ORIGINAL ARTICLE

Factors Affecting Post-Vasectomy Semen Analysis Compliance in Thai Men

Varote Satayawutipong, MD[1], Pat Saksirisampant, MD[1]

[1] Division of Urology, Department of Surgery, Somdech Phra Pinklao Hospital, Naval Medical Department, Royal Thai Navy, Bangkok, Thailand

Background: Vasectomy is a highly effective permanent contraceptive method. Its success is confirmed by azoospermia through post-vasectomy semen analysis (PVSA) that indicates the efficacy of the procedure. However, the compliance of patients with PVSA testing presents a significant challenge.

Objective: To identify the factors influencing patient compliance with PVSA at a tertiary hospital in Thailand.

Materials and Methods: A retrospective analysis was conducted on 73 male patients who underwent a vasectomy procedure between 2018 and 2024. Fifty-three of the subjects attended the recommended follow-up for semen analysis. Demographic data, comorbidities, number of children, geographical location, age, and operative complications were assessed as potential predictors of follow-up compliance. Reasons for non-compliance were explored through retrospective phone interviews.

Results: Of the 73 patients, 53 (72.6%) complied with the recommended follow-up for PVSA. No significant associations were found among follow-up compliance and age, underlying health conditions, number of children, or complications. However, significant differences were observed with geographical locations. By multivariable analysis, patients residing in other provinces were more likely to miss the PVSA appointment than those who lived in Bangkok (odds ratio [OR] 3.32, 95% confidence interval [CI] 1.08 to 10.22, p=0.036). The primary reasons for non-compliance were forgetfulness in 40%, time constraints in 33.3%, and geographical distance in 26.7%. Post-vasectomy complications were minimal, with 6.8% of patients experiencing minor issues such as surgical site pain, wound infection, and hematoma.

Conclusion: Geographical location was the only factor significantly associated with post-vasectomy follow-up compliance. The main barriers to adherence were forgetfulness, time limitations, and geographical distance.

Keywords: Vasectomy; Semen analysis; Compliance; Post-vasectomy; Azoospermia; Patient adherence; Geographical location

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Vasectomy is a permanent contraceptive method involving the transection and ligation of the vas deferens, preventing sperms to enter the female reproductive tract[1]. Although highly effective, the success of vasectomy depends on post-vasectomy semen analysis (PVSA) to confirm azoospermia[2]. Challenges in post-vasectomy monitoring include inconsistent follow-up, non-compliance with medical instructions, and patient-specific factors such as comorbidities or concurrent medications. Standard protocols recommend an initial follow-up 1 to 2 weeks post-surgery to assess the surgical site and a semen analysis 8 to 16 weeks later to confirm the absence of sperm[3]. Repeated tests are necessary until azoospermia is proved, after which no further follow-up is required unless new symptoms or health issues arise[4].

At Somdech Phra Pinklao Hospital, a tertiary hospital in Bangkok, semen analysis is scheduled for three months post-vasectomy. Between 2018 and 2024, 73 men underwent the procedure, but only 53 patients complied with the follow-up. The present study investigated the factors influencing adherence to PVSA, focusing on age, comorbidities, number of children, and geographical location. The aim was to improve follow-up protocols, enhance patient counseling, and reduce the risk of vasectomy failure due to incomplete evaluation.

Correspondence to:

Saksirisampant P.

Division of Urology, Department of Surgery, Somdech Phra Pinklao Hospital, Naval Medical Department, 504 Somdech Phra Chao Taksin Road, Bukkhalo, Thon Buri, Bangkok 10600, Thailand.

Phone: +66-2-4600000

Email: dr_pat.md@hotmail.com, patbiggy2@hotmail.co.th

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Materials and Methods

Study design and setting

The present study was a retrospective analytical study conducted at Somdech Phra Pinklao Hospital,

a tertiary health care center under the Royal Thai Naval Medical Department. The medical records of male patients who underwent a vasectomy procedure between January 2018 and December 2024 were reviewed, with data extracted from the hospital's electronic medical records system.

As a retrospective study, the sample size was based on all available eligible cases during the study period, which is 73. No formal sample size calculation was performed, which may limit the statistical power of subgroup analyses.

Inclusion and exclusion criteria

The present study included male patients aged 18 years or older who underwent a vasectomy procedure at the present study hospital during the designated study period. Only patients with complete and accessible medical records were eligible for inclusion in the analysis to ensure the accuracy and reliability of the data collected.

Patients were excluded from the study if they had medical conditions that could affect sperm production such as testicular cancer, other malignancies of the reproductive system, or untreated sexually transmitted infections. Patients diagnosed with oligospermia or azoospermia before the procedure were excluded. Patients with a history of incomplete or abnormal vasectomy procedures, as well as those whose medical records were missing or incomplete, were also excluded from the analysis.

Data collection

All data for the present study were collected retrospectively from the electronic medical records. The dataset included comprehensive demographic information such as age, number of children, postoperative complications, and geographical location of residence, categorized as residing either in Bangkok or other provinces outside Bangkok.

Medical history was reviewed to identify pre-existing health conditions, including chronic illnesses such as diabetes and hypertension, as well as any history of previous surgeries or reproductive health issues. Details related to the vasectomy procedure were also extracted, including the date of surgery and any complications that occurred intraoperatively.

Follow-up data were collected to determine patient compliance with post-vasectomy monitoring. These included the dates of follow-up visits, the results of semen analysis, and if available, histopathological findings of the excised vas deferens tissue. Information on any post-operative complications was also recorded.

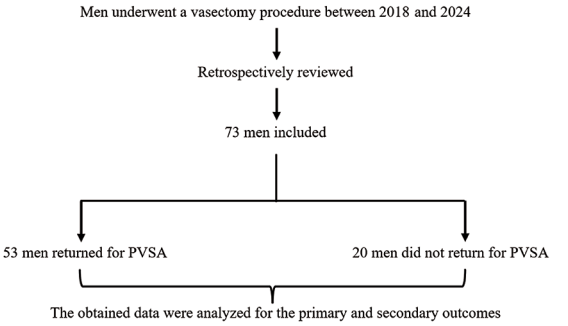

Figure 1. The process of patient selection and analysis in the present study.

For patients who did not return for follow-up, the reasons for non-compliance were obtained through retrospective phone interviews to gain further insights into the potential barriers to adherence.

Study outcomes

The primary outcome was to identify the factors affecting patients' compliance with PVSA. The analysis focused on variables such as age, the presence of comorbidities, the number of children, postoperative complications, and the geographical location of residence, classified as either residing in Bangkok or in other provinces.

Patients were categorized into two groups, men who returned for PVSA follow-up and those who did not. Data from both groups were analyzed for the primary outcomes using a Fisher's exact test for categorical variables and a Mann-Whitney U test for continuous variables. Univariable and multivariable analyses using the binary logistic regression with the calculation of adjusted odds ratios (ORs) and 95% confidence interval (CI) were conducted to investigate the actual independent factors associated with the patients' adherence to PVSA follow-up. Statistical significance was confirmed when the p-value was less than 0.05.

Secondary outcomes included an assessment of the procedural success of vasectomy, evaluated through semen analysis results, histopathological confirmation of the excised vas deferens tissue, and the presence or absence of postoperative complications. The reasons behind patients' non-compliance with follow-up appointments were identified as contributing factors to incomplete post-vasectomy evaluation. Figure 1 describes the process of patient selection and analysis in the present study.

Table 1. Demographic data and factors examined in patients who returned for PVSA follow-up and who did not

Factors	Overall (n=73)	Follow up (n=53)	Did not follow up (n=20)	p-value
Underlying medical condition; n (%)				0.413
No	66 (90.4)	47 (88.7)	19 (95.0)	
Yes	7 (9.6)	6 (11.3)	1 (5.0)	
Number of children; n (%)				0.720
1	15 (20.5)	10 (18.9)	5 (25.0)	
2	44 (60.3)	34 (64.2)	10 (50.0)	
3	11 (15.1)	7 (13.2)	4 (20.0)	
4	1 (1.4)	1 (1.9)	0 (0.0)	
5	2 (2.7)	1 (1.9)	1 (5.0)	
Mean±SD		2.04±0.76	2.1±0.97	0.916
Median (min-max)		2 (1 to 5)	2 (1 to 5)	
Region of residence; n (%)				0.063
Bangkok	42 (57.5)	34 (64.2)	8 (40.0)	
Other provinces	31 (42.5)	19 (35.8)	12 (60.0)	
Age (years)				0.804
Mean±SD	40.27±7.74	40.3±7.7	40.2±8.05	
Median (min-max)	39 (26 to 63)	39 (26 to 63)	38 (28 to 58)	
Complication; n (%)				0.701
No	68 (93.2)	49 (92.5)	19 (95.0)	
Yes	5 (6.8)	4 (7.5)	1 (5.0)	

PVSA=post-vasectomy semen analysis, SD=standard deviation

Ethical approval

For this retrospective study, ethical considerations focus on protecting patient privacy and confidentiality. Since the data was already collected, informed consent was not required. The study was approved by the Institutional Review Board (IRB) of Somdech Phra Pinklao Hospital (RP010/68). All patient information was anonymized, and the study adhered to ethical standards to ensure confidentiality. No interventions were made, and patient care was not altered during the research process.

Results

Seventy-three male patients underwent a vasectomy procedure during the study period, with 53 attending the recommended follow-up. The demographic characteristics of the study population are summarized in Table 1.

An analysis of the demographic characteristics of the study participants revealed that most (90.4%) had no underlying health conditions, while only 9.6% had comorbidities. Most participants (60.3%) had two children. The mean number of children was 2.05±0.81, with a median of 2 and a range from 1 to 5. Geographically, a greater proportion of the patients resided in Bangkok, at 57.5%, compared to those from other provinces at 42.5%. The mean age of participants was 40.27±7.74 years, with a median age of 39 and a range from 26 to 63 years.

These findings provided an overview of the demographic distribution among patients who underwent a vasectomy procedure at the study site. None of the evaluated variables including age, presence of underlying conditions, number of children, geographical region, or complications were significantly correlated with non-compliance with the PVSA.

Primary outcomes

The primary outcomes, including factors examined in patients who returned for PVSA follow-up and those who did not, are demonstrated in Table 1.

Among the 53 patients who came back for PVSA follow-up, 47 (88.7%) did not have any medical conditions, while six men (11.3%) had some comorbidities. Nineteen out of 20 participants (95%) who did not comply with the PVSA schedule reported no abnormal health conditions. No statistically significant differences were found between the two groups considering underlying health conditions (p=0.413).

The number of children did not influence compliance. The mean number of children among those who returned for follow-up was 2.04±0.76,

Table 2. Univariable and multivariable binary logistic regression analyses of the factors for PVSA follow-up

Factors	Univariable analysis		Multivariable analysis	
	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Underlying medical condition				
No	2.43 (0.27 to 21.52)	0.426	4.17 (0.35 to 49.30)	0.258
Yes	1 (ref)		1 (ref)	
Number of children	1.10 (0.59 to 2.05)	0.770	1.28 (0.65 to 2.52)	0.473
Region of residence				
Bangkok	1 (ref)		1 (ref)	
Other provinces	2.68 (0.93 to 7.72)	0.067	3.32 (1.08 to 10.22)	0.036*
Age (years)	1.00 (0.93 to 1.07)	0.960	1.01 (0.93 to 1.10)	0.764
Complication				
No	1.55 (0.16 to 14.78)	0.703	3.04 (0.28 to 33.09)	0.362
Yes	1 (ref)		1 (ref)	

PVSA=post-vasectomy semen analysis; OR=odds ratio; CI=confidence interval; ref=reference

* p-value indicates the statistical significance of correlation

compared to 2.1±0.97 for those who did not. The p-value of 0.916 indicated no significant association between the number of children and the follow-up compliance.

Most men who returned for PVSA follow-up resided in Bangkok, at 64.2% (34 out of 53). On the contrary, 12 out of 20 patients (60%) who failed to show up for the appointment lived in other provinces. Despite this difference, the primary statistical analysis showed an insignificant association between geographical location and follow-up adherence (p=0.063).

The mean age of participants who complied with the follow-up was 40.3±7.7 years, while those who did not return had a mean age of 40.2±8.05 years. This negligible difference was not statistically significant (p=0.804), suggesting that age did not affect the likelihood of follow-up.

Similarly, the occurrence of post-vasectomy complications, at 7.5% versus 5%, had no impact on adherence to the medical appointment (p=0.701).

Table 2 depicts the results of univariable and multivariable binary logistic regression analyses of the study. After adjusting for all possible contributing factors, the multivariable analysis demonstrated that geographical location had a measurable influence on follow-up adherence. The participants who resided in other provinces were more likely to miss the PVSA appointment than those who stayed in Bangkok, with the adjusted OR of 3.32 (95% CI 1.08 to 10.22, p=0.036).

Secondary outcomes

Among the 53 patients who returned for PVSA, 51 (96.2%) successfully provided a semen sample and all demonstrated azoospermia, indicating a complete absence of sperm in the ejaculate. Two patients (3.8%) were unable to provide a seminal fluid sample for analysis.

For the histopathological evaluation, 64 out of the 73 participants (87.7%) underwent tissue analysis of the excised vas deferens. All samples confirmed the presence of bilateral vas deferens, indicating successful identification and excision during the surgical procedure. Nine patients did not undergo a pathological examination.

Most of the patients (93.2%) experienced no post-operative complications, with five patients (6.8%) reporting minor complications including surgical site pain for two patients, superficial wound infection for two patients, and localized hematoma for one patient. No serious or long-term complications were observed.

For patients who did not return for follow-up, retrospective phone interviews were conducted to explore the reasons for non-compliance. Of the 20 non-compliant patients, 15 were successfully contacted. The most commonly reported barriers were forgetfulness in 40%, limited time availability in 33.3%, and geographical distance from the hospital in 26.7%. These findings underscore the influence of logistical and practical factors on follow-up adherence.

A sensitivity analysis was conducted by excluding participants with missing data or extreme outliers. The results remained consistent with the primary analysis, confirming the reliability of the findings.

Discussion

Studies on factors influencing compliance with post-vasectomy sperm analysis (PVSA) in Thailand are limited. This study provides insights that align with global research trends. International studies such as those by Welliver et al. (2023), found that surgeon-specific factors, as well as the number of children, significantly influenced follow-up rates[5]. However, the present study did not identify any significant demographic factors such as age and number of children, associated with follow-up compliance, suggesting that logistical barriers such as geographical distance and time constraints may play a more significant role in the Thai population.

Research by Zhu et al. (2024) emphasized the importance of providing sperm sample collection tools during the vasectomy procedure, which significantly increased follow-up rates[6]. Providing patients with sample collection cups on the day of the vasectomy may improve follow-up compliance. In the authors' hospital, the semen collection cups were provided on the day of PVSA, thus this factor was not assessed in the present study.

Barriers to compliance identified in the present study including forgetfulness at 40%, time limitations at 33.3%, and geographical distance at 26.7%, were consistent with the findings from a previous study[7]. Addressing these barriers through targeted interventions such as a reminder system, a notification protocol, or offering home-based testing could improve follow-up rates.

The low complication rate in the present cohort, at 6.8%, concurred with the previous results[8] and contributed to the high follow-up rate observed.

However, the present study had limitations. The small sample size limited the extent to which these findings can be generalized to broader populations, while the higher follow-up rates in Bangkok may not reflect the experiences of patients from other regions, introducing potential geographic bias. Reasons for non-compliance were based on self-reported data, introducing recall bias. Future studies with a larger number of more diverse samples are recommended to explore additional factors such as socioeconomic status and educational background.

Conclusion

The present study results showed that the PVSA follow-up compliance was higher among participants residing in Bangkok than those living in other provinces. No significant differences observed based on age, underlying health conditions, number of children, and complications. The primary reasons for the loss to follow-up were forgetfulness, time constraints, and geographical distance. These findings highlight the need for improved patient education and the provision of more accessible follow-up services to enhance adherence to post-vasectomy care.

What is already known about this topic?

Vasectomy is highly effective when followed by semen analysis to confirm azoospermia, yet global compliance with PVSA remains low at 50% to 80%. Studies have shown that follow-up is influenced by surgeon practices, patient education, and barriers such as forgetfulness and distance. However, data from Thailand and Southeast Asia are still limited, highlighting the need for local research studies.

What does this study add?

This study provided new evidence on factors affecting PVSA compliance in a Thai population, with geographical location identified as a significant factor. Common reasons for non-compliance included forgetfulness, time constraints, and travel distance. These patient-reported barriers offer practical insights into improving follow-up rates. The findings fill a gap in regional research and support tailored strategies to enhance post-vasectomy care in Thailand.

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Conflicts of interest

The authors declare no conflict of interest.

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