomes of infertile **males** undergoing in-vitro fertilization (IVF) treatment at Indira IVF centers across India.

Study Population

The study population will consist of infertile **males** attending Indira IVF centers for their treatment.

Study Setting

The study was conducted across all 103 Indira IVF centers in India, leveraging state-of-the-art infrastructure and advanced equipment available at these centers.

Subjects Selection

Inclusion Criteria

- Male attending in-vitro fertilization centers and giving informed consent.
- Male infertility cause identified as azoospermia.
- **The male patient** is between 18-45 years of age.

Exclusion Criteria

- Male partners older than 45 years of age.
- **Male patient** if in the terminal stage of an illness such as cancer, HIV-AIDS, transplant patients, etc.
- **Male patient** affected by COVID-19 disease.

Instruments/Tools Used

Fertility Quality of Life (FertiQoL) Questionnaire:

- **Purpose:** Assess the quality of life specifically about fertility issues.
- **Structure:** Consists of core and treatment sections, encompassing various domains such as mind/body, relational, social, emotional, and treatment-related aspects.
- **Scoring:** Comprises 36 items scored according to 5 response categories, with a response scale ranging from 0 to 4. Higher scores indicate a higher quality of life. Ferti QoL yields six subscales and three total scales with a range of 0 to 100.

WHO Quality of Life-BREF (WHOQOL-BREF)

- **Purpose:** Measure the general quality of life across four domains.
- **Structure:** Contains 26 items divided into four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items), along with two items for overall quality of life and general health.
- **Scoring:** Each item is scored from 1 to 5. Domain scores are transformed to a 0-to-100-point scale using the WHO-QoL transformation table. Higher scores indicate a better quality of life.

Socio-demographic and Medical History Questionnaire

- **Purpose:** Collect data on general characteristics, socio-demographic information, medical history, and personal history.
- **Structure:** Developed specifically for this study to gather comprehensive background information relevant to the study population.

Reliability: We obtained acceptable reliability for both the tools examined by Cronbach's alpha coefficient analysis. (WHO physical domain, 0.70; WHO psychiatric domain, 0.76; WHO social domain, 0.75; WHO environment domain, 0.91; WHO Overall, 0.78; Core (FertiQoL), 0.84) Table 1.

Characteristics	Categories	n (%)
Age	18-25 years	21 (2.9)
	26-35 years	414 (57.6)
	36-45 years	284 (39.5)
Religion*	Hindu	613 (85.3)
	Muslim	106 (14.7)
Residential status	Urban	425 (59.1)
	Rural	294 (40.9)
Education Level*	<10 years of education	143 (19.9)
	>=10 years of education	576 (80.1)
Occupation	Gainfully Employed	651 (90.5)
	Unemployed	68 (9.5)
Annual Family Income (INR)*	<=5 lakhs (INR)	493 (68.6)
	>5 lakhs (INR)	226 (31.4)
Any Living Children	Yes	24 (3.3)
	No	695 (96.7)
Number of Children*	None	695 (96.7)
	One or More	24 (3.3)
Type of Family	Nuclear	389 (54.1)
	Joint	330 (45.9)
Number of Family Members*	<=5 members	525 (73.0)
	>5 members	194 (27.0)
Body Mass Index (BMI)*	<18.5	11 (1.5)
	18.5-22.9	163 (22.7)
	23-24.9	149 (20.7)
	>=25	396 (55.1)
Current use of Tobacco	Yes	197 (27.4)
	No	522 (72.6)

Current Alcohol Consumption History	Yes	173 (24.1)
	No	546 (75.9)
Suffering from Any Chronic Disease*	Yes	73 (10.2)
	No	646 (89.8)
Years of Infertility	<5 years	242 (33.7)
	5-10 years	319 (44.4)
	>10 years	158 (22.0)
Cause of Infertility	Male factor	517 (71.9)
	Both	171 (23.8)
	Unknown	31 (4.3)
History of treatment for Infertility	Yes	435 (60.5)
	No	284 (39.5)
Number of medical consultations for infertility before coming to this center*	<=5 Consultations	680 (94.6)
	>5 Consultations	39 (5.4)
Number of failures after IVF treatment*	None	610 (84.8)
	<2	65 (9.0)
	>=2	44 (6.1)

Table 1: Socio-demographical characteristics of the study population (N=719).

Statistical Analysis Plan

The results were reported as Mean (SD) for quantitative variables and number (percentages) for categorical variables. The quantitative variables were compared using the Whitney U test and Kruskal Wallis test after testing for normal distribution. Multiple linear regression analysis was used with dependence on the Ferti (QoL) and WHOQOL-BREF subscales. The regression equation included terms for the participant's demographics and information from his medical history. Adjusted regression coefficient (β) with the standard error (SE) were computed from the results of the linear regression analysis. All statistical analyses were performed at the 95% significance level ($P<0.05$) using the statistical software SPSS 28.0 statistical software (SPSS, Inc., Chicago, IL, USA).

Results

Study Population and Characteristics

In this cross-sectional study, 719 patients undergoing IVF treatment were invited to participate; 719 agreed, resulting in a response rate of 100.0%. The age of the respondents ranged from 18 to 45 years, with a majority falling between 26-35 years (57.6%) and a mean age of 34.52 years (SD =5.03 years). Most respondents completed academic education, with 80.1% having ten or more years of education, and 61.1% lived in urban areas.

A significant proportion of respondents had an annual family income between 5 lakhs and 2.5 lakhs INR, which is near the average yearly income. The most prevalent duration of infertility among the respondents was 5-10 years (44.4%), followed by less than 5 years (33.7%), and more than 10 years (22.0%).

Most participants were gainfully employed (90.5%) and resided in nuclear families (54.1%). The majority had five or fewer family members (73.0%). Regarding BMI, 55.1% of the respondents had a BMI of 25 or higher, 22.7% had a BMI between 18.5-22.9, 20.7% had a BMI of 23-24.9, and 1.5% had a BMI less than 18.5.

Tobacco use was reported by 27.4% of the participants, while 72.6% did not use tobacco. Alcohol consumption was noted in 24.1% of the population, with 75.9% reporting no alcohol consumption history. Only 10.2% of respondents reported suffering from any chronic disease.

A significant number of participants (60.5%) had undergone treatment for infertility, while 39.5% had not. Most participants (94.6%) had fewer than five medical consultations for infertility before coming to the center, with only 5.4% having more than five consultations. Lastly, 84.8% of participants reported no failures after IVF treatment, 9.0% had fewer than two failures, and 6.1% experienced two or more failures.

The WHOQOL Questionnaire demonstrates good reliability (Table 2) across all its subscales, with particularly high reliability in the WHO Environment Domain [22]. The mean scores suggest that respondents perceive their quality of life most positively in terms of overall quality (WHOQOL BREF) and environmental factors, while physical health is perceived less positively. The variability in responses is highest in the Social Relationship Domain, indicating differing perceptions of social relationships among the population. Overall, the WHOQOL Questionnaire is a reliable tool for assessing various aspects of quality of life in this population. Similarly, the Core (FertiQoL) Questionnaire demonstrates acceptable reliability across (Table 3) its subscales, with Cronbach's alpha values ranging from 0.64 to 0.84. The highest reliability is in the overall Core (FertiQoL) score ($\alpha = 0.84$), while the Social Domain shows the lowest reliability ($\alpha=0.64$). Mean scores indicate that respondents perceive their quality of life most positively in the Social Domain (77.60) and least positively in the Relationship Domain (65.61).

Subscales of WHOQOL	Mean	SD	Cronbach (α)
WHO Physical Health Domain	56.83	12.63	0.7
WHO Social Relationship Domain	68.54	20.38	0.75
WHO Psychological Domain	71.04	16.76	0.76
WHO Environment Domain	72.25	18.33	0.91
WHOQOL BREF (Over all)	72.64	20	0.78

Table 2: Reliability analysis for WHOQOL Questionnaire.

Subscales of Core (FertiQoL)	Mean	SD	Cronbach (α)
FertiI Social Domain	77.6	16.65	0.64
FertiI Relationship Domain	65.61	18.77	0.69
FertiI Emotional Domain	65.77	17.4	0.7
FertiI Mind/Body Domain	71.47	17.84	0.77
Core (FertiQoL) (Over all)	71.06	19.29	0.84

Table 3: Reliability analysis for Core (FertiQoL) Questionnaire.

WHOQOL Tool

Our analysis of 719 participants revealed several significant trends in WHOQOL domain scores across various demographic characteristics (Table 4).

- **Age:** Younger participants (18-25 years) reported higher overall WHOQOL scores (Mean=83.33, P=0.030) and significantly higher psychological scores (P=0.010) compared to older age groups.
- **Religion:** Hindu participants generally reported higher scores across all domains compared to Muslim participants. This was particularly significant in the Physical Health (P<0.001), Psychological (P=0.003), Social Relationship (P < 0.001), and Environment (P<0.001) domains.
- **Residential Status:** Urban residents scored significantly higher in the Physical Health (P < 0.001), Social Relationship (P < 0.001), and Environment (P = 0.030) domains compared to rural residents.
- Education Level: Participants with less than 10 years of education had higher overall WHOQOL scores (P = 0.001) and scored significantly higher in the Physical Health (P=0.004) and Psychological (P=0.003) domains.
- **Annual Family Income:** Individuals with an annual family income greater than 5 lakhs INR reported better scores in the Physical Health (P < 0.001) and Social Relationship (P<0.001) domains.
- **Body Mass Index (BMI):** Those with a BMI <18.5 had lower scores in the Physical Health (P=0.004), Psychological (P=0.010), Social Relationship (P = 0.004), and Environment (P=0.007) domains compared to individuals with a higher BMI.
- **Current Use of Tobacco:** Tobacco users scored significantly lower in the Physical Health (P<0.001) and Social Relationship (P<0.001) domains compared to non-users.
- **Years of Infertility:** Participants experiencing infertility for less than 5 years had higher scores across all domains, particularly in the Psychological (P<0.001), Social Relationship (P=0.001), and Environment (P<0.001) domains.

These significant findings indicate the profound impact that demographic factors such as age, religion, residential status, education level, income, BMI, tobacco use, and duration of infertility have on the quality of life among individuals undergoing infertility treatment.

In this study, the multiple linear regression analysis shown in Table 5 reveals several key factors influencing the total WHOQOL score among infertile males with azoospermia. The results indicate that education level, religion, and years of infertility are significant predictors of WHOQOL scores. Specifically, lower education levels and longer durations of infertility are associated with poorer quality of life, while religious affiliation plays a role in the overall quality of life. Conversely, variables such as age, residential status, number of children, number of family members, suffering from chronic diseases, and history of infertility treatment do not significantly affect the WHOQOL scores. These findings highlight the critical importance of educational and religious factors, along with the impact of prolonged infertility, in shaping the quality of life for individuals facing azoospermia. Addressing these factors may be essential for improving support and interventions for this population.

Characteristics (n=719)	Categories	Total WHOQOL			Physical Health			Psychological			Social Relationship			Environment		
		Mean	SD	P value	Mean	SD	P value	Mean	SD	P value	Mean	SD	P value	Mean	SD	P value
Age	18-25 years	83.33	12.07	0.03	60.24	11.14	0.478	81.24	13.94	0.01	78.24	15.63	0.073	82.05	16.55	0.058
	26-35 years	72.71	20.45		56.32	12.97		71.54	16.57		68.95	20.38		72.31	18.45	
	36-45 years	71.74	19.61		57.32	12.22		69.56	16.95		67.23	20.52		71.43	18.13	
Religion	Hindu	73.41	19.35	0.028	57.59	12.35	<0.001	71.93	16.23	0.003	69.91	19.74	<0.001	73.65	17.55	<0.001
	Muslim	68.16	23.02		52.42	13.4		65.87	18.8		60.62	22.25		64.16	20.63	
Residential status	Urban	73.35	20.17	0.153	58.17	12.53	<0.001	71.99	16.26	0.101	71.44	18.99	<0.001	73.63	17.49	0.03
	Rural	71.6	19.73		54.88	12.56		69.67	17.38		64.36	21.6		70.26	19.34	
Education Level	<10 years of education	77.1	20.44	0.001	60.01	15.7	0.004	74.23	16.5	0.003	70.28	20.92	0.142	73.9	17.87	0.124
	>=10 years of education	71.53	19.75		56.04	11.63		70.25	16.74		68.11	20.24		71.84	18.44	
Occupation	Gainfully Employed	72.54	19.75	0.57	57.09	12.69	0.215	70.83	16.53	0.259	68.84	20.17	0.293	72.11	17.82	0.249
	Unemployed	73.53	22.39		54.31	11.92		73.04	18.76		65.69	22.26		73.6	22.78	
Annual Family Income (INR)	<=5 lakhs (INR)	73.07	20.57	0.283	55.04	12.31	<0.001	70.92	17.66	0.979	65.89	21.36	<0.001	71.6	19.36	0.25
	>5 lakhs (INR)	71.68	18.71		60.72	12.47		71.3	14.62		74.33	16.69		73.67	15.81	
Any Living Children	Yes	78.13	16.99	0.209	56.21	9.46	0.974	73.75	17.06	0.497	67.42	20.68	0.639	75.25	16.91	0.61
	No	72.45	20.08		56.85	12.73		70.95	16.75		68.58	20.38		72.15	18.38	
Number of Children	None	72.45	20.08	0.209	56.85	12.73	0.974	70.95	16.75	0.497	68.58	20.38	0.639	72.15	18.38	0.61
	One or More	78.13	16.99		56.21	9.46		73.75	17.06		67.42	20.68		75.25	16.91	
Type of Family	Nuclear	72.17	20.26	0.686	58.34	12.84	<0.001	71.4	17.14	0.242	69.58	20.56	0.062	72.6	18.59	0.351
	Joint	73.18	19.69		55.04	12.17		70.62	16.3		67.33	20.13		71.84	18.04	
Number of Family Members	<=5 members	71.9	20.22	0.143	57.47	13.26	0.037	70.64	16.81	0.543	68.19	20.59	0.701	71.73	18.45	0.369
	>5 members	74.61	19.29		55.1	10.59		72.11	16.6		69.49	19.82		73.66	17.98	
Body Mass Index (BMI)	<18.5	68.18	29.72	0.516	56.91	18.6	0.004	65.09	22.35	0.01	62.82	25.45	0.004	63.18	25.7	0.007
	18.5-22.9	70.86	18.89		55.54	12.9		68.2	16.82		64.88	19.63		68.65	18.55	
	23-24.9	73.15	19.94		60.22	12.03		74.01	16.35		72.41	18.53		74.09	16.78	
	>=25	73.3	20.17		56.08	12.38		71.26	16.54		68.76	20.97		73.29	18.38	
Current use of Tobacco	Yes	71.7	21.91	0.526	53.41	12.22	<0.001	69.98	18.94	0.57	62.83	23.17	<0.001	70.2	20.88	0.204
	No	72.99	19.24		58.12	12.56		71.44	15.85		70.7	18.8		73.02	17.23	
Current Alcohol Consumption History	Yes	73.55	19.75	0.495	55.99	12.33	0.234	72.29	15.26	0.302	68.06	19.77	0.573	73.2	17.44	0.396
	No	72.34	20.08		57.09	12.73		70.64	17.2		68.7	20.58		71.95	18.61	
Suffering From Any Chronic Disease	Yes	69.18	22.63	0.231	56.86	11.7	0.982	70.9	18.45	0.986	69.9	22.01	0.402	72.92	19.02	0.668
	No	73.03	19.66		56.82	12.47		71.05	16.57		68.39	20.2		72.17	18.27	
Years of Infertility	<5 years	74.9	18.84	0.034	57.34	11.5	0.131	74.65	16.73	<0.001	72.4	19.93	0.001	76.55	17.74	<0.001
	5-10 years	72.73	19.74		57.21	13.17		70.15	14.96		67.16	19.79		71.39	17.33	
	>10 years	68.99	21.75		55.27	13.37		67.3	19.12		65.42	21.43		67.4	19.81	
Cause of Infertility	Male factor	72.29	19.62	0.28	57.04	13.36	0.754	70.71	16.35	0.014	68.47	20.36	0.901	71.55	17.93	0.112
	Both	74.12	21.16		56.23	11.03		73.02	18.61		68.32	21.33		74.23	20.27	
	Unknown	70.16	19.81		56.55	7.58		65.68	10.41		70.97	15.06		73	12.37	
History of treatment for Infertility	Yes	71.78	20.39	0.13	57.35	13.84	0.34	70.79	17.4	0.933	68.1	21.4	0.95	71.91	19.03	0.9
	No	73.94	19.34		56.03	10.5		71.42	15.73		69.22	69.22		72.77	17.23	
Number of medical consultations for infertility before coming to this center	<=5 Consultations	72.83	19.65	0.434	56.92	12.52	0.272	71.11	16.39	0.979	68.76	20.29	0.346	72.34	18.16	0.929
	>5 Consultations	69.23	25.3		55.15	14.5		69.77	22.38		64.77	21.85		70.64	21.28	
Number of failures to conceive after IVF treatment	None	73.07	19.88	0.294	57.06	12.71	0.157	71.25	16.91	0.22	68.59	20.81	0.257	72.24	18.52	0.488
	<2	71.15	20.83		56.71	12.31		72.09	15.08		70.65	17.76		74.12	17.18	
	>=2	68.75	20.26		53.84	12		66.57	16.65		64.8	17.66		69.61	69.61	

Table 4: Comparison of WHO domains mean score across demographic characteristics (n=719).

Characteristics (n=719)	Total WHOQOL			
	β	SE	t value	p Value
Intercept	86.35	8.29	10.42	<0.001
Education Level	-6.23	1.87	-3.33	<0.001
Years of Infertility	-2.86	1.11	-2.58	0.01
Religion	-5.27	2.1	-2.51	0.012
Suffering from Any Chronic Disease	4.06	2.44	1.67	0.096
Number of Children	6.08	4.14	1.47	0.142
Number of Family Members	2.36	1.68	1.4	0.161
Residential status	-1.33	1.53	-0.86	0.388
History of treatment for Infertility	0.71	1.56	0.46	0.647
Age	-0.47	1.52	-0.31	0.76

Table 5: Multiple Linear Regression for Total WHOQOL Score to find out Factors influencing the poor quality of life among infertile couples with Azoospermia.

FertiQoL score across Socio-demographic

The comparison of FertiQoL domain scores across various demographic characteristics reveals several significant patterns shown in Table 6. History of treatment and the number of failures to conceive after IVF treatment also show significant variations in the emotional and relationship domains. These findings highlight the complex interplay between demographic and clinical factors in influencing the quality of life among infertile azoospermic males.

Characteristics (n=719)	Categories	Total FertiQoL			Emotional Domain			Mind/Body			Relationship			Social		
		Mean	SD	P value	Mean	SD	P value	Mean	SD	P value	Mean	SD	P value	Mean	SD	P value
Age	18-25 years	78.71	15.85	0.013	77	15.09	0.004	79.23	12.67	0.033	72.14	21.36	0.117	89.71	10.3	<0.001
	26-35 years	72.15	19.2		66.37	16.89		72.21	17.57		66.3	19.08		77.88	16.69	
	36-45 years	68.91	19.43		64.08	17.98		69.81	18.36		64.11	17.99		76.31	16.62	
Religion*	Hindu	71.89	18.44	0.03	66.46	16.96	0.013	71.7	17.62	0.53	65.75	18.7	0.557	78.12	16.3	0.079
	Muslim	66.31	23.12		61.78	19.39		70.17	19.08		64.8	19.21		74.63	18.32	
Residential status	Urban	71.76	19.12	0.243	65.73	16.11	0.663	71.83	17.79	0.421	66.39	18.4	0.105	78.93	15.94	0.021
	Rural	70.06	19.51		65.84	19.15		70.95	17.92		64.48	19.26		75.68	17.47	
Education Level*	<10 years of education	75.11	19.72	0.002	65.03	15.84	0.73	70.74	16.01	0.722	67.64	18.78	0.109	79.31	17.47	0.083
	>=10 years of education	70.06	19.06		65.96	17.78		71.65	18.24		65.1	18.74		77.18	16.42	
Occupation	Gainfully Employed	70.83	19.09	0.155	65.31	16.88	0.038	71.49	17.5	0.949	65.01	18.49	0.018	77.85	16.18	0.552
	Unemployed	73.26	21.09		70.18	21.46		71.32	20.94		71.31	20.53		75.26	20.58	
Annual Family Income (INR)*	<=5 lakhs (INR)	70.85	20.51	0.874	65.05	18.35	0.04	69.43	18.36	<0.001	68	19.26	<0.001	76.01	17.37	<0.001
	>5 lakhs (INR)	71.54	16.33		67.36	15.05		75.92	15.78		60.38	16.51		81.07	14.39	
Any Living Children	Yes	76.21	16.4	0.159	71.38	15.58	0.136	75.79	17.14	0.338	65	20.4	0.747	80	14.75	0.573
	No	70.89	19.36		65.58	17.44		71.32	17.85		65.63	18.72		77.52	16.71	
Number of Children	None	70.89	19.36	0.159	65.58	17.44	0.136	71.32	17.85	0.338	65.63	18.72	0.747	77.52	16.71	0.573
	One or More	76.21	16.4		71.38	15.58		75.79	17.14		65	20.4		80	14.75	
Type of Family	Nuclear	71.41	19.82	0.335	66.84	17.68	0.036	72.67	18.12	0.037	65.9	18.89	0.701	78.5	16.66	0.092
	Joint	70.65	18.67		64.52	17.01		70.07	17.41		65.26	18.64		76.54	16.6	
Number of Family Members*	<=5 members	70.65	19.27	0.4	66	17.14	0.259	71.97	17.86	0.173	65.35	18.42	0.757	78.07	16.41	0.245
	>5 members	72.18	19.35		65.15	18.21		70.12	17.75		66.31	19.71		76.34	17.24	
Body Mass Index (BMI)*	<18.5	64.91	26.14	0.008	62.09	18.04	0.086	72.09	23.02	0.023	55.45	17.72	0.006	75.82	17.08	0.015
	18.5-22.9	66.41	20.71		63.16	16.77		68.14	18.88		63.14	18.05		73.96	17.26	
	23-24.9	72.73	18.43		66.66	16.08		74.45	16.06		64.76	18.5		79.58	15.26	
	>=25	72.52	18.51		66.62	18.05		71.71	17.72		67.23	19.03		78.41	16.71	
Current use of Tobacco	Yes	70.45	22.51	0.786	63.08	19.95	0.017	69.88	18.67	0.14	68.74	20.34	0.012	74.96	17.85	0.013
	No	71.3	17.94		66.79	16.24		72.07	17.49		64.43	18.02		78.6	16.07	
Current Alcohol Consumption History	Yes	72.79	19.29	0.18	64.21	17.62	0.148	71.58	18.07	0.984	67.32	18.92	0.147	77.39	16.91	0.808
	No	70.52	19.27		66.27	17.32		71.44	17.7		65.07	18.7		77.67	16.58	
Suffering From Any Chronic Disease*	Yes	72.92	20.08	0.323	67.7	18.97	0.212	70.74	18.06	0.684	67.59	18.4	0.186	80.42	15.25	0.168
	No	70.85	19.2		65.56	17.22		71.56	17.82		65.39	18.81		77.28	16.78	
Years of Infertility	<5 years	75.29	18.07	<0.001	69.39	17.62	<0.001	74.67	18.24	<0.001	69.94	19.67	<0.001	80.35	15.82	<0.001
	5-10 years	70.07	18.33		65.15	15.96		71.83	16.25		63.7	18.06		77.39	16.44	
	>10 years	66.59	21.69		61.5	18.79		65.85	19.01		62.84	17.65		73.84	17.6	
Cause of Infertility	Male factor	70.22	18.84	0.046	65.01	17.1	0.019	71.01	17.71	0.416	64.66	18.33	<0.001	76.76	16.67	0.002
	Both	74.04	20.63		68.96	18.57		72.93	18.6		70.57	20.02		80.91	16.87	
	Unknown	68.71	17.92		60.97	13.14		71.13	15.55		54.13	9.41		73.35	12.09	
History of Treatment for Infertility	Yes	70.83	19.33	0.857	66.5	17.65	0.062	72.61	17.77	0.02	64.46	19.1	0.032	78.78	16.55	0.013
	No	71.42	19.25		64.65	16.99		69.73	17.82		67.36	18.14		75.81	16.66	
Number of medical consultations for infertility before coming to this center*	<=5 Consultations	71.3	19.04	0.288	65.87	17.07	0.658	71.65	17.66	0.315	65.56	18.64	0.854	77.8	16.39	0.39
	>5 Consultations	66.87	23.08		64.08	22.69		68.31	20.63		66.41	21.07		74.1	20.53	
Number of failures to conceive after IVF treatment	None	71.38	19.64	0.142	66.18	17.71	0.244	71.77	17.83	0.569	65.65	18.95	0.855	77.99	16.55	0.304
	<2	71.31	17.49		63.98	16.96		70.85	19.15		64.82	18.98		75.86	18.03	
	>=2	66.32	16.36		62.82	13.05		68.27	15.86		66.18	15.95		74.8	15.78	

Table 6: Comparison of FertiQoL domains mean score across demographic characteristics using t-test or ANOVA (n=719).

Table 7 illustrates the multiple linear regression analysis of the total FertiQoL score among infertile males with azoospermia reveals that education level, religion, BMI, and the duration of infertility are significant determinants of fertility-specific quality of life. Specifically, lower education levels and longer infertility durations are associated with a poorer quality of life, while higher BMI is linked to better quality of life. Religion also plays a significant role, with certain religious backgrounds correlating with lower quality of life scores. In contrast, factors such as age, residential status, occupation, number of children, alcohol consumption, cause of infertility, and the number of IVF failures do not significantly impact fertility-specific quality of life. These findings underscore the importance of considering educational background, religious context, BMI, and the length of infertility when assessing and addressing the quality of life in infertile **azoospermic males.**

Characteristics (n=719)	Total FertiQoL			
	β	SE	t value	p Value
Intercept	87.01	8.83	9.85	<0.001
Education Level	-5.74	1.79	-3.21	0.001
Body Mass Index (BMI)	2.76	0.82	3.38	0.001
Years of Infertility	-3.96	1.05	-3.75	<0.001
Religion	-5.84	2	-2.93	0.004
Number of Children	5.7	3.92	1.46	0.146
Age	-2	1.44	-1.39	0.164
Occupation	3.12	2.44	1.28	0.2
Current Alcohol Consumption History	-1.91	1.65	-1.16	0.248
Number of failures to conceive after IVF treatment	-1.21	1.32	-0.91	0.362
Cause of Infertility	1.05	1.28	0.82	0.411
Residential status	-0.96	1.47	-0.65	0.513

Table 7: Multiple Linear Regression for Total FertiQoL Score to find out Factors influencing the poor quality of life among infertile couples with Azoospermia.

Discussion

Azoospermia, characterized by the absence of sperm in semen, is a significant cause of male infertility. The psychological impact of this condition on patients' Quality of Life (QOL) is well-documented. Li-Yan Luo et al. [12] emphasize that infertility-related psychological stress negatively impacts the QOL of azoospermia patients. Their study reveals a correlation between higher stress levels and poorer QOL outcomes, underscoring the importance of addressing psychological factors in the management of azoospermia [12].

Core FertiQoL Domains

The key findings from our study, based on this tool, are as follows

- Physical Health: Scores in this domain were lower for males with infertility. Factors such as age, body mass index (BMI), and chronic health conditions significantly influenced the scores. Older age and higher BMI were associated with poorer physical health, while the presence of chronic diseases also negatively impacted this domain.

- Psychological: Psychological well-being was significantly affected by age, and duration of infertility. Older individuals and reported lower scores, indicating greater psychological distress. Prolonged infertility duration exacerbated psychological stress.

- Social Relationships: Social well-being was influenced by age, gender, education level, and residential status. Older individuals, and those with higher education levels reported poorer social relationships. Rural residents also experienced lower sco res, likely due to limited access to support and stigma associated with infertility [13].

- Environment: This domain was affected by factors such as income, occupation, and residential status. Lower-income and unemployment were associated with poorer environmental scores, reflecting financial and living conditions' impact on overall well-being [14].

FertiQoL Results

The key findings from our study using the FertiQoL tool are

- Emotional Well-being: Significant factors included age, gender, annual family income, tobacco use, unexplained infertility, and duration of infertility., and those with lower incomes or tobacco use reported greater emotional distress. Unexplained infertility and longer disease duration also negatively impacted emotional well-being [15].

- Mind/Body Health: Influencing factors were age, annual family income, BMI, cause of infertility, years of infertility, and history of infertility treatment. Older age, lower income, and normal BMI were associated with poorer scores. Unexplained infertility and longer infertility duration also resulted in lower scores, highlighting the physical and psychological toll of prolonged infertility [16].

- Relational: This domain was affected by relationship

duration and previous treatment history.Males with longer marriages and those with unsuccessful treatment attempts reported poorer relational well-being, indicating the strain infertility places on relationships.

- Social: Social well-being was influenced by age, rural residence, education level, employment status, income, duration of infertility, and number of failed IVF treatments [17]. Older age, rural residence, higher education, unemployment, lower income, longer infertility duration, and failed treatments all contributed to poorer social well-being [18].

Hypothesis 1

- **Null Hypothesis (H0):** There exists no correlation (there is no linear relation) between Azoospermia and Quality of Life.
- **Alternate Hypothesis (H1):** There is a significant correlation (there is an inverse linear relation) between Azoospermia and Quality of Life.

Findings

The multiple linear regression analysis showed that several factors related to azoospermia, such as years of infertility and education level, significantly impacted the Quality of Life (QoL). Specifically, longer years of infertility and lower education levels were associated with poorer QoL scores, indicating an inverse relationship. In comparison, the Polish study by Makara SM et al. reported lower social domain scores, whereas the current study showed relatively higher scores in this domain, suggesting better social integration among the study participants. Therefore, we reject the null hypothesis and accept the alternate hypothesis, **concluding that there is a significant correlation between azoospermia and quality of life.**

Hypothesis 2

- **Null Hypothesis (H0):** Azoospermic males get adequate societal acceptance and support towards their infertility.
- **Alternate Hypothesis (H1):** Society plays little to no role in supporting or accepting the Azoospermic male's battle with infertility.

Findings

Social well-being scores from the FertiQoL indicate that societal support is lacking for azoospermic males. Factors such as rural residence, male gender, and lack of education were associated with lower social well-being, suggesting inadequate societal acceptance and support. Thus, we reject the null hypothesis and accept the alternate hypothesis that **society plays little to no role in supporting azoospermic males** [16].

Hypothesis 3

- **Null Hypothesis (H0):** Azoospermic males with higher income will have a better quality of life than Azoospermic males with lower income.
- **Alternate Hypothesis (H1):** There is no significant difference in the quality of life of Azoospermic males across income groups.

Findings

The multiple regression analysis indicated that lower annual family income significantly impacted Mind/Body Health and Emotional Well-being, suggesting that income level does influence QoL. Thus, we reject the null hypothesis and accept the alternate hypothesis that **there is a significant difference in QoL across income groups**. Further supporting this, Bahadır Topuz et al. [4] report that patients with Non-Obstructive Azoospermia (NOA) experience reduced QOL across physical, psychological, and social domains. The study highlights the necessity for routine assessments of mental health and QOL, advocating for integrated care approaches that include psychological support alongside medical treatments [4].

Hypothesis 4

- **Null Hypothesis (H0):** Azoospermic males in a higher age bracket will have a poorer quality of life than Azoospermic males in a lower age bracket.
- **Alternate Hypothesis (H1):** There is no significant difference in the quality of life of Azoospermic males across differing age brackets.

Findings

Age was found to negatively impact the QoL scores, but it was not statistically significant in the regression analysis (β =-2.00, p=0.164). This suggests age might not significantly affect QoL, leading us to accept the alternate hypothesis **that there is no significant difference in QoL across different age brackets** [19].

Hypothesis 5

- **Null Hypothesis (H0):** The higher the years of infertility, the poorer quality of life the Azoospermic male will have.
- **Alternate Hypothesis (H1):** There is no significant difference in the quality of life of Azoospermic males across years of infertility endured.

Findings

Years of infertility was a significant negative predictor of QoL (β=-3.96, $p < 0.001$), indicating that longer infertility duration is

associated with poorer QoL. Thus, we reject the null hypothesis and accept the alternate hypothesis **that there is a significant difference in QoL across years of infertility.** This aligns with previous findings by Dourou P et al., who reported lower mind/body scores in females and those with higher education. However, these factors did not significantly impact mind/body scores in the present study [20].

Hypothesis 6

- **Null Hypothesis (H0):** The higher the history of failures using ART, the poorer the quality of life of the Azoospermic male.
- **Alternate Hypothesis (H1):** There is no significant difference in the quality of life of Azoospermic males across the number of ART failures incurred by the Azoospermic male.

Findings

The number of failed IVF treatments was not a significant predictor of QoL (β=-1.21, p=0.362). This indicates that ART failure history does not significantly affect QoL. Therefore, we accept the alternate hypothesis that there is no significant difference in QoL across the number of ART failures [21].

Limitation

The study population was specific to **males** with azoospermia, which may not reflect the experiences of **the overall infertile population, with other reasons for infertility**. The cross-sectional nature of the study limits the ability to infer causality between azoospermia and QoL. Longitudinal studies would be beneficial to understand the temporal relationship and causal pathways.

Given the significant impact of social well-being on QoL, integrating psychosocial support into infertility treatment protocols is crucial. **Counseling services and support groups could help address the emotional and social challenges faced by azoospermic males. Increasing awareness and education about azoospermia and its impact on QoL can help reduce stigma and improve societal acceptance.** Educational campaigns targeting both urban and rural populations could promote understanding and support for infertile males.

Studies involving larger and more diverse populations, as well as those incorporating qualitative methods, could provide deeper insights into the experiences of azoospermic males. The partners of azoospermic males could be studied separately to understand coping mechanisms employed as a couple to deal with Azoospermia.

Conclusion

Overall, this study reveals that several socio-demographic and medical factors significantly influence the quality of life of azoospermic males. Factors such as education level, years of infertility, and income levels were particularly impactful. The WHOQoL-BREF and FertiQoL tools both provide valuable insights, though they emphasize different aspects of quality of life. Comprehensive support strategies, including psychosocial interventions, are essential to improve the overall well-being of these individuals.

Funding

There is external funding for the study.

Conflict of Interest

There is no conflict of interest among authors.

Declaration

Consent has been taken from each participant. All the data will be shared on request.

References

1. Bendayan M, Sais E, Alter L, Fathallah K, Jaoul M, et al. (2022) For patients with non-obstructive azoospermia, the outcome of testicular sperm extraction correlates with self-esteem, sexual health and the quality of the couple's relationship. Basic and Clinical Andrology. 32.
2. Taniguchi H, Matsuda T, Nakaoka Y, Morimoto Y (2018a) Health-related quality of life in infertile couples receiving testicular sperm extraction treatment. International Journal of Urology. 25: 164-165.
3. Renzi A, Fedele F, Di Trani M (2023) Assisted Reproductive Treatments, Quality of Life, and Alexithymia in Couples. Healthcare (Switzerland). 11.
4. Topuz B, Ebiloğlu T, Sarıkaya S, Coğuplugil AE, Bedir S, et al. (2021a) Evaluation of depression, anxiety and quality of life in patients with non-obstructive azoospermia. Revista Internacional de Andrología, 19: 73-79.
5. Bechoua S, Hamamah S, Scalici E (2016) Male infertility: an obstacle to sexuality? Andrology. 4: 395-403.
6. Cocuzza M, Alvarenga C, Pagani R (2013) The epidemiology and etiology of azoospermia. Clinics. 68: 15-26.
7. Topuz B, Ebiloğlu T, Sarıkaya S, Coğuplugil AE, Bedir S, et al. (2021b) Evaluation of depression, anxiety and quality of life in patients with non-obstructive azoospermia. Revista Internacional de Andrología, 19: 73-79.
8. Dourou P, Gourounti K, Lykeridou A, Gaitanou K, Petrogiannis N, et al. (2023a) Quality of Life among Couples with a Fertility Related Diagnosis. Clinics and Practice. 13: 251-263.
9. Perouse C, Klein JP, Piqueres S, Ghazi M, Aknin I, et al. (2022) Azoospermia: Is it worth waiting for the confirmation of the semen abnormality to start an infertility assessment? Andrologia. 54: e14487.
10. Taniguchi H, Matsuda T, Nakaoka Y, Morimoto Y (2018b) Health-related quality of life in infertile couples receiving testicular sperm extraction treatment. International Journal of Urology. 25: 164-165.
11. Wosnitzer M, Goldstein M, Hardy MP (2014) Review of Azoospermia. Spermatogenesis. 4: e28218.

12. Luo L-Y, Shi L (2018) Impact of infertility-related psychological stress on the quality of life of azoospermia patients. Zhonghua Nan Ke Xue=National Journal of Andrology. 24: 425-430.

13. Wang JY, Lv XQ, Wu JM, Tang WQ, Luo GY, et al. (2022) Sexual Function, Self-Esteem, and Quality of Life in Infertile Couples Undergoing In vitro Fertilization: A Dyadic Approach. Psychology Research and Behavior Management. 15: 2449-2459.

14. Li W, Zhao N, Yan X, Zou S, Wang H, et al. (2021) The prevalence of depressive and anxiety symptoms and their associations with quality of life among clinically stable older patients with psychiatric disorders during the COVID-19 pandemic. Translational Psychiatry. 11: 75.

15. Nicoloro-SantaBarbara JM, Lobel M, Bocca S, Stelling JR, Pastore LM (2017) Psychological and emotional concomitants of infertility diagnosis in women with diminished ovarian reserve or anatomical cause of infertility. Fertility and Sterility. 108: 161-167.

16. Hsu P-Y, Lin M-W, Hwang J-L, Lee M-S, Wu M-H (2013) The fertility quality of life (FertiQoL) questionnaire in Taiwanese infertile couples. Taiwanese Journal of Obstetrics and Gynecology. 52: 204-209.

17. Ni Y, Huang L, Zhang E, Xu L, Tong C, et al. (2022) Psychosocial correlates of fertility-related quality of life among infertile women with repeated implantation failure: The mediating role of resilience. Frontiers in Psychiatry. 13: 1019922.

18. Bose S, Roy B, Umesh S (2021) Marital duration, and fertility-related stress as predictors of quality of life: Gender differences among primary infertile couples. Journal of Human Reproductive Sciences. 14: 184-190.

19. Tharakan T, Luo R, Jayasena CN, Minhas S (2021) Non-obstructive azoospermia: current and future perspectives. Faculty Reviews. 10.

20. Dourou P, Gourounti K, Lykeridou A, Gaitanou K, Petrogiannis N, et al. (2023b) Quality of Life among Couples with a Fertility Related Diagnosis Clinics and Practice. 13: 251-263.

21. El-Ansary NI, Zromba MA, El- Ansary E-S (2023) Effect of Collaborative Infertility Counseling on Coping Strategies and Marital Satisfaction among Women Undergoing In Vitro Fertilization A Randomized Control Trial. Assiut Scientific Nursing Journal. 11: 1-13.

22. Mousavi SA, Masoumi SZ, Keramat A, Pooralajal J, Shobeiri F (2013) As-sessment of Questionnaires Measuring Quality of Life in Infertile Couples: A Systematic Re-view. In J Reprod Infertil. 14: 110-119.