

## Sexual Functions in Men with Congenital Bilateral Absence of the Vas Deferens: A Retrospective Cross-sectional Study with Fertile Men

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**Purpose:** To examine the sexual and psychological conditions of men with Bilateral Congenital Bilateral Absence of the Vas Deferens (CBAVD), a rare condition that contributes to male infertility, and compare it with healthy fertile men.

**Material and Methods:** A total of 52 patients with CBAVD and 66 healthy, fertile men who attended our infertility and andrology clinic were included in the study. Patients with cognitive impairments, language barriers, significant comorbidities, or a history of urogenital surgery were excluded. Reproductive hormone levels and semen volumes were evaluated. In addition, sexual status was investigated with validated questionnaires such as the International Index of Erectile Function, Male Sexual Health Questionnaire, Arabic Index of Premature Ejaculation, Premature Ejaculation Diagnostic Tool, and Premature Ejaculation Profile.

**Results:** In the CBAVD group, median total testosterone, FSH, LH levels, and semen volume were 401 ng/dL, 3.9 mIU/ml, 3.9 mIU/ml, and 0.9 ml, respectively. These parameters were 376 (ng/dL), 4.8 mIU/ml, 5 mIU/ml, and 3 ml in the control group. Semen volume was significantly lower in CBAVD men ( $p < 0.001$ ). Questionnaires assessing erectile and ejaculatory function have shown that there was no significant difference between the CBAVD and control groups in terms of erectile function, orgasmic function, and sexual relationship satisfaction. However, sexual desire ( $p = 0.006$ ) and overall satisfaction ( $p = 0.028$ ) were found to be higher in the CBAVD group.

**Conclusion:** The study suggests that CBAVD may not be a direct etiological factor for erectile dysfunction or premature ejaculation.

**Keywords:** Congenital absence of vas deferens; infertility; sexual functions; questionnaire.

### INTRODUCTION

Congenital absence of the vas deferens (CAVD) is an uncommon abnormality that can contribute to male infertility. This abnormality can be characterized as unilateral (CUAVD) or bilateral (CBAVD). CBAVD is found in 6% of azoospermic and 1% – 2% of infertile males. The most characteristic findings of CBAVD are bilateral nonpalpable vas deferens and the absence of the distal part of the epididymis<sup>(1)</sup>. CBAVD is often associated with mutations in the CFTR gene, which is also responsible for cystic fibrosis. However, patients with CBAVD typically do not exhibit the classic pulmonary symptoms of cystic fibrosis, but may still have other CFTR-related conditions, such as chronic sinusitis or pancreatic insufficiency. The presence of these mutations can complicate family planning, as there is a risk of offspring inheriting cystic fibrosis if the partner is a carrier. Clinical diagnosis of absent vasa is easy to miss and all men with azoospermia should be carefully examined to exclude CBAVD, particularly those with a semen volume  $< 1.0$  mL and acidic pH  $< 7.0$ <sup>(2)</sup>.

Infertility can also negatively impact sexual, psychological, and marital well-being. Previous studies have reported sexual dysfunction prevalence among infertile men ranging from 11% to 61%, with variations attributable to differences in study methodologies and pop-

ulation characteristics<sup>(3-5)</sup>. The psychological stress of infertility, coupled with repeated conception failures, can lead to sexual dysfunctions, potentially diminishing sexual satisfaction<sup>(6)</sup>. Although low ejaculate volume does not directly impact sexual function, it may reduce sexual satisfaction due to decreased sensory stimuli<sup>(7,8)</sup>. Many different studies have been conducted to date on men with CBAVD. These studies have generally focused on fertility status, the results of assisted reproductive techniques, the genetic basis of the anomaly, and other associated anomalies<sup>(9,10)</sup>. There are also many studies evaluating the sexual function of infertile men<sup>(11,12)</sup>. However, no study has been conducted to evaluate in detail how the sexual and ejaculatory functions of CBAVD patients with low ejaculate volume are affected by this condition.

This study aims to investigate the sexual and physiologic conditions of men with CBAVD and compare them with the normal fertile healthy individuals using validated sexual function questionnaires.

### MATERIALS AND METHODS

The study was conducted by our Infertility and Andrology Clinic between October 2022 and May 2023. It included 52 men with CBAVD who were treated and followed up. The retrospective part of the study consists of blood and semen volume data from CBAVD patients.

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Received May 2024 & Accepted November 2024

**Table 1.** Characteristics of groups

	CBAVD (n=52)	Control (n=66)	p*
Age (year)	32.5 (29-36.7)	31 (29-36)	0.523
Body mass index (kg/m <sup>2</sup> )	25.5 (23-28.3)	26 (23.2-28.7)	0.512
Total Testosterone (ng/dL)	401 (335-558)	376 (236-492)	0.166
Prolactin (ng/ml)	7 (5.7-10.4)	7.5 (6.1-11.6)	0.678
Sex hormone binding globulin (nmol/L)	27.4 (19-37)	24 (21-41)	0.947
Follicle-stimulating hormone (mIU/ml)	3.9 (2.3-5.6)	4.8 (2.9-7.6)	0.113
Luteinizing hormone (mIU/ml)	3.9 (2.8-5.4)	5 (2.7-7.3)	0.137
Estradiol (pg/ml)	26.7 (19.1-38)	28.4 (16.5-42.8)	0.814
Semen volume (ml)	0.9 (0.6-1.3)	3 (2.5-3.9)	< 0.001

CBAVD: Congenital Bilateral absence of Vas Deferens  
Values are expressed as median (25th-75th percentiles).

\* = Mann-Whitney U test

The cross-sectional part of the study involved filling out questionnaires by men with CBAVD and collecting questionnaires and other data from fertile men. CBAVD was diagnosed based on decreased semen volume, clinical examination, and transrectal ultrasonography/magnetic resonance imaging. Cystic fibrosis transmembrane conductance regulator (CFTR) gene analyses were also performed, and cystic fibrosis (CF)-related comorbidities were assessed. Heterosexual individuals over 18 years of age who had regular sexual intercourse within the last 3 months were enrolled in the study. These individuals were recruited from sources outside the fertility clinic, such as routine health checks, and were selected from eligible candidates who agreed to participate in the study. Men with cognitive disabilities or a lack of ability to understand and speak the Turkish language were excluded. Participants with any comorbidity, such as diabetes mellitus, hypo/hyperthyroidism, or those who had undergone urogenital surgeries (except testicular and epididymal sperm extraction procedures) were also excluded from the study. Patients who had previously been diagnosed with any psychiatric disorder or had

ever been treated for one were excluded as well. Men who had at least one child, had regular sexual activity, and did not meet the above-mentioned exclusion criteria were included as the control group. Semen analysis was performed on samples obtained by masturbation at the clinic after 3 days of sexual abstinence. Blood samples were collected from patients for hormonal analysis (sex hormone binding globulin (SHBG), total testosterone (TT), luteinizing hormone (LH), follicle-stimulating hormone (FSH), estradiol (E2), prolactin (PRL) at around ten o'clock am. As a control group, 66 healthy fertile men fulfilling the inclusion criteria were included in the study. Semen analysis and reproductive hormone analysis were performed same as in the CBAVD group. All participants filled up the sexual and psychological questionnaires voluntarily in the voiceless room in the presence of the physician. Informed consent was obtained from all the subjects and institutional review board approval was obtained for this study.

### Questionnaire forms

#### Instruments

**Table 2.** Comparison of questionnaire scores between Congenital Bilateral Absence of Vas Deferens and control groups.

	CBAVD (n = 52)	Control (n = 66)	p
International index of erectile function (IIEF-15)			
• Erectile Function	27 (24-30)	28 (15-30)	0.908*
• Orgasmic Function	10 (9-10)	10 (7.7-10)	0.388*
• Sexual Desire	9 (8-10)	8 (6.7-9)	0.006*
• Intercourse Satisfaction	13 (10-14)	12 (10-14)	0.283*
• Overall Satisfaction	10 (8-10)	8 (8-10)	0.028*
Male Sexual Health Questionnaire (MSHQ-Ejd short form)			
• Ejaculatory function (3 items)	15 (13-15)	14 (12-15)	0.283*
• Bother/satisfaction (1 item) (mean of rank)	0.5 (0-2) (66.63) #	0 (0-1) (53.89) #	0.027*
Premature ejaculation profile (PEP) (male)			
• Perceived control over ejaculation	3 (2-4)	3 (2-4)	0.243*
• Satisfaction with sexual intercourse	3 (3-4)	3 (2.7-4)	0.384*
• Personal distress related to ejaculation	0 (0-2)	1 (0-2)	0.358*
• Interpersonal difficulty related to ejaculation	0 (0-1)	0 (0-1)	0.803*
• Beck depression inventory	3 (0-14.2)	7 (1.7-17.2)	0.057*
Arabic index of premature ejaculation (AIPE)	26 (21-31)	27 (24-31)	0.309*
• No PE n, (%)	15 (28.8)	19 (28.8)	0.409‡
• Mild PE n, (%)	14 (26.9)	21 (31.8)	
• Mild-Moderate PE n, (%)	14 (26.9)	22 (33.3)	
• Moderate PE n, (%)	7 (13.5)	3 (4.5)	
• Severe PE n, (%)	2	(3.8)	1 (1.5)
Premature ejaculation diagnostic tool (PEDT)	4 (2-11.7)	5 (2-9.2)	0.974*
• No PE n, (%)	32 (61.5)	50 (75.8)	0.096‡
• PE n, (%)	20 (38.5)	16 (24.2)	

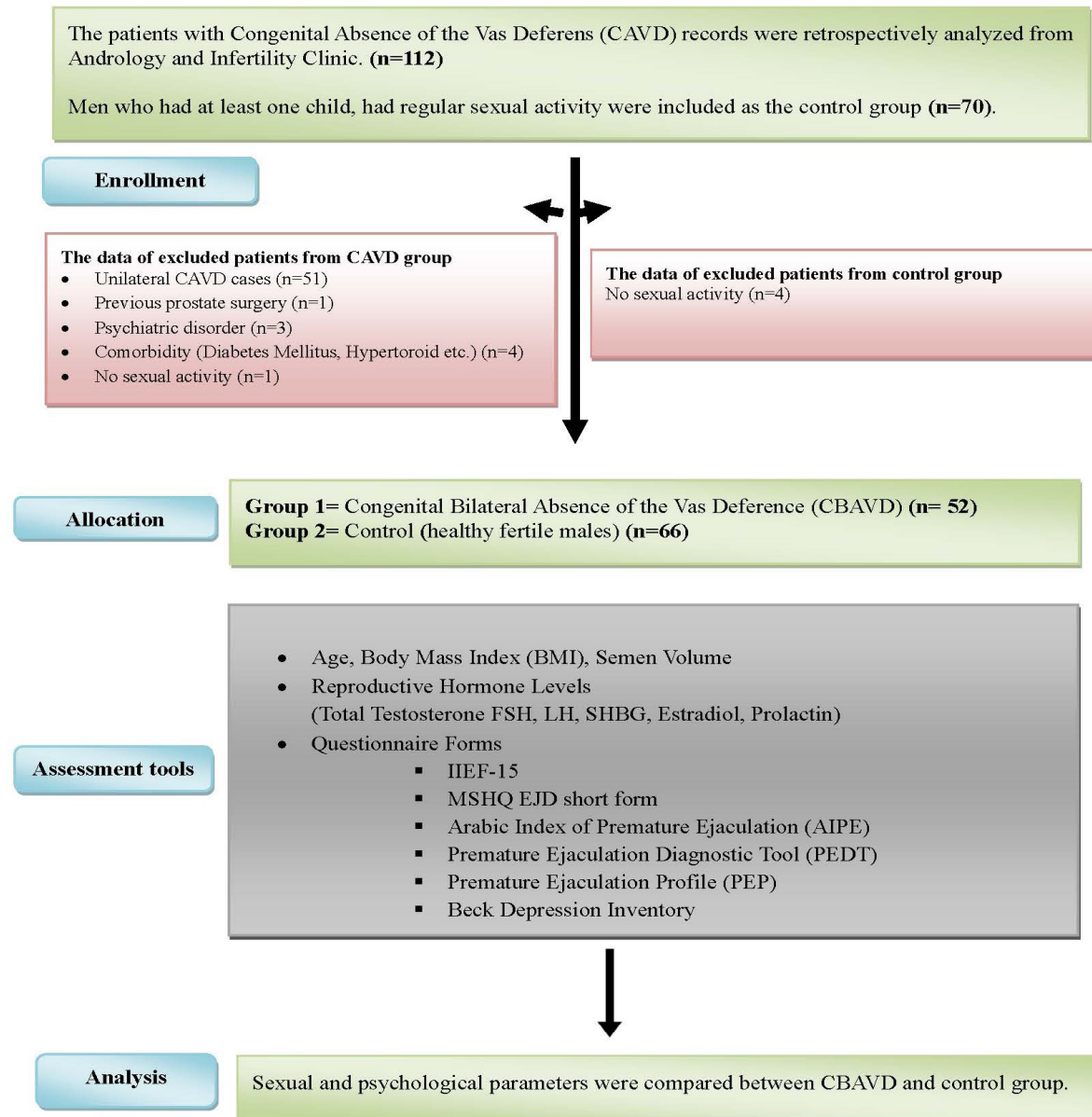
CBAVD: Congenital Bilateral absence of Vas Deferens

Values are expressed as median (25th-75th percentiles)

\* = Mann-Whitney U test

# = In the Mann-Whitney U test, mean of rank values were given for data with similar median values and statistically significant.

‡ = Chi-Square test



**Figure 1.** Flowchart of the study design

1. International index of erectile function, (IIEF)-15<sup>(13)</sup>. Erectile dysfunction was investigated with the Questionnaires of the International Index of Erectile Function-15 (IIEF-15), in its Turkish translation.

2. Male Sexual Health Questionnaire (MSHQ-Ejd short form)<sup>(14)</sup>.

Twenty-five item MSHQ was developed and validated (MSHQ-Ejd Short Form) for assessing ejaculatory dysfunction (EjD). This form consists of 4 items and evaluates three ejaculatory functions at the first three items and one ejaculation bother at the last item.

3. Arabic index of premature ejaculation (AIPE)<sup>(15)</sup>. This form consists of seven items based on an assessment of erectile function, sexual desire, ejaculation latency, ejaculation control, patient satisfaction, partner satisfaction, and psychological distress. Severity of premature ejaculation (PE) was classified as; severe (7-13 pts.), moderate (14-19 pts.), mild to moderate (20-25

pts.), mild (25-30 pts.), no-PE (31-35 pts.).

4. Premature ejaculation profile (PEP)<sup>(16)</sup>.

PEP is a self-reported outcome instrument for evaluating premature ejaculation (PE), notably control, distress, interpersonal difficulty, and sexual satisfaction. Each item was calculated for subjects with and without the complaint of ejaculating prematurely and their partners.

5. Premature ejaculation diagnostic tool (PEDT)<sup>(17)</sup>.

PEDT was developed to standardize the diagnosis of PE. It was designed to capture the main elements of the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition, Text Revision (DSM-IV-TR); control, frequency, minimal sexual stimulation distress, and interpersonal difficulty. The original nine items of the PEDT are validated in the Turkish language with an items questionnaire. A score below 9 indicates a low likelihood of PE and above 11 indicate high likelihood

PE.

#### 6. Beck depression inventory<sup>(18)</sup>.

This scale consists of a 21-item self-report instrument intended to assess the existence and severity of symptoms of depression. There is a four-point scale for each item ranging from 0 to 3. The severity of depression was classified as; minimal, mild, moderate, severe.

#### Statistical Analyses

To determine the appropriate sample size for our study, a power analysis was conducted using the G\*Power software<sup>(19)</sup>. The power analysis aimed to estimate the minimum sample size required to achieve a statistical power of 80%, assuming an alpha level (significance level) of 0.05 and a medium effect size. The analysis revealed that a sample size of at least 47 participants for each group would be necessary to detect the expected effects with an 80% probability.

However, 10-15% more than the minimum number of patients in each group were included in the study in case the subjects who participated in the study may leave the study or not accept the study and in case of possible outliers that may affect the statistics.

Shapiro-Wilk test and Q-Q (Quantile-Quantile) plots were used to evaluate data normality. Mann-Whitney U test was used to determine the differences between two independent groups with continuous variables that were not normally distributed. In cases where the median values were similar and statistically significant, the mean of the rank values was given in the Mann-Whitney U test. Chi-square analysis was performed for categorical variables. All analyses were performed using the IBM SPSS Statistics 29 software package (IBM, Armonk, NY, USA). Statistical significance was set at  $p < 0.05$ . To assess the variance homogeneity Levene test was used.

#### RESULTS

Results are given in **Table 2**. There were 52 men in the CBAVD group and 66 normal healthy fertile men in the control group. Descriptive data of these two groups and  $p$  values of the differences between groups are given in Table 1. The median age was 32.5 (29-36.7) years in the CBAVD group and 31 (29-36) years in the control group. Body mass index (BMI) was 25.5 (23-28.3) kg/m<sup>2</sup> in the CBAVD group and 26 (23.2-28.7) kg/m<sup>2</sup> in the control group.

In the CBAVD group, median total testosterone, FSH, LH, levels and semen volume were 401 (335-558) ng/dL, 3.9 (2.3-5.6) mIU/ml, 3.9 (2.8-5.4) mIU/ml, and 0.9 (0.6-1.3) ml, respectively. These parameters were 376 (236-492) nmol/ml, 4.8 (2.9-7.6) mIU/ml, 5 (2.7-7.3) mIU/ml, and 3 (2.5-3.9) ml in the control group. Although there was no significant difference between the groups in terms of age, BMI, and reproductive hormone levels, semen volume represented a significant decrease in CBAVD men ( $p < 0.001$ ).

When the IIEF-15 questionnaire scores of the groups were compared; the median erectile function (also known as IIEF-6), orgasmic function and intercourse satisfaction scores were 27 (24-30), 10 (9-10), 13 (10-14) in the CBAVD group, respectively. These scores were 28 (15-30), 10 (7.7-10) and 12 (10-14) in the control group, respectively. There were no significant differences between groups for erectile function, orgasmic function, and intercourse satisfaction scores.

The median sexual desire and overall satisfaction scores of the CBAVD group were 9 (8-10), 10 (8-10) and these scores for control group were 8 (6.7-9), 8 (8-10). Sexual desire ( $p=0.006$ ) and overall satisfaction scores ( $p = 0.028$ ) were found to be significantly higher in the CBAVD group.

There were no significant differences between groups accordingly AIPE, PEDT, PEP, and Beck depression inventory questionnaires. The men with CBAVD were more bothered when they had ejaculation difficulties according to MSHQ Ejd short form. The prevalence of premature ejaculation among men with CBAVD was 38,5% according to PEDT questionnaires. There was no significant difference between the groups in the comparison of premature ejaculation rates according to PEDT, with the PEDT showing a rate of 38.5% in the CBAVD group and 24.2% in the control group.

#### DISCUSSION

Common forms of male sexual dysfunction are erectile dysfunction and premature ejaculation. The studies that investigate erectile dysfunction and premature ejaculation in infertile men using validated tools are few in number. The most important limitations of the studies are the wide variety of causes of male infertility, small case populations, and non-standardized questionnaires. Evaluation of sexual functions in infertile men in subgroups according to etiology may overcome these limitations. Therefore, this study was designed to evaluate sexual dysfunction only in men with CBAVD.

In studies evaluating erectile dysfunction among infertile men which have semen quality impairment using the validated IIEF-15, the prevalence of erectile dysfunction has been reported between 11% and 35%(3,20). Notably, some studies have been published on this issue, finding a higher prevalence (50,8%, 61,6%) of erectile dysfunction in infertile men<sup>(5,21)</sup>. It is very difficult to determine an independent relationship between erectile dysfunction and infertility. Because many factors such as age, infertility etiology, infertility duration, hormonal status, and comorbidities may affect this association. However, some studies have reported that infertility may be an independent factor for erectile dysfunction. Lotti et al. reported a significant association between erectile dysfunction and semen quality impairment after adjusting for age, comorbidities, serum testosterone levels, and prostatitis-like symptoms<sup>(20)</sup>. Besides this, another study reported a correlation between erectile dysfunction and depressive symptoms independent of age, BMI, and duration of marriage in men without comorbidities with primary or secondary infertility<sup>(22)</sup>. However, in these studies, cases were not evaluated separately according to the etiology of infertility.

Although studies evaluating erectile function in isolated cases of CBAVD have not been performed in the past, there are studies on sexual function in cases of CF that are associated with CBAVD. Chambers et al. reported the prevalence of sexual dysfunction as 65% in their study evaluating sexual function in 32 male cases with CF. They have also reported sexual dysfunction in men with CF. However, sexual function is not impaired until cystic fibrosis becomes severe enough to impact the patient's general health, and sexual dysfunction is more often associated with disease-related problems than fertility status<sup>(23)</sup>.

In our study, it was found that there was no significant difference between men with CBAVD and the control group in terms of erectile dysfunction. None of the patients in our study population had CF-related comorbidities. In addition, their serum testosterone levels were normal. There are limited publications investigating the relationship between sexual function and other causes of obstructive azoospermia such as trauma, infection, or ejaculatory duct cysts. The results of studies evaluating the sexual function of vasectomized patients with obstructive azoospermia, such as CBAVD, suggest that sexual function is not affected in these men. However, this situation does not fully meet the cases we investigated. Because vasectomized patients do not have factors such as the stress of childlessness, decreased self-esteem or low ejaculate volume<sup>(24)</sup>.

In the literature, there are some inconsistencies in studies investigating the frequency of premature ejaculation in infertile men. The prevalence of premature ejaculation has generally been reported quite high in studies using non-validated questionnaires in small cohort groups<sup>(25,26)</sup>. In our study, the prevalence of premature ejaculation among men with CBAVD was 38,5% and 71,2% respectively according to PEDT and AIPE questionnaires. There was also no statistically significant difference in the premature ejaculation rate when compared with the control group. On the other hand, the prevalence of premature ejaculation in men with CBAVD in our study is higher than the prevalence reported for the Turkish population. In a previous study by Serefoglu et al., the prevalence of premature ejaculation was reported as 20% among 2593 Turkish men<sup>(27)</sup>. The participants were heterosexual men and their partners, over 18 years old, who had regular sexual intercourse in the past 6 months, and the sample was representative of the Turkish population in terms of urban-rural distribution, geographic regions, and age groups. The study by Serefoglu et al. examined the prevalence of premature ejaculation (PE) in the general population, including a broad group of men without specific health conditions. In contrast, your study focused on men with congenital bilateral vasal agenesis (CBAVD), a group that may differ due to physiological and psychological factors affecting sexual function. Men with CBAVD may experience anxiety or stress related to their condition, which could increase the rate of PE. Furthermore, the assessment methods and classification criteria used in Serefoglu et al.'s study might not fully capture PE in men with CBAVD. Therefore, the higher prevalence of PE in CBAVD cases observed in your study can be justified by differences in population characteristics, underlying health conditions, and assessment methods. The issue of sexual satisfaction in infertile men is still debated. Some studies showed no differences between sexual satisfaction in men in infertile couples and men in fertile couples<sup>(20,28)</sup> whereas others reported lower satisfaction in infertile men<sup>(29)</sup>. Many factors such as coitus frequency, duration of infertility, cause of infertility, timing of infertility diagnosis, age of the partner, and education levels have been addressed in these studies. In a study evaluating sexual satisfaction in infertile couples, it was emphasized that the cause of infertility and the type of treatment were predictive variables for sexual satisfaction in husbands<sup>(30)</sup>. We had the expectation that men with CBAVD would have low sexual satisfaction due to low ejaculate volume when we designed the

study. In our clinical practice, we observed that sexual satisfaction was considerably reduced in patients with anejaculation or retrograde ejaculation after benign prostatic hyperplasia or prostate cancer treatments. But contrary to what we thought, sexual desire and overall satisfaction scores were higher in the CBAVD group than in the control group. A statistically significant difference was also found between the groups for the question "If you had any ejaculation difficulties or could not ejaculate, were you disturbed by this?" in the MSHQ-Ejd short-form questionnaire. Men with CBAVD felt more bothered when they experienced ejaculation difficulties than the control group. We attributed this to the fact that for the CBAVD group, the main goal of sexuality is the desire to have children rather than satisfaction.

Our study has some limitations. While evaluating premature ejaculation, intravaginal ejaculatory latency time (IELT) and PEP-female questionnaire could have increased the value of our study. The results of these questionnaires are based on the respondents' own experiences and perceptions. Therefore, they can lead to misleading results as they are based on subjective assessments rather than objective measurements. In addition, a larger study population would have helped to make the results more reliable.

## CONCLUSIONS

In conclusion, CBAVD, one of the rare causes of male infertility, differs from other causes of infertility etiologically and genetically as well as in terms of erectile and sexual functions. In our study, the sexual and erectile functions of this special group were analyzed separately from other causes of infertility. This study can be a starting point for future studies. More comprehensive studies may reveal this situation clearly.

## ACKNOWLEDGMENTS

ECA, NB designed the study and edited the paper. NB, EK created the database, collected data, performed data analysis, and assisted with paper writing and editing. HT, GS collected data and assisted with paper writing and editing. ECA, NB, HT collected data and assisted with paper writing and editing. GS assisted with paper editing.

## CONFLICT OF INTEREST

The authors declare no competing interests.

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