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Medical Related Determinants of Azoospermia Among Patients Attending Ebenezer Clinical Laboratory-Kampala Capital City, Uganda

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Keywords

Azoospermia, Normozoospermia, Sperm Count, Medica-related determinants, Ebenezer Clinical Laboratory, Kampala Capital City Authority.

Abstract

Background: One of the societal issues plaguing families and nations now throughout the world is azoospermia, which has caused an unintentional decline in the birth rate (Sengoku, 2012). More than 70 million couples experience infertility globally, and up to 10–20 percent of males who visit an infertility clinic are thought to have azoospermia (Kumar, 2015). With an estimated 5,000,000 people experiencing infertility and 10 to 15% of couples failing to conceive, Uganda is among the nations where male infertility is thought to be a significant problem. Therefore, the goal of the study was to identify the medical-related determinants associated with azoospermia in patients who visit Ebenezer Clinical Laboratory in Kampala, Uganda.

Methods: Using a retrospective case-control study design, men who had attended the Microbiology Department between January 1, 2015, and December 31, 2015, had their semen analyzed. In the ECL database, cases were individuals who were azoospermic and had no sperm cells in their ejaculate, whereas controls were individuals who were normozoospermic and had normal sperm cells in their ejaculate. The selection of respondents was done through systematic sampling with the use of the respondents' clinical data. A method from the OpenEpi software package for Kelsey was used to determine the sample size, which came out to be 204 clients (102 cases and 102 controls). There were 102 cases and 102 controls in the sample, with a 1:1 case-to-control ratio. Data for the study were gathered using a standardized data abstraction questionnaire. Utilizing descriptive statistics, the data was examined and generated means, standard deviations, ranges, frequencies,

and percentages. The study employed the chi-square test and binary logistic regression analysis to ascertain the presence of a statistically significant association ($p < 0.05$) between medical-related factors and azoospermia.

Results: The study found that urethral discharge [AOR = 2.395, (CI 95% = 1.284-4.469), p=0.006], Genital Swelling [AOR = 2.340, (CI 95% = 1.031- 5.311), p=0.042] and genital trauma [AOR = 3.514, (CI 95% = 1.505- 8.202), p=0.004] were positively associated with azoospermia among patients ($p < 0.05$).

Conclusions: Interventions should be focused on improving these factors, such as sensitization programs to be brought on board to make males aware of the risks of genital infections that can lead to urethral discharges and how to prevent such.

Background

Globally one of the social problems affecting families/countries today is the involuntary declining birth rate, although the number of infertile couples is not well documented (Al-kandari et al., 2020). Worldwide, more than 70 million couples suffer from infertility (Vitrikas et al., 2015). Approximately 1% of all men in the general population suffer from azoospermia, and azoospermic men constitute approximately 10 to 15% of all infertile men. Male infertility accounts for 40-50% of infertility, affecting approximately 7% of all men. Yet approximately 10% of infertile men are azoospermic (Gudeloglu et al., 2013). Also, azoospermia is found in up to 10 to 20 percent of the men who present to an infertility clinic (Kumar, 2015). Thus, this group of patients represents a significant population in the field of male infertility (Skakkebaek, 2016).

The highest numbers of male infertility have been recorded in the “African Infertility Belt” of which 43% of the infertility cases are due to men. Among developing countries, the exact number of male infertilities is unknown due to a lack of proper registration and well-performed studies (Tüttelmann et al., 2018). According to Szabó et al. (2023), one in every four couples in developing countries is affected by infertility. There has been a notable difference in the prevalence according to geographical locations, and environmental, cultural, and socioeconomic influences. E.g., in Nigeria, male infertility is at 11% (Szabó et al., 2023). In some parts of sub-Saharan Africa including the Republic of Sudan and Cameroon, the infertility rate could exceed 30% (Abarikwu, 2013). In Kenya, Taghavi et al. (2021) in a national study concluded that azoospermia (no sperm) and Oligospermia (low sperm) were the major causes of infertility among men; responsible for 41 percent of all male infertility.

In Uganda, infertility is a major challenge, with an estimated 5,000,000 people facing infertility, mainly handled by the private centers in urban areas; and about 10-15% of the couples cannot have children due to infertility. According to Abebe (2020), 75% of people are affected by infertility, the problem is due to Sexually Transmitted Infections (STIs) which often lead to blockage of sperm ducts among men. Medical consultants have highlighted that more Ugandans are seeking care for reproductive issues, however, it is difficult to determine the precise percentages indicating infertility rates in the country due to people's lack of transparency and lack of data (Kang, 2021). Medical-related determinants have been cited to be behind the increase in the number of patients with infertility, among men contributing almost half of all cases in advanced nations (Zhu et al., 2022).

Methods

Study design

The study adopted a retrospective case-control study design descriptive survey design with a cross-sectional design to establish the risk factors associated with azoospermia among men who had visited the Microbiology Department for semen analysis from 1st January to 31st December 2015. Cases were azoospermic participants in the ECL database with no sperm cells in the ejaculate

whereas controls were normozoospermic participants in the ECL database with normal sperm cells in the ejaculate. Quantitative research approaches were used, where data from the patient files was analyzed using descriptive and inferential statistics.

Setting

The study was carried out at Ebenezer Limited Clinical Laboratory, Kampala, Uganda. It's found on the First Floor of Sure House Building Plot 1, Bombo Road within the central area of Kampala Capital City Authority (KCCA), Uganda. This laboratory was chosen because it's accredited to ISO 15189 Testing Laboratory No. M0221, by SANAS from South Africa (Ebenezer Ltd Clinical Laboratory, 2020) serves more people for infertile investigations than any other Laboratory in Kampala and Uganda in general. The laboratory participates in external and internal quality assurance schemes and runs control daily. Since 2015, there has been a rapidly increasing number of clients visiting the Ebenezer laboratory, testing positive for azoospermia among those seeking semen analysis tests, where an average of five azoospermic patients have been reported per day from 2013 to 2015. This raised a concern about conducting the current study at Ebenezer's laboratory.

Sample

The sample size was 204 (102 cases and 102 controls) clients, determined using a formula from the OpenEpi software package for Kelsey (Abayomi et al., 2018) which is suitable for determining sample size in an unmatched case-control study design. This sample size was determined with an assumption of a proportion of controls with exposure being 10 % at a 95% confidence interval with 5% marginal error and power of 80% as well as an odds ratio of three detected. The sample involved 102 cases and 102 with a ratio of cases to controls being 1:1.

Sampling

A systematic sampling technique was employed to select 102 cases and 102 controls. According to the records at ECL, a total of 2,880 clients visited the Microbiology Department for semen analysis tests in the period of 1st January to 31st December 2015 (ECL-2020 Annual Report, 2015). Since daily half of the clients were turning out to have azoospermia; this implies that out of the total population of clients, half of them (1,440 clients) were the estimated population of azoospermia clients (cases). Hence from this population, 102 azoospermia clients were picked using a systematic sampling technique, and these were the cases. Whereas, according to the daily trend of normozoospermia (controls), 2 out of 10, were normozoospermia and hence the study population for controls was 576 clients, and the sample size for controls was 102.

Data was captured from a pre-arranged laboratory register book in the microbiology department which is usually filled whenever one comes for semen examination. Systematic sampling was employed to select the study participants. Since the sample size for cases was 102, the sampling interval was 1,440/102 = 14. Therefore, hence every 14th element in succession was chosen from the sampling frame to be a part of the case group. Using the rotary method, the first case participant between 1 and 14 was selected randomly in the register which was 1. Then, 1, and every 14^{th} element to follow was picked from the target population of 1,440.

The sample size for controls was 102, therefore the sampling interval was 576/102 = 6. Therefore every 6^{th} element in succession was chosen from the sampling frame to be a part of the control group. Using the rotary method, a first-case participant between 1 and 6 was selected randomly in the register which was 4. Then, 4, and every 6th element to follow was picked from the target population of 576. The collection of the data took 2 months to be completed.

For inclusion criteria, all the azoospermic and normozoospermic patients in the data register aged 18 years and above, who visited the ECL Microbiology Department for semen analysis from 1st January to 31st December 2015 were

considered in the study. Whereas, for exclusion criteria, the following categories of patients were not included in the study; Oligozoospermic (Sperm concentration less than the reference values); Asthenozoospermic (Less than the reference value for motility); Teratozoospermic (Less than the reference value for morphology); Oligoasthenoteratozoospermic (Signifies disturbance of all three variables); Aspermic (No ejaculate); Incomplete responses in the data register; Men that were below 18 years of age; and non-Ugandans.

Data collection

Methods

The study used a questionnaire survey method for data collection. This is because the data to be gathered was quantitative. The questionnaire survey method was used to collect data from the laboratory records.

Instruments

A data abstraction questionnaire captured information from cases and controls on clients who had visited the facility in 2020. The data abstraction structured questionnaire had closed-ended questions developed to address the objectives of the study. The questionnaire was used because it is the most appropriate instrument given the nature of the topic of the study.

Data analysis

Data from the respondents was edited to detect errors, cleaned daily, and sorted and questionnaires were given numbers for identification. Filled questionnaires were reviewed at the end of the day for completeness and accuracy. Data was entered into a datasheet and analyzed in the computer using the Statistical Package for Social Scientists (SPSS) version 25.0 while ensuring the accuracy and consistency of data.

Data was analyzed using descriptive statistics to generate frequencies, percentages, means, standard deviations, and ranges. To establish the significant associations between the predictor variables and azoospermia, a chi-square test was used for bivariate analysis. The χ^2 independent test was used to determine whether there was a significant association between risk factors and azoospermia about 0.05 statistical significance. Variables that were significant under chi-square analysis were further subjected to binary logistic regression to obtain crude odds ratios (COR) and adjusted odds ratios (AOR) and their corresponding 95% confidence intervals and p values. The hypotheses were tested using a significance level (α=0.05) and P-value. The null hypothesis (Ho) was rejected if the P-value was less than or equal to 0.05, indicating statistical significance. Conversely, the null hypothesis (Ho) was accepted when the P-value exceeded 0.05.

Ethical considerations

During the retrieval of respondents' individual medical-related information from their medical documents, the anonymity and privacy of the participants were observed. The participants remained anonymous during the whole process of the study. The participants' information was kept confidential and only used for the research, the local Research Ethics Committee (REC) and Uganda National Council for Science and Technology (UNCST) as entities that may have access to private information that identifies the research participants by name.

Results

Table 1 presents descriptive findings about the medical-related profile of male respondents attending Ebenezer Limited Clinical Laboratory in Kampala, Uganda, based on their azoospermia status. Among the male patients with azoospermia, 72 (70.6%) had palpable testicles, and 93 (91.2%) had penile abnormalities, contrasting with the normozoospermia controls where the majority, 84 (82.4%) and 102 (100%), respectively, did not exhibit these conditions.

Table 1: Medical-related Determinants of the Male Respondents Attending Ebenezer Limited Clinical Laboratory, Kampala, Uganda

Factors & Categories	Azoospermia Status	
	Cases (Azoospermia) n (%)	Controls (Normozoospermia) n (%)
Palpable Testicles		
Yes	72 (70.6)	18 (17.6)
No	30 (29.4)	84 (82.4)
Penile Abnormality		
Yes	93 (91.2)	0 (0)
No	9 (8.8)	102 (100)
Genital Operation		
Yes	84 (82.4)	9 (8.8)
No	18 (17.6)	93 (91.2)
Chronic Diseases		
Yes	87 (85.3)	18 (17.6)
No	15 (14.7)	84 (82.4)
Injury of the Private Parts		
Yes	93 (91.2)	3 (2.9)
No	9 (8.8)	99 (97.1)
Urethral Discharge		
Yes	69 (67.6)	54 (52.9)
No	33 (32.4)	48 (47.1)
Genital Swelling		
Yes	75 (73.5)	15 (14.7)
No	27 (26.5)	87 (85.3)
Genital Ulcer		
Yes	90 (88.2)	12 (11.8)
No	12 (11.8)	90 (88.2)
Painful Urination		
Yes	57 (55.9)	39 (38.2)
No	45 (44.1)	63 (61.8)
Genital Trauma		
Yes	72 (70.6)	9 (8.8)
No	30 (29.4)	93 (91.2)
Passing Blood in Urethra		
Yes	72 (70.6)	24 (23.5)
No	30 (29.4)	78 (76.5)
Suffered from Mumps		
Yes	84 (82.4)	12 (11.8)
No	18 (17.6)	90 (88.2)
Scrotal Swelling		
Yes	93 (91.2)	36 (35.3)
No	9 (8.8)	66 (64.7)

A substantial proportion of azoospermia cases, 84 (82.4%), had undergone genital operations, while the majority of normozoospermia controls, 93 (91.2%), had not. Chronic diseases were prevalent among 87 (85.3%) azoospermia cases, but the majority of normozoospermia controls, 84 (82.4%), reported no chronic diseases. Injuries to private parts were experienced by most azoospermia cases, 93 (91.2%), compared to only 3 (2.9%) in normozoospermia controls. Urethral discharge was reported by 69 (67.6%) azoospermia cases, while 54 (52.9%) normozoospermia controls had never experienced it.

Genital swelling was prevalent in 75 (73.5%) azoospermia cases, whereas the majority of normozoospermia controls, 87 (85.3%), had no history of genital swelling. Genital ulcers were found in 90 (88.2%) azoospermia cases, while the majority of normozoospermia controls, 90 (88.2%), had never experienced them. Painful urination was reported by 57 (55.9%) azoospermia cases, whereas the majority of normozoospermia controls, 63 (61.8%), had never experienced it. Genital trauma was prevalent in 72 (70.6%) azoospermia cases, whereas the majority of normozoospermia controls, 93 (91.2%), had never experienced it. Passing blood in the urethra was reported by 72 (70.6%) azoospermia cases, while the majority of normozoospermia controls, 78 (76.5%), had never experienced it. A history of mumps was prevalent in 84 (82.4%) azoospermia cases, while the majority of normozoospermia controls, 90 (88.2%), had never suffered from mumps. Scrotal swelling was reported by the majority of azoospermia cases, 93 (91.2%), whereas the majority of normozoospermic controls, 66 (64.7%), had never experienced it

Medical Related Determinants Associated with Azoospermia among Patients Attending Ebenezer Clinical Laboratory

To establish the medical risk factors associated with azoospermia among patients attending Ebenezer Clinical Laboratory. Inferential statistics using chi-square analysis, and bivariate and multiple logistic linear regression analyses were conducted to generate χ^2 values, crude and adjusted crude odds at a 95% level of significance.

Table 2: Chi-Square Analysis of Medical Related Determinants Associated with azoospermia among patients attending Ebenezer Clinical Laboratory

Factors & Categories	Azoospermia Status		χ^2	df	p-value
	Cases (Azoospermia) n (%)	Controls (Normozoospermia) n (%)			
Palpable Testicles					
Yes	72 (70.6)	18 (17.6)	3.923	1	0.048
No	30 (29.4)	84 (82.4)			
Penile Abnormality					
Yes	93 (91.2)	0 (0)	9.415	1	0.002
No	9 (8.8)	102 (100)			
Genital Operation					
Yes	84 (82.4)	9 (8.8)	3.458	1	0.063
No	18 (17.6)	93 (91.2)			
Chronic Diseases					
Yes	87 (85.3)	18 (17.6)	0.325	1	0.568
No	15 (14.7)	84 (82.4)			

Injury of the Private parts					
Yes	93 (91.2)	3 (2.9)	3.188	1	0.074
No	9 (8.8)	99 (97.1)			
Urethral Discharge					
Yes	69 (67.6)	54 (52.9)	8.838	1	0.003
No	33 (32.4)	48 (47.1)			
Genital Swelling					
Yes	75 (73.5)	15 (14.7)	4.317	1	0.038
No	27 (26.5)	87 (85.3)			
Genital Ulcer					
Yes	90 (88.2)	12 (11.8)	0.000	1	1.000
No	12 (11.8)	90 (88.2)			
Painful Urination					
Yes	57 (55.9)	39 (38.2)	0.729	1	0.393
No	45 (44.1)	63 (61.8)			
Genital Trauma					
Yes	72 (70.6)	9 (8.8)	13.980	1	0.000
No	30 (29.4)	93 (91.2)			
Passing Blood in Urethra					
Yes	72 (70.6)	24 (23.5)	0.907	1	0.341
No	30 (29.4)	78 (76.5)			
Suffered from Mumps					
Yes	84 (82.4)	12 (11.8)	1.407	1	0.236
No	18 (17.6)	90 (88.2)			
Scrotal Swelling					
Yes	93 (91.2)	36 (35.3)	1.415	1	0.493
No	9 (8.8)	66 (64.7)			

The chi-square analysis in Table 2 highlights significant associations for various factors with azoospermia. Palpable testicles as a medical factor exhibit a significant association with azoospermia ($\chi2 = 3.923$, df = 1, $p = 0.048$), Also, penile abnormality ($\chi2 = 9.415$, df = 1, $p = 0.002$), urethral discharge ($\chi2 = 8.838$, df = 1, $p = 0.003$), genital swelling ($\chi2 = 4.317$, df = 1, $p = 0.038$), genital trauma. ($\chi2 = 13.980$, df = 1, $p = 0.000$) were significantly associated with azoospermia. However, other medical-related Determinants such as genital operation, chronic diseases, genital ulcers, painful urination, passing blood in the urethra, suffering from mumps, and scrotal swelling were not significantly associated with azoospermia ($p < 0.05$)

Factors significant at chi-square analysis were further analyzed using both bivariate and multivariate logistic linear regression and the findings are presented in Table 3.

Table 3: Logistic Regression Analysis of Medical Factors Associated with Azoospermia Among Patients Attending ECL

Factors & Categories	Azoospermia Status		COR (95%CI)	p	AOR (95%CI)	p
	Cases (Azoospermia) n (%)	Controls (Normozoospermia) n (%)				
Age						
18 - 49	27 (26.5)	30 (29.4)	1		1	
50 >	75 (73.5)	72 (70.6)	1.157 [0.627-2.131]	0.640	1.006 [0.509-1.989]	0.985
Testicles Felt on Touch						
Yes	72 (70.6)	18 (17.6)	1		1	
No	30 (29.4)	84 (82.4)	1.944 [1.001-3.776]	0.050	1.999 [0.969-4.121]	0.692
Urethral Discharge						
Yes	69 (67.6)	54 (52.9)	1		1	
No	33 (32.4)	48 (47.1)	2.352 [1.332-4.153]	0.003	2.395 [1.284-4.469]	0.006
Genital Swelling						
Yes	75 (73.5)	15 (14.7)	1		1	
No	27 (26.5)	87 (85.3)	2.088 [1.034- 4.216]	0.040	2.340 [1.031-5.311]	0.042
Genital Trauma						
Yes	72 (70.6)	9 (8.8)	1		1	
No	30 (29.4)	93 (91.2)	4.306 [1.923-9.639]	0.000	3.514 [1.505-8.202]	0.004

Results in Table 3 indicate that while there is a marginal significance, there might be a potential association between reporting “testicles felt on touch” and higher odds of azoospermia among patients attending Ebenezer clinical laboratory. The crude odds ratio [COR = 1.944 (CI 95% = 1.001, 3.766), p = 0.050], implied that the odds of developing azoospermia among patients who reported “testicles felt on touch” were about twice higher compared to those who did have such condition. While, on multivariate analysis, the adjusted odds ratio (AOR) for Testicles Felt on Touch is 1.999 (CI 95% = [(0.969, 4.121), p = 0.692], the odds remained approximately twice higher for azoospermia compared to those without this symptom.

Regarding urethral discharge among men, the finding suggests that the presence of urethral discharge among male patients is strongly associated with an increased risk of azoospermia. The crude odds ratio [COR = 2.352, (CI 95% = 1.332, 4.153), p = 0.003], implied that the odds of developing azoospermia among male patients with urethra discharge is twice higher compared to male patients who did not possess such a health symptom. The adjusted odds ratio (AOR) for urethral discharge is 2.395 (CI 95% = [(1.284,

4.469), p = 0.006], this indicates that individuals with urethral discharge have approximately 2.4 times higher odds of experiencing azoospermia compared to those without urethral discharge symptom.

In respect to the presence of genital swelling as a medical condition among male patients is significantly associated with azoospermia. The crude odds ratio [COR = 2.088 (CI 95% = 1.034, 4.216), p = 0.040], implied that the odds of developing azoospermia among male patients with genital swelling is twice higher compared to male patients who did not possess such a medical condition. The adjusted odds ratio (AOR) for genital swelling is 2.340 (CI 95% = [(1.031, 5.311), p = 0.042], further indicating that men with genital swelling have 2.3 times higher odds of experiencing azoospermia compared to those without this symptom. Furthermore, genital trauma history among men is significantly associated with azoospermia. The crude odds ratio [COR = 4.306 (CI 95% = 1.923,9.639), p = 0.000], implied that the odds of developing azoospermia among male patients with genital trauma is 4.0 times higher compared to male patients who did not have a history of genital trauma. Based on the adjusted odds ratio (AOR) for genital trauma is 3.514 (CI 95% = [(1.505, 8.202), p = 0.004.]. The result indicates that men with a history of genital trauma have approximately 4 times higher odds of experiencing azoospermia compared to those without such trauma.

Discussion

The logistic regression model suggests that variables such as urethral discharge, genital swelling, and genital trauma are statistically significant predictors of azoospermia, while testicles felt on touch, do not show statistically significant associations. In the study, it was found that having urethral discharge was a strong statistically significant factor associated with azoospermia among patients attending Ebenezer clinical laboratory, showing that having a urethral discharge is a very high-risk factor that highly increases the likelihood of the individual acquiring azoospermia. Urethra discharge occurs due to infections and accidents like groin or scrotal accidents that can result in damaging internal parts resulting in the discharge, and at times can damage the sperm ducts or even the epididymis that is necessary to produce sperms. The study's results highlight the importance of recognizing urethral discharge as a potential medical determinant of azoospermia and clinicians should be attentive to patients reporting urethral discharge during assessments, as this symptom may serve as a potential indicator of reproductive health issues. In conformity with this study finding, Agarwal et al. (2022) demonstrated that a history of sexually transmitted infections (STI), epididymitis, and testicular damage all have statistically significant associations with semen abnormality when controlled for multiple risk factors.

Whereas Obwoge et al., (2019) concluded that infertile men were significantly more likely than fertile men to report having experienced penile discharge, painful micturition, and genital ulcers, less likely to seek treatment for these symptoms, and more likely to seek treatment with informal sector providers. Therefore, sensitization programs should be brought on board to make males aware of the risks of genital infections that can lead to urethral discharges, and how to prevent such.

In the study, genital swelling as a medical condition was found to be a significant risk factor for azoospermia. Genital swelling in males can arise from various causes, including infections like sexually transmitted infections (STIs) or inflammatory conditions such as epididymitis, physical trauma, including injuries or blunt force, may also result in swelling, while allergic reactions to substances like fabrics or topical medications can contribute. Additionally, inflammatory disorders and conditions like hernias or fluid retention can manifest as swelling in the genital area. In rare instances, certain cancers, including testicular cancer, might present with genital swelling. Varicocele, the enlargement of veins in the scrotum, is another potential cause.

The finding further underscores the need for careful clinical consideration and further evaluation when patients report genital swelling, given its statistically significant association with an increased likelihood of azoospermia. Healthcare providers should be vigilant in recognizing and addressing genital swelling during clinical evaluations. Based on the above findings, El-Shehawi et al, (2020) confirm that therapy with alkylating agents, such as cyclophosphamide, can be associated with irreversible gonadal toxicity in male survivors of adult cancer which leads to azoospermia and oligospermia. Whereas, in a related scenario, a study done by Abdullah et al. (2021), confirmed that vincristine may have a previously unrecognized important role in causing azoospermia, possibly irreversible, when administered in childhood or adolescence. Similarly, Bisht et al, (2017) proved that anabolic steroid treatment is associated with azoospermia.

Having genital trauma was also found to be a statistically significant factor associated with azoospermia. This finding proposes that experiencing genital trauma increases the chances of the individual getting azoospermia. This is because genital trauma usually results from accidents, which end up affecting spermatogenesis, leading to azoospermia. The finding provides valuable guidance for healthcare providers, indicating that a comprehensive assessment of male fertility should include an inquiry into the history of genital trauma to offer a more careful and accurate understanding of reproductive health. Zhou et al. (2019) also found out that in the presence of other factors, genital trauma was still a significant risk factor 2 times more likely to be azoospermic; and justified that the results are because genital trauma leads to swelling and causes disorganization of the anatomy and physiology of male reproduction. Current study findings are also consistent with (Leisegang et al., 2021), who demonstrated that testicular damage is statistically significantly associated with semen abnormality.

Limitations

The study's limitations include concerns about sample size and representativeness, possibly leading to selection bias. Reliance on self-reported data introduces potential recall or social desirability bias, and unaccounted confounding variables may exist. The single-site nature of the study could limit generalizability, urging future research in multiple centers or diverse healthcare settings. The specific clinical laboratory setting might constrain the findings' applicability. The study may not have fully explored all potential medical factors related to azoospermia, emphasizing the need for future research to examine a broader range of determinants for a more comprehensive understanding.

Conclusions

Addressing the medical-related determinants influencing azoospermia is crucial for alleviating the burden and mitigating the consequences associated with this condition. By identifying and targeting specific factors such as urethral discharge and genital trauma, interventions can be designed to reduce the incidence of azoospermia, ultimately lessening the negative impacts on affected individuals. This approach not only helps minimize consequences like stigmatization, isolation, and mental health issues but also contributes to societal well-being by tackling issues related to family dynamics and social status. Healthcare professionals can enhance their ability to assess, diagnose, and manage male reproductive health issues by understanding the practical implications derived from this study. However, it is imperative to underscore the need for further research and clinical validation to refine these implications and tailor interventions, ultimately improving patient outcomes and promoting reproductive health in males.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome; AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; CVI: Content Validity Index; DNA: DeoxyRibo Nucleic Acid; ECL: Ebenezer Clinical Laboratory; FSH: Follicle Stimulating Homone; HBM: Health Belief Model; HIV: Human Immune Virus; IRB: Institutional Review Board; KCCA: Kampala Capital City Authority; LH: Luteinizing Hormone; MOH: Ministry of Health; NEMA: National Environment Management Authority; PCR: Polymerase Chain Reaction; SANAS: South African National Accreditation System; SPSS: Statistical Package for Social Scientists; STDs: Sexually Transmitted Diseases; STIs: Sexually Transmitted Infections; TB: Tuberculosis; UBOS: Uganda Bureau of Statistics; UNRA: Uganda National Roads Authority; WHO: World Health Organization.

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Authors' contributions

SSK was the primary author. NT, SL and DC read and suggested improvements in the manuscript. All the authors herein read, reviewed, and found the final manuscript acceptable.

Consent for publication

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