



Post Vasectomy Semen Analysis-Factors Predicting Compliance

Grant S Johnson^{1,2*}, Greg Andros³ and James Siegert^{1,4}

Abstract

Objective: To determine the impact of patient demographics, health care related factors, and financial factors on Post-Vasectomy Semen Analysis compliance (PVSA).

Methods: A retrospective review was performed of 248 men who underwent the first-time vasectomy between January 2008 through March 2016. Baseline demographic factors were collected and analyzed according to PVSA compliance. Chi-squared analysis was used to evaluate the predictive value of these factors for PVSA return.

Results: Forty-two percent of men returned at least one post-vasectomy semen analysis while twenty percent returned two PVSA collections. Compared to non-compliant men, patients who returned at least one PVSA were more likely to have independent predictive factors of smaller family size ($p < 0.0003$), older age ($p < 0.002$) and Caucasian race ($p < 0.03$). Marital status, tobacco use, alcohol use, comorbidities, body mass index, insurance, occupation, and direct patient expenses were not significant factors.

Conclusion: Men older than 38 years, those with smaller family size, and those of Caucasian ethnicity were more likely to return at least one PVSA. Compliance for PVSA return has remained dismal despite relaxed semen analysis protocols when compared to historical recommendations. Further research is needed to determine additional factors and improve compliance with a post-vasectomy semen analysis. All men should be encouraged and counseled on the importance of PVSA compliance for determining successful versus failed vasectomy to ensure future family planning.

Keywords

Sterilization; Semen analysis; Guideline; Vasectomy; Contraception

Introduction

Vasectomy continues to be one of the primary contraceptive methods for couples given its high safety profile and efficacy in achieving sterility. Following a vasectomy, a small number of sperm can remain in the distal portions of the male reproductive tract. Therefore, men are commonly counseled to perform 10-20 ejaculations to clear residual sperm followed by providing a post-vasectomy semen specimen for confirmation of sperm clearance. Unfortunately, it is well documented that Post-Vasectomy Semen Analysis (PVSA) compliance rates range from 55%-71% in North America, raising potential medicolegal implications [1-3]. The contributing factors to PVSA noncompliance are poorly defined.

It has been suggested that timing and number of post-vasectomy semen analysis required for clearance as well as lack of close follow up, negatively impact compliance rates [4-6]. Historically, the American Urological Association (AUA) recommended stringent criteria defined as two successive centrifuged azoospermic semen analysis samples. In 2012, the AUA formulated consensus guidelines regarding vasectomy including the recommendation for obtaining at one negative post-vasectomy semen analyses (PVSA) prior to cessation of other contraceptive methods, with PVSA defined as one well mixed, uncentrifuged semen specimen with azoospermia or rare non motile sperm ($< 100,000$ non motile sperm/ml) [7]. However, despite the relaxed criteria for only one required PVSA, compliance rates have remained low. Given the multifactorial nature of this issue, we evaluated the potential impact of patient demographics, financial, and health-care related factors on PVSA completion.

Materials and Methods

We retrospectively reviewed our outpatient clinic database of 248 men who underwent the first-time vasectomy between January 1, 2008, through March 18, 2016, by one of nine board-certified urologists [8]. The vasectomy procedure was performed in the outpatient office setting with local anesthesia. Standardized written and verbal instructions were given to all patients for PVSA return in approximately 3 months (or after 10-20 ejaculations) to one of three local hospital laboratories. Specimen cups are sent with the men following their procedure and all were instructed to utilize alternative methods of contraception until sterility could be confirmed. Follow up appointments were not made for patients. Following publication in May 2012 of the updated AUA guidelines on vasectomy, the number of PVSAs recommended to patients declined to one, however, no other protocol changes were made.

Baseline demographic factors including age (\geq / $<$ median of 38 years), ethnicity (Caucasian vs non-Caucasian), tobacco use (yes/no), alcohol use (yes/no), marital status (yes/no), family size (\geq / $<$ 2 kids), BMI (obese vs non obese), presence or absence of comorbidities (yes/no), health insurance status (Blue Cross Blue Shield (BCBS) vs other), occupation (professional vs skilled), and direct procedural patient costs (\geq / $<$ median of \$30) were collected and analyzed according to PVSA compliance. The category of non-Caucasian includes Hispanic, Asian, African American, African, and American Indian ethnicity. Obesity defined as BMI greater than or equal to 30 kg/m^2 . Professional work defined as employment in an office or professional environment (teacher, professor, physician, lawyer, office manager, etc.). Skilled labor in manual work (fireman, police, factory worker, teamster, construction worker, janitor, etc.). Blue Cross Blue Shield was the primary insurance provider in the study geographic area. Chi-squared analysis was used to evaluate the predictive value of these factors for PVSA return. Significance includes p values less than 0.05. For numerical categories (age, family size, patient costs), the median of the cohort was used for division into subgroups.

Results

Forty-two percent of men (103/248) returned at least one post-vasectomy semen analysis while 19.7% returned two PVSA collections. Baseline demographics demonstrated an average age of 38 years,

*Corresponding author: Grant S Johnson, Franciscan Health, 20201 South Crawford Avenue, Olympia Fields, IL 60464, USA, E-mail: Gjohnson71@midwestern.edu

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mostly Caucasian (77%) skilled workers (71%) with an average family size of 2.5 kids (Median 2 kids). Average time to PVSA return was 14.5 weeks for the 103 compliant men. Compared to non-compliant men, patients who returned at least one PVSA (Table 1), were more likely to have independent predictive factors of smaller family size (two or fewer kids, $p < 0.0003$), greater age (greater than 38 years old at vasectomy, $p < 0.002$) and Caucasian race ($p < 0.03$). Marital status, tobacco use, alcohol use, comorbidities, BMI, insurance, occupation, and direct patient expenses were not significant factors.

Discussion

Poor compliance with post-vasectomy semen analysis is a widespread clinical challenge for urologists and is likely multifactorial with clinical, psychosocial and economic forces involved. Our overall compliance rate of 42% for the return of one PVSA is low compared to published data (55%-71%) [1-3].

The ability to predict which men are at high risk for noncompliance with post-vasectomy recommendations, specifically semen analysis return, has been difficult to quantify. In our data, those men who were 38 years or older or who had smaller family size had significantly better compliance with PVSA return. We suspect that these men wanted to ensure occlusive success secondary to established families and occupations, however further evaluation with a validated questionnaire or personal interview would be needed to determine potential motives.

There was a significant difference in compliance when comparing Caucasian to non-Caucasian race ($p > 0.03$), which may represent a socioeconomic, cultural and/or geographical difference in the perspective of PVSA compliance and/or of vasectomy in general, but this is difficult to speculate and requires further evaluation.

Our analysis expands on previous studies evaluating for noncompliance factors. Smucker et al. examined several factors for PVSA noncompliance in 141 men sent post vasectomy questionnaires [4]. They found that the majority of respondents were embarrassed about having to return a semen sample (55%). For those noncompliant men, “inconvenience, embarrassment, forgetfulness, or certainty of sterility” was cited as the most common reasons for their noncompliance. Interestingly, 28% of men in their study responded that they do not remember receiving PVSA counseling. Sheykin et al. examined socioeconomic factors of marital status, age, family size, level of education, and smoking history and found that,

like our study, those men with larger family size were more likely to be noncompliant with PVSA return [9]. Those with smoking history and lower educational level also had decreased compliance. They saw no difference in age or marital status. Our analysis included additional clinical factors such as overall comorbidities, BMI, and alcohol use as well as financial factors including occupation, insurance type, and out of pocket costs. These factors did not show statistical significance. Limitations exist including the retrospective nature of data collection and occasional incomplete or unavailable data (1.2% of the database). Our results cannot be extrapolated to all socioeconomic groups as only three men were uninsured and the majority having private insurance policies.

In addition to standardized pre-procedure counseling regarding semen analysis return, attempts to improve compliance have centered around decreasing the number of PVSAs required for clearance and decreasing the time until first PVSA testing. Badrakumar et al. recommend one semen analysis at 3 months given this group was more compliant at PVSA return than those who were asked to return two samples at 3 and 4 months. The rate of azoospermia was not significantly different [5]. The 2012 AUA guidelines subsequently decreased requirements for post-vasectomy semen analysis to one. Dhar et al. prospectively evaluated the impact of scheduled follow-up appointments following vasectomy demonstrating improved compliance with PVSA return in the study group [6]. Another strategy is to utilize office-based Electronic Medical Record (EMR) database systems to automatically trigger patient reminders to be sent via email or postal mail. These efforts seek to decrease the logistical factors that potentially contribute to noncompliance. The 2012 American Urological Association vasectomy guidelines have the potential to decrease the number of post-vasectomy semen analysis required to ensure sterility, therefore leading to improved compliance rates. The projected impact of these guidelines has been evaluated in the literature with significant improvement in sterility rates, avoidance of unnecessary repeat vasectomies and cost savings [10,11].

Conclusion

Our research indicates three characteristics of men more likely to return at least one PVSA; men older than 38 years, those with smaller family size, and those of Caucasian ethnicity. Indeed, compliance for PVSA return has remained dismal even despite relaxed semen analysis protocols when compared to historical recommendations. Further research is needed to determine additional factors and improve

Table 1: Demographic and health-related factors for PVSA return with Chi-squared analysis.

	No PVSA N=145	Any PVSA N=103	p-value
Age >38 years	41%	60%	0.002
Tobacco use	68%	69%	0.347
Alcohol use	72%	66%	0.28
Married	88%	86%	0.785
Family size >2	53%	29%	0.0003
Caucasian	72%	84%	0.03
Skilled Occupation	71%	76%	0.385
Comorbidities present	37%	38%	0.92
Obesity (BMI>30)	33%	32%	0.93
Blue Cross Blue Shield Insurance	67%	69%	0.82
Out of pocket expense >30\$	44%	55%	0.11

Note: Proportion of noncompliant (No PVSA) vs. compliant (Any PVSA) men with demographic and health related factors. Analysis for differences using chi squared analysis ($p < 0.05$ =significance)

compliance with a post-vasectomy semen analysis. All men should be encouraged and counseled on the importance of PVSA compliance for determining successful versus failed vasectomy to ensure future family planning.

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Author Affiliations

[Top](#)

¹Franciscan Health, 20201 South Crawford Avenue, Olympia Fields, IL 60464, USA

²Midwestern University, 555 31st St. Downers Grove, IL 60515, USA

³Advanced Urology Associates, 1541 Riverboat Center Drive, Joliet, IL 60431, USA

⁴Specialty Physicians of Illinois, LLC, 3700 203rd St. Olympia Fields, IL 6046, USA

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