

Perceptions of Varicocele Embolization as a Therapeutic Options for Adult Patients, A Local Prospective

Varicocele
Embolization as a
Therapeutic Options
for Adult

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ABSTRACT

Objective: To assess awareness of varicocele, knowledge of available therapeutic options, particularly varicocele embolization, and related health-seeking practices among adults in the Qassim region of Saudi Arabia.

Study Design: Community-based cross-sectional study

Place and Duration of Study: This study was conducted at the Qassim, Saudi Arabia from June 2024 to June 2025.

Methods: A total of 320 adults were recruited through convenience sampling and completed a self-administered Arabic questionnaire comprising 23 items. The questionnaire collected sociodemographic information and assessed knowledge of varicocele, its clinical implications, diagnostic approaches, and treatment options, including surgical repair and interventional radiological embolization. Data were analysed using SPSS version 26.0 and presented as frequencies and percentages.

Results: Of the 320 participants, 185 (58%) were married, 205 (64%) worked in non-health-related fields, 212 (66%) held a bachelor's degree, and 250 (78.1%) were Saudi nationals. Only 37 (11.5%) participants reported having been diagnosed with varicocele. Nearly half, 158 (49.4%), incorrectly described varicocele as enlargement of the testes, while 122 (38.1%) did not know its meaning; none correctly identified it as dilatation of the testicular veins. Regarding varicocele embolization, only 68 (21.3%) correctly recognised it as an interventional radiological procedure, whereas 66 (20.6%) considered it a surgical procedure and 186 (58.1%) had no knowledge of it. Furthermore, 288 (89.7%) participants reported never undergoing routine testicular examination.

Conclusion: Adults in the Qassim region demonstrated inadequate knowledge of varicocele and limited awareness of varicocele embolization as a therapeutic option. Community-based educational campaigns, improved counselling, and greater involvement of healthcare professionals are needed to promote early recognition, appropriate health-seeking behaviour, and informed treatment decisions.

Key Words: Varicocele, varicocele embolization, awareness, interventional radiology, male infertility, Saudi Arabia

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INTRODUCTION

Varicocele, a condition characterized by the abnormal dilation and tortuosity of veins within the pampiniform plexus of the spermatic cord in the scrotum, affects approximately 15% of males, with a heightened prevalence of 35% in those with primary infertility and reaching up to 80% in cases of secondary infertility¹.

Typically observed unilaterally, varicocele predominantly affects the left side in 78-93% of cases, while bilateral occurrences are less common and isolated incidences on the right side are rare².

There are several theoretical explanations for the etiology for varicocele. Anatomical variations in venous drainage between the left and right internal spermatic veins, coupled with venous valve incompetence, are crucial to the prevalence of left-sided varicocele. Moreover, factors such as physical exertion and heightened intra-abdominal pressure are implicated in varicocele development, leading to increased hydrostatic pressure in the spermatic veins. This elevation in pressure results in heightened scrotal temperature, believed to be the primary mechanism underlying symptomatic presentations and infertility associated with varicocele³.

Clinically, classification of varicocele is delineated by distinct characteristics. Grading ranges from 1 to 3, with Grade 1 detectable solely during the Valsalva maneuver, Grade 2 easily palpable without the maneuver but not visible, and Grade 3 presenting as a

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sizable, visible anomaly upon scrotal inspection⁴. Various imaging grading systems utilizing color Doppler have been proposed, with the classification outlined by Sarteschi being widely embraced⁵.

Treatment modalities for varicocele include open surgical repair, microsurgical techniques, laparoscopic ligation, or percutaneous embolization of the internal spermatic vein. The primary goal relies on the occlusion of the dilated veins that drain the testis⁶. Percutaneous embolization emerges as a minimally invasive option, obviating the need for surgical incisions and enabling complete procedures under local anesthesia, offering advantages over conventional surgical methods⁷. The chosen type of intervention influences the patient's option and the logistics of the healthcare center (availability of interventional radiology department, experience of the surgeons)⁸.

Since varicocele is a common cause of infertility, public awareness of its symptoms, impacts, and management is paramount for early detection and enhanced treatment outcomes⁹⁻¹¹. The study aims to identify the awareness of varicocele symptoms, therapeutic options, as well as explore health-seeking behavior and knowledge of available services and barriers to access within our population, Qassim, Saudi Arabia.

METHODS

This was a community-based cross-sectional study conducted among the general population of Qassim, Saudi Arabia, to assess knowledge and awareness regarding varicocele and its available therapeutic options. The study was conducted from June 2024 to June 2025 using a self-administered questionnaire. Adult residents of Qassim who were able to read and understand Arabic and were willing to participate were included. Participants younger than 18 years, those unable to understand Arabic, duplicate responses, and incomplete questionnaires were excluded from the final analysis.

Data were collected using a structured questionnaire consisting of 23 questions developed after reviewing relevant literature. The questionnaire included items related to sociodemographic characteristics such as age, gender, marital status, educational level, occupation, monthly income, and place of residence. It also assessed participants' knowledge about varicocele, including its causes, risk factors, symptoms, complications, effect on fertility, and diagnostic methods. The final part assessed awareness of available therapeutic options, including conservative management, surgical treatment, radiological interventions, and sources of information.

The questionnaire was prepared in Arabic to ensure clarity and better understanding among participants. After ethical approval, the questionnaire was converted into an electronic format and distributed through social

media platforms and community networks using a convenience sampling technique. Before completing the survey, participants were informed about the purpose of the study, voluntary nature of participation, confidentiality of responses, and their right to withdraw at any time. Electronic informed consent was obtained from all participants before starting the questionnaire. No personal identifying information was collected.

The collected responses were reviewed for completeness and accuracy before analysis. Knowledge and awareness questions were scored by assigning one point for each correct response and zero points for incorrect or "don't know" responses. The total score was calculated for each participant and categorized into poor awareness, moderate awareness, and good awareness according to the percentage of correct responses. Data were entered and analyzed using SPSS version 26.0. Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as mean $\pm$ standard deviation. The Chi-square test was used to assess associations between awareness level and sociodemographic variables. Independent sample t-test and one-way ANOVA were applied where appropriate to compare mean knowledge scores between groups. A p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Institutional Review Board. Participant anonymity and confidentiality were maintained throughout the study, and all collected data were used only for research purposes.

RESULTS

Table No. 1: Descriptive statistics of demographic characteristics (N=320)

Variables	Frequency (f)	Percentage (%)
Marital Status		
Single	135	42%
Married	185	58%
Occupation		
Student	45	14%
Employed in the health field	50	16%
Employed in non-health field	205	64%
Non employed	20	6%
Education		
Middle and high school graduates	92	29%
Bachelor's degree	212	66%
Master/PhD degree	15	5%
Nationality		
Saudi	250	78.1%
Non-Saudi	66	21.9%

Most participants are married (58%) and employed in non-health-related fields (64%). About two-third of the participants have Bachelor's degree-level qualifications and 78% of the participants were Saudi (Table 1).

Table No. 2: Descriptive Analysis of perception and awareness of varicocele

What is a varicocele?	Frequency (f)	(%)
Increase seminal fluid volume	40	12.5
Enlargement of tests	158	49.4
Dilatation of the testicular veins	0	0
don't know	122	38.1
Are you currently diagnosed as a varicocele patient?		
Yes	37	11.5%
No	283	88.4%
What is varicocele embolization?		
Varicocele removal by Surgery	66	20.6%
Varicocele embolization by Interventional Radiology	68	21.3%
Something else	0	0%
I don't know	186	58.1%
How long does a varicocele embolization procedure take?		
One to two hours	168	52.5%
Three to four hours	86	26.9%
Four to six hours	37	11.6%
Eight hours	24	7.5%
Did you receive any surgical treatment for varicocele?		
Yes	288	90%
No	30	9.4%
Do you have colleagues dedicated to varicocele?		
Yes	46	14.4%
No	272	85%
Have you ever done routine checkups for testicular examination?		
Every year	12	3.8%
Every two years	11	3.4%
Every five years	7	2.2%
I have never do	288	89.7

A majority of the participants (44.6%) described varicocele as an enlargement of the testes, while a significant portion (59.4%) lack of knowledge about its nature. Among the participants, 88% (n=36) had not received a diagnosis of varicocele, whereas 22% had the diagnosis (Table 2). Furthermore, the knowledge of varicocele embolization among adults was as following: 20.6% believed this can be done surgically, 21.3% alleged this can be done surgically, while majority 57.8% had no knowledge about it (Figure 1). Notably,

9% of the participants had undergone invasive interventions, such as surgery or embolization ($P > 0.001$) (Table 2).

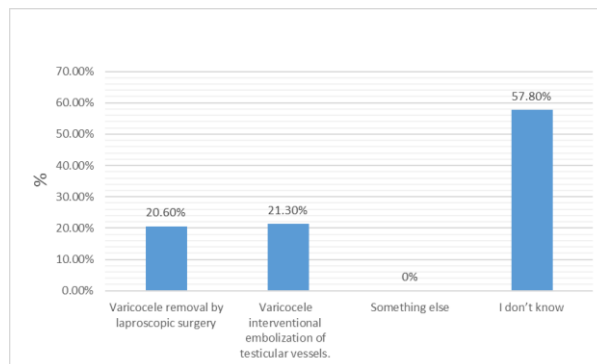


Figure No. 1: Knowledge of varicocele embolization among adults.

DISCUSSION

A significant proportion of the participating in our study (50%) demonstrated a lack of knowledge and awareness regarding varicocele. In addition, a considerable number of respondents incorrectly described treatment options (78%). Similar findings were observed in a study conducted in Riyadh, Saudi Arabia, among athletes found that 157 (41%) lacked knowledge and awareness regarding varicocele, its symptoms, and complications¹⁰. Of the clinically examined participants, 22 (46%) were found to have varicocele. Saleem et al, reported that over 50% of participants exhibited insufficient knowledge regarding varicocele¹².

Despite the global incidence of varicocele standing at about 15%, we found that less than 15% of our participant were either diagnosed or know a someone was diagnosed with varicocele. In addition, most participants have not been diagnosed with the varicocele, so ultimately, there is a few numbers of patient with limited experience regarding treatment option.

Jayadevan et al discuss the decisional conflict i.e. uncertainty about course action, on treatment of Infertile men with varicocele found that more about 55% of patients were found to have decisional conflict. Of those men without decisional conflict had higher infertility knowledge¹³. In our study, despite most of the participant were educated (71%), we noted a constrained understanding of the disease.

All of those factors, might be attributed to the socio-economical and decision conflict discussing this topic in our community as this also acknowledge in several studies conducted in Saudi Arabia, Pakistan and Nigeria¹⁴⁻¹⁶. Consequently, the level of knowledge and

awareness in these regions remains significantly inadequate^{17,18}.

Our study has certain limitations due to the limited population participants, which restricts the generalizability of the population in Saudi Arabia. However, our study contributes new insights into the understanding of knowledge and awareness of adult population regarding varicocele and the therapeutic options in Saudi Arabia. We strongly recommend that efforts be made to enhance the availability of information concerning varicocele and the therapeutic options to the general population.

CONCLUSION

Majority of adults possess inadequate knowledge regarding the fundamental aspects of varicocele as well as the treatment options that are available. Thus, it becomes imperative to initiate awareness programs and campaigns that are designed to enhance community understanding and awareness about this condition.^{33,6}

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Abdulaziz AlGharas, Abdulsalam S. Alkhidhr
Drafting or Revising Critically:	Abdulaziz AlGharas, Abdulsalam S. Alkhidhr
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Informed Consent Statement: Informed consent was obtained from all subjects prior to participation in the study.

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