Vasectomy: A Literature Review With Implications for Pre-Vasectomy Counseling

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Annette Thrift Wing
University of Central Florida

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VASECTOMY: A LITERATURE REVIEW WITH IMPLICATIONS FOR PRE-VASECTOMY COUNSELING

BY

ANNETTE THRIFT WING
B.A., University of Central Florida, 1980

THESIS

Submitted in partial fulfillment of the requirements for the Master of Science degree in Clinical Psychology in the Graduate Studies Program of the College of Arts and Sciences University of Central Florida Orlando, Florida

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# TABLE OF CONTENTS

INTRODUCTION ........................................... 1

Definition of Term .................................... 2
Medical Implications ................................. 2
Legal Implications .................................... 9

CHAPTER I: Review of the Related Literature ........ 12

Demographics ............................................ 12
Eligibility Criteria .................................... 13
The Decision-Making Process ....................... 16
Implications for Pre-Vasectomy Screening ....... 26
Post-Surgery Adjustment to Vasectomy ........... 28
Reaction of Wives to Vasectomy ................... 37

CHAPTER II: Conclusions ............................... 42

CHAPTER III: Direction for Future Research ....... 50

REFERENCES ............................................. 53
INTRODUCTION

Many factors have influenced the popularity of vasectomy as a viable choice of birth control. There is a growing concern over the population explosion and the need to conserve our natural resources. Social movements involving economic problems, better health care, and the changing role of women have influenced the need for safe, effective methods of contraception. Although vasectomy was first performed in the last century, it became a popular choice of birth control in the 1960s among couples who had all the children they desired (Ory, Forrest, & Lincoln, 1983). By 1970 more than three million men had undergone a vasectomy procedure (Fried, 1974). Sterilization is the most popular method of birth control for couples over the age of 30 in the United States (Population Reports, 1983). From 1972 to 1981 between 424,000 and 554,000 vasectomies were performed yearly in the United States, according to the Association for Voluntary Sterilization (AVS) estimates. These estimates were based on data gathered by AVS from clinics and military facilities and on a sample survey of private physicians.

The primary purpose of this paper is to review research literature which addresses psychological and behavioral ramifications involved in a man's decision to
have a vasectomy. Implications of this literature for more effective pre-surgical counseling will also be addressed.

**Definition of Term**

**Vasectomy** - The sterilization of the male by surgical separation of the vas deferens (tubes which carry sperm to the urethra via the prostrate gland) is a simple procedure which can be performed inexpensively in a doctor's office or clinic under local anesthesia....A vasectomy involves several steps (a) identifying and immobilizing the vas, (b) making an incision in the scrotum, (c) dividing the layers of tissue and isolating the vas, (d) dividing the vas, (e) removing a small section of each vas, (f) sealing the vasal stumps, and (g) finally closing the scrotal incision....The ends of the vas can be sealed in several ways: by ligation, by coagulation with electricity...or heat, and by clips (Population Reports, 1983, p. 63).

**Medical Implication**

Vasectomy has many favorable attributes. Ory, Forrest, & Lincoln (1983), in research to evaluate the health risks and benefits of birth control methods, indicated that vasectomy is less expensive than female sterilization methods, and there is less health risk involved. The results of this study indicated that the
major risks to women using contraceptives are increased incidence of heart attacks and strokes associated with pill use, occurring mainly among users over 35 who smoke; significant risk of pelvic inflammatory disease from use of the intrauterine device; surgical complications and anesthesia deaths from sterilization and abortion procedures; and complications of pregnancy from failure of barrier methods and periodic abstinence. The study indicated that the health risks from pregnancy and childbirth are almost always greater than the risks from contraceptive use.

The purpose of a recent study was to compare the risks and costs of male and female sterilization procedures (Smith, Taylor, & Smith, 1985). The authors indicated that according to the Health Institute of America, Blue Shield Health Insurance, and the Federal DRG (diagnostic related groups) payment schedule for Dallas and Boston from 1983 to 1984, a vasectomy costs a total of $451.00 on an outpatient basis, while an outpatient laparoscopy (female sterilization procedure) costs a total of $873.00. The authors indicated that their review found no reported deaths in the United States attributable to vasectomy, however, female sterilization presented mortality rates from 2.5 to 10.0/100,000. Several vasectomy techniques are currently in use. However, since there have been no
comparative studies, it is uncertain whether one technique is safer or more effective than others (Population Reports, 1983).

According to Smith (1981), many physicians prefer the contemporary method of sealing each vas deferens electrically to guard against spontaneous reanastomosis (rejoining of the ends of the vas). According to Smith, spontaneous reanastomosis refers to the body's biological tendency to make itself whole again. There is a tendency for the severed ends of the vas deferens to grow back together, thereby resulting in the failure of the procedure to produce infertility. In addition, when a vasectomy is performed by removing a portion of the vas deferens and electrically sealing the ends, reanastomosis will almost never occur.

In a series of over 4,000 vasectomies, Stanwood Schmidt of the University of California School of Medicine, reported five failures in the first 150 cases, where the vas were simply excised and tied with suture (Population Reports, 1983). By contrast, there were no reported failures in over 4,000 subsequent cases when the vas were ligated or coagulated and the distal ends were buried in the fascial sheath, according to the authors. This study adds support to the findings of the previous study by Smith (1981).
In large studies, vasectomy failure rates have ranged from 0% to 2.2%, and in most studies the failure rates are less than 1% (Population Reports, 1983). According to this publication, vasectomy failures are usually due to: "(a) unprotected coitus before the reproductive tract is cleared of sperm, (b) spontaneous recanalization of the vas, (c) division and occlusion of the wrong structure during surgery, and (d) rarely, congenital duplication of the vas that went unnoticed during the procedure" (Population Reports, 1983, p. 66).

Generally only minor complications occur and are associated with slight discomfort, discoloration, and swelling according to Ory et al. (1983). Smith et al. (1985) described major complications as those associated with serious illness and/or large additional costs. Major complications are (a) those requiring intravenous antibiotics, (b) hemorrhage requiring transfusion and/or operative intervention, and (c) operative complications or trauma requiring further repair or extended hospitalization. The authors indicated that after reviewing 15 studies, they found seven major complications out of 16,319 vasectomies, 0.43/1,000 procedures (95% confidence limits 0.17-0.81).
Although sterilization by vasectomy is considered permanent, the success rate of reversibility judged by the incidence of pregnancy is from 18% to 60% (Ory et al., 1983). It has been pointed out that successful rejoining of the vas may not restore the ability to procreate because some vasectomized men have antisperm antibodies and are rendered sterile by this factor (Wolfers, 1970). In a more recent article, Schmidt (1987), reported that approximately 50% of men undergoing vasectomy develop antisperm antibodies which can cause immobilization of sperm. This is important to only about 1% of those vasectomized men who seek return of fertility according to Schmidt.

Recent information (Clarkson & Alexander, 1980), suggesting an association between atherosclerosis (hardening of the arteries) and vasectomy in Rhesus monkeys caused concern although the study did not suggest that the risk generalized to humans. Two reports on the results of a study on vasectomized men enrolled in a Seattle, Washington, group health plan suggested that there was no increased risk of circulatory disease or nonfatal myocardial infarction after vasectomy (Walker et al., 1981). Myocardial infarction is defined as death of the myocardium or muscular tissue of the heart (Dorland's Illustrated Medical Dictionary, 1974, p. 663).
One report compared 4,830 men who had been vasectomized with 24,150 men who had not (Walker et al., 1981). The subjects were matched according to age, sex and membership in the Seattle health plan at the time of the subject's vasectomy. The authors suggested that the subjects were matched on two other variables as well, but no other variables were specified. Investigative evidence suggested that the rates of nonfatal myocardial infarction among vasectomized men (0.9 cases per 1,000 men) were almost the same as the rates among nonvasectomized men (1.0 per 1,000). Another finding of this study was that the frequency of myocardial infarction increased with age at about the same rate in both groups. In addition, the authors reported that the lack of association found in this study was apparently not the result of bias due to contamination by hypertension, obesity, diabetes, or smoking. This information suggests that the subjects were screened for various health conditions.

The investigators reported that the rates of nonfatal myocardial infarction for the vasectomized men and the controls were almost identical for the group of men studied for the longest period of time (8-16 years). Although the authors indicated that reliable conclusions about the long term effects of vasectomy could not be drawn from this investigation because of the small number of men in the
group, there was no indication of increased risk in the vasectomy group.

A second report from the Seattle health plan study, described findings for the same group plus an additional 1,200 vasectomized men (Walker et al., 1981). Hospitalization rates were compared for a number of general disease classifications and for more specific ailments among vasectomized and nonvasectomized men. The investigators reported that vasectomized men had no increased risk of being hospitalized for treatment of circulatory disease or acute myocardial infarction. Rates of myocardial infarction were actually somewhat lower in vasectomized men and showed no rise with interval following vasectomy, according to the authors. Exact figures were not included, and the authors indicated that because less than ten years had passed after the men in the study had been vasectomized, a causal link could not be ruled out.

A more recent report indicated that although many investigators have sought to evaluate the association between vasectomy and atherosclerosis, no evidence of increased risk of atherosclerotic disease among vasectomized men has been proven (Perrin, Woods, Namedata, Yagi, Bruce, & Hofer, 1984). The study was conducted among a population of 10,632 men who were under surveillance for coronary heart disease risk factors while they participated
in an exercise testing program at the University of Washington. Of the nearly 4,944 men studied, 1,383 had undergone a vasectomy. The interval from vasectomy to the time of the survey ranged from less than one year to thirty-seven years with a mean of fifteen years. Levels of sperm antibodies were measured to test whether the presence of these sperm antibodies increased the risk of atherosclerosis. The results of the study indicated that the men without coronary disease were just as likely as those with coronary heart disease to have elevated antibody levels. The results of the study suggested further that smoking, hypertension, and family history of heart disease were found to be significant predictors while vasectomy status was not. The findings of Walker et al. in the previous studies cannot be compared with the present study because of differences in the means of diagnosis, selection of subjects and the method of data analysis, according to the authors.

**Legal Implications**

According to the data from a questionnaire survey by Mackay and Edey (1970), there is very little litigation involving physicians and voluntary sterilization procedures. The investigators suggest the reasons for this are that written consent of both patient and spouse are typically secured, as well as the fact that the laws are
clear in this area. Black's Law Dictionary defines informed consent as "A person's agreement to allow something to happen (such as surgery) that is based on full disclosure of facts needed to make the decision intelligently; that is, knowledge of risks involved, alternatives, etc..." (Black, Nolan, & Conally, 1979, p. 701). Before surgery, patients are asked to sign consent forms indicating that they understand the possible consequences and that they request the procedure. Signed consent forms are evidence that the necessary educational procedures to obtain consent to treatment have been carried out (Paul & Scofield, 1979). Specifically, informed consent is interpreted in practice as informing the patient of the risks involved in the operative procedure, the alternate methods of treatment, (i.e., the other methods of birth control), the advantages of surgery, the disadvantages of surgery, the advantages of alternative methods of treatment, and the risk-benefit factors of surgery versus alternate methods of care. Additionally, it is necessary to include that no implied or expressed warranty is given. Leader (1974) devised a counseling brochure which is used in some physicians' offices to answer questions regarding vasectomy that the patient or spouse might have. Such presurgery education procedures in this area may be a significant factor in the reportedly low
litigation rate. An additional factor in the low litigation rate may be the virtual absence of reported death and the low rates of major complications after vasectomy as described by Smith et al. (1985).
CHAPTER I

Review of the Related Literature

In reviewing the previous studies on vasectomy, some of the results are not clear and others are occasionally contradictory. This may be due to research methodology and interpretation.

Demographics

Janke & Weist (1974) suggested in a review article that the demographic profile of vasectomy patients varies over time and locale. Most men in the United States who have been vasectomized are between thirty and forty years of age, are white, Protestant, and have fathered from three to four children (Rogers, Zeigler, Rohr, & Prentiss, 1963; Zeigler, Rogers, & Prentiss, 1969). Maschhoff, Fanshier, and Hansen (1976), in a study of 50 couples in the Tacoma-Pierce County Health Department Planning Clinic in Washington, indicated that 92% of the subjects seeking vasectomy were under the age of 32. The authors indicated that these statistics suggested a general trend toward younger couples seeking sterilization. The socioeconomic and educational levels of vasectomy patients vary across different samples. A study by Paul and Scofield (1979), suggested that vasectomy basically represents a white middle to upper class sterilization choice. This
indication is supported by a study of 15,937 vasectomized men between 1977 and 1982 by four medical centers: the School of Public Health at the University of California, Los Angeles, The School of Medicine at the University of Southern California, Los Angeles, the School of Public Health at the University of Minnesota, and the Mayo Clinic (Family Planning Perspectives, 1984). They also found that vasectomy represents a white middle to upper class sterilization choice.

Eligibility Criteria

Sobrero, Kohli, Edey, Davis, and Karp (1972), pointed out that there are no legal restrictions in the United States for performing voluntary sterilization in male and female adults seeking the operation. However, according to this study, the first outpatient vasectomy service in America which was opened in 1969 at the Margaret Sanger Research Bureau in New York City, had certain eligibility guidelines for vasectomy patients. The candidate had to be at least 25 years old, married or in a stable relationship. Additionally, he had to have at least three children if less than 40 years old, two children if 40 to 45 years old, one child if from 46 to 50 years old, and if over 50 he was eligible without any children. The original criteria were modified in favor of accepting patients in terms of the needs of the individual families, and the decision for
approval was left to the director of the bureau in consultation with the psychiatric interviewer and the surgeon.

On the other hand, in a study by the University of Texas and Planned Parenthood of Houston, to establish modern eligibility criteria for vasectomy in the United States, the authors indicated that elective vasectomy should be readily available to competent, mature, fully informed men when they have all the children they desire (Leader, Axelrad, & Mumford, 1976). The authors indicated that the physicians and clinics should adopt criteria that allow the responsibility for fertility control to be carried by the individual. The decision was made to inform couples of all known consequences of the procedures and allow them to decide regardless of their family size.

Uhlman (1974), in a survey to determine the number of vasectomies performed, the number refused, and the reasons for refusal, collected data by questionnaires which had been sent to registrants with the Association for Voluntary Sterilization throughout the United States. Seventy-seven clinics and 108 private physicians provided information on the number of vasectomies performed, those refused, and the most frequent reasons for refusing candidates from 1969 through 1971. The 108 private physicians were a subsample obtained from among several thousand by means of the random
sampling technique. Although both clinics and physicians were self-selected, the authors believed that the survey population was a representative sample of vasectomists throughout the health care system. Approximately 80% of the clinics and 60% of the private physicians responded to the questionnaire. Respondents were asked to give the number of vasectomies they had performed and the number of vasectomies they had refused to perform, as well as their reasons for refusal in the years from 1969 to 1971.

Results of the study suggested that the number of vasectomies performed increased over the three year period as did the number of providers. Physicians performed 8,637 vasectomies in 1969 and 19,637 in 1971, while the clinics performed 12,281 vasectomies in 1969 and 18,275 in 1971. Refusal to perform vasectomies were reported more frequently by physicians, who refused approximately 1,500 applicants in 1971 (mean = 13), while the clinics refused only approximately 500 (mean = 7). Ratios of performed to refused vasectomies in 1971 were 13:1 for physicians and only 36:1 for clinics.

The most frequent reasons given for refusal by both physicians and clinics were that the applicant was too young and psychological problems of the applicant. Although 49% of the subjects were refused by physicians for reasons related to age and number of children (this
criterion has since been ruled out as a requirement as demonstrated by the Leader et al. study), 45% were refused because of evaluation during counseling which suggested psychological problems, immaturity, or coercion.

Results of this study suggested that refusing a candidate’s request for a vasectomy is more often the decision of the physician. The survey data did not explain the greater probability of obtaining a vasectomy from a clinic as opposed to a private physician. The authors also did not explain the meaning of the terms "immaturity" and "too young," nor did they specify what psychological problems the subjects might have had or how they were assessed.

Possible reasons for the greater probability of obtaining a vasectomy from a clinic rather than from a private physician may be related to the more personal relationship between a patient and his private physician, that is, the private physician may be more familiar with the medical history and psychological implications involved as related to a particular patient. Another reason could be related to the physician's desire to avoid possible malpractice liability.

The Decision-Making Process

The most common reason for seeking sterilization is related to the decision not to have more children (Janke &
Weist, 1974; Changing Times, 1981). The decision is also related to financial and health reasons, as well as dissatisfaction with other methods of birth control (Rogers, Zeigler, Rhor, & Prentiss, 1963; Lear, 1972). Bean, Clark, South, Swicewood, & Williams (1982), pointed out that an additional reason for undergoing sterilization was related to the fear of pregnancy. Sometimes vasectomy was sought because of excessive fears regarding childbirth or inherited disease. Other couples were apparently fulfilled by their work and had undertaken vasectomy as a responsible and informed step in order not to have children (The Staff of the Margaret Pyke Centre, 1973).

An interesting finding of the Gallop Poll in 1979 in a representative sample of 2,280 men and women 18 years and older was that 64% approved of voluntary contraceptive sterilization (Family Planning Perspective, 1979). As suggested by the previous studies, a larger percentage of white men (27%) in this survey as opposed to only (9%) of nonwhite men indicated that they would consider vasectomy as their choice of birth control. A finding that was somewhat surprising in this nationwide survey was that Catholic men were nearly as likely as Protestant men to consider vasectomy (19% as compared to 23%, respectively). The number of prospective sterilization candidates rose with the number of children living in the home. Four
percent of the men in the sample had no knowledge of vasectomy.

Landis and Poffenberger (1965), conducted a questionnaire study among 330 couples who had chosen vasectomy for birth control. One of the questions asked was why they had chosen to have a vasectomy. The responses were similar to the previously mentioned studies. The largest percentage, 64%, responded that they had as many children as they could afford, while 21% responded that contraceptives interfered with sexual pleasure. Eighteen percent responded that they did not trust other forms of birth control. Fifteen percent indicated that they were beyond the age for having children, and 14% gave a medical reason for having the vasectomy. An interesting finding was that the smallest number of men, 12% indicated that their wives were reluctant to continue sexual relations unless the husband had the vasectomy.

According to the questionnaire, 90% of the couples had decided together to have the vasectomy. The men responded in the following manner when questioned as to why the couple had chosen vasectomy rather than salpingectomy (sterilization of the female): (a) 78% that it was easier for the man, (b) 47% that it was cheaper, and (c) 21% that they did not want to place more burden on their wives. One-third of the husbands reported that their relationships
with their wives had improved after the vasectomy because she seemed more relaxed, and 13% of the husbands indicated that previous arguments over sex and the use of contraceptives had ceased. All but 1% of the vasectomized men indicated that they would recommend the procedure to a friend or that they would have the operation again if they had the opportunity to make the choice again. The investigators were interested in the four men who reported that they would not have the operation again if given the choice. According to the authors, the responses seemed to reveal serious fears regarding masculinity. The investigators reported that they did not know "whether such fears were related to the operation or were of long standing and were more openly recognized after the operation provided an explanation for feelings of inadequacy" (Landis & Poffenberger, 1965, p. 58).

In criticism of this study, the responses of the four men who were apparently unhappy with vasectomy were not included. It would be of value to learn if the four men who were unhappy with the operation had been coerced by their wives, i.e., if they were among those who had responded that their wife's refusal to continue sexual relations had influenced their decision to have the vasectomy. Results of this study suggested that assessment
of individual personality characteristics preoperatively could possibly be of value.

In exploring the motivational factors involved in a man's decision to become vasectomized, some interesting findings were reported by Lear (1972) in a before and after interview and questionnaire study of 100 consecutive male patients who requested vasectomy. Although patients were usually referred by another physician to the urology office for vasectomy, 50% of these patients were referred by friends. The authors indicated that this finding suggested that physicians were not in the vanguard recommending the procedure. Another reason for this could reasonably be that a man is more strongly influenced by a satisfied friend's recommendation. Support for this was found in a special report from the first international meeting to focus on vasectomy which was held October 4-7, 1982, in Colombo, Sri Lanka. Stephen Mumford, of Family Health International, in his presentation indicated that well informed vasectomized men invariably served as the most influential vasectomy media in the community (Johnson, 1983). Mumford indicated further that vasectomy candidates seek out vasectomized men for their advice.

In addition, Lear (1972) pointed out that although the office practice was routinely made up of 25% black patients, only 3 of the 100 vasectomy cases were black men.
The investigators suggested that the small percentage of black candidates seeking vasectomy might reflect different cultural values, including minimal future orientation, fear of genocide, or lack of knowledge regarding vasectomy. There is no empirical evidence to support these claims. Those minority men who do choose vasectomy, do so for the same reasons as their white middle-class counterparts (Smith, 1981).

Additional findings of the Lear study revealed that there were almost twice as many Catholic men as Protestant men (121 Catholics and 64 Protestants) requesting vasectomy in this study. Two characteristic points emerged, according to the author. Many of the Catholic men had come from large families, and indicated that they had been emotionally and educationally deprived. Thus, they wanted to provide better emotional and financial support for their children. There were apparently some strong religious concerns also. Since each act of contraception use was considered a sin, the benefit of vasectomy was that it involved only one sin and apparently was considered the lesser of the two evils.

In criticism of this study, the authors did not include their method of tabulating their evidence. Apparently, their findings were based on information gained
from a brief questionnaire, personal interviews, and their own reasonable speculation.

Clark, Bean, Swicegood, and Ansbacher (1979) conducted research to investigate the difference between factors affecting decisions for male versus female sterilization procedures. The data for this study were collected from the urology and gynecology clinics at the Brooke Army Hospital in San Antonio, Texas. Husbands and wives were asked to complete questionnaires independently while waiting to see a physician about surgical sterilization procedures. Approximately 80% of those asked completed the questionnaire. In 102 of the couples, the wife obtained a tubal ligation, and in 86 of the couples, the husband obtained a vasectomy. The couples had been married an average of eight years and had an average of .8 children. The husbands were an average of 26 years old. The age of the wives was not given. Slightly over 38% of the wives had attended college. The educational level of the husbands was not given. This study delineated four sets of variables that may be important in the decision making process regarding sterilization. Additionally, the relationship of these variables with the choice of a male versus a female procedure was examined among samples of 188 husbands and wives. The four groups of variables investigated were: (a) reasons for desiring sterilization,
(b) sources of information about sterilization, (c) sources of personal influence, and (d) conjugal role relationship. Specifically, a check list of eleven reasons for desiring sterilization was given to each of the participants. They were instructed to indicate which ones were very important to their decision for obtaining the sterilization procedure. The investigators divided the items in two subsets on the basis of a factor analysis of the responses (not included in the original study). One of the subsets focused on reasons related to contraception and coitus, and the other focused on reasons related to health. A summary index for each of these was derived by summing the items which had been scored 1 or 0. The respondents were then divided into two groups for analysis by splitting the sample at the index median.

The results of the factor analysis (not included in the study) of responses to questions about where participants had obtained information about sterilization indicated that the four major sources were reading material, physicians, verbal communications with men, and verbal communications with women. Subsequent analyses revealed that sources of personal influence could be measured by two factors. Friends, parents, and relatives made up one factor, while physicians and other medical personnel made up the other. The items which made up each
of these were combined into a summary index and also split at the median. The investigators followed the same procedure for items measuring conjugal role relationship (not defined by authors). The factor analytic results indicated that a single dimension best measured this variable. Therefore, the items measuring this dimension were summarized into a single index score. Approximately 61% of the husbands who indicated that their major reason for desiring sterilization was for contraceptive and coitus related purposes obtained a vasectomy, but only 32.3% of those men who indicated that contraceptive and coitus related purposes were of minor importance obtained a vasectomy. Conversely, more than 67% of the wives whose husbands indicated those reasons (contraceptive and coitus related) were of minor importance chose a female procedure. Thus, the most important finding from this analysis, as reported by the investigators, was that the choice of a male versus female sterilization procedure was much more closely related to the responses of the husbands than the wives. That is, the subset, contraceptive and coitus related reasons for desiring sterilization were indicated among the 188 husbands as reasons for the couple's choosing vasectomy as opposed to a female sterilization option (p<.001). However, the subset, health-related reasons was not significantly related to male versus female sterilization choice for the husbands. On the other hand,
there were no statistically significant relationships between any of the factors and choice of sterilization procedure for the 188 wives.

In addition, the association between certain other variables and the choice of male or female sterilization procedures were statistically significant for the husbands, but none of the variables reached statistical significance for the wives. For example, the relationship between reading material and choice of sterilization procedure was significant for the husbands ($p<.05$). Further, the relationship between the husbands choice of vasectomy and the source of information from physicians, men, and women, as well as the influence of friends, parents, and relatives each reached statistical significance ($p<.001$). In this study there was no significant relationship found between choice of sterilization procedures and the independent variables of health related reasons, conjugal role relationship, or physicians and health personnel among the husbands. The author pointed out that although there was no significant relationship found between conjugal role relationship and choice of procedure in this study, that the relationship was in the expected direction, i.e., the data appeared to suggest that the degree of mutuality within the relationship is positively associated with an
increased likelihood of choosing vasectomy. Thus, it would be interesting to investigate whether conjugal role relationship is related to a husband's choice of vasectomy. The authors indicated that the results of this study support the idea that men require more social support in the decision making process in favor of permanent sterilization than women do.

In criticism of this study, the fact that it was conducted at a military installation limits the generalization possibilities of its findings. However, free medical care eliminates the possibly complicating issue of cost effectiveness.

Implications for Pre-Vasectomy Screening

Conclusions of a study using questionnaire and personal interview by Wolfers (1970) suggested that screening of applicants for vasectomy was required and tentatively suggested that men with marital, psychological, or sexual problems should be discouraged from having this operative procedure. Results from this study suggested that 10 out of 82 respondents indicated some psychological damage arising from vasectomy. Patients who believed they had problems as a result of the operation were asked to request an appointment with a visiting psychologist. Seven out of the eighty-two men who returned their forms requested appointments. The author indicated further that
three others were contacted to investigate their comments which suggested psychological impairment. Results of the study indicated that only three couples out of seven who sought interviews with the psychologist indicated that they were unaware of physical or psychological problems in their sexual lives before vasectomy. Specifically, the study suggested that all three couples suffered sexual problems involving premature ejaculation, vaginismus, and/or impotence. However, the author indicated that no causal connection between their vasectomies and the ensuing sexual problems was provable. Wolfers speculated that the operation may have triggered the ensuing sexual disability owing to the coincidence in time. Additional research with a much larger sample is needed to explore this relationship further.

Perhaps no stronger point is made for dissatisfaction than that of regret. A study of 1,784 vasectomized patients suggested that some of the reasons men seek vasovasostomy (rejoining of the vas or reversal of vasectomy) were related to religious reasons, sometimes involving guilt on the part of the wife, and divorce and remarriage owing to marital problems at the time of vasectomy (Cass, 1979). Other reasons were related to wanting more children after a change of mind, improvement in financial conditions, or emotional maturity. In this
study, there were suggestions of unsatisfactory results after vasectomy which were manifested as anxiety reactions and sexual dysfunction in eight men. These postvasectomy patients with psychosocial problems returned to the vasectomy clinic of their own accord. "Special or extra interviews, or psychological testing was not done on postvasectomy patients..." (Cass, 1979, p. 588). As a result of the unsatisfactory psychosocial results suggested by this study, preoperative counseling was modified by the department of urology at St. Paul-Ramsey Medical Center, St. Paul, Minnesota. Specifically, psychological instability, marital problems, sexual difficulty, and anxiety because of religious beliefs were considered contraindications to vasectomy. In addition, the author suggested that psychosocial problems were reduced after introducing those contraindications into prevasectomy counseling. There was no empirical evidence, however, to demonstrate this point of view. Although the study was unsophisticated, it supports the findings of other investigations (Wolfers, 1970; Lear, 1972).

Post-Surgery Adjustment to Vasectomy

Previous studies by questionnaire and interview surveys suggested that approximately 90% of the participating subjects indicated satisfaction with vasectomy postoperatively (Landis & Poffenberger, 1965;
Rogers, Zeigler, & Levy, 1967; Lear, 1972; Maschhoff, Fanshier, & Hansen, 1976). Zeigler, Rogers, & Kriegsman (1966) pointed out that subjects attributed only favorable changes to vasectomy and tended to blame other life circumstances for adverse changes. The authors attributed this paradox to dissonance reduction. Dissonance reduction suggests that persons making a difficult decision tend afterwards to reassure themselves about it by focusing primarily on the favorable attributes and ignoring the unfavorable manifestations (Festinger, 1962). Since the vasectomized man assumes that the procedure has rendered him permanently sterile, he desires to convince himself that he has made the right decision.

Early studies of vasectomized psychiatric inpatients by psychiatrists appear to demonstrate reasonable answers to this paradox. Erickson (1954) argued that preservation of gender is a biological necessity and any willful destruction of one's gender would lead to lowering of self-esteem. An in-depth study of anatomy and physiology is an integral part of the training of a physician, hence Erickson knew on a conscious level that there is no loss of gender involved in vasectomy. Wolfers in a previous study pointed out that Erickson apparently equated vasectomy with castration and sterility with loss of gender. If one so highly educated could confuse these issues, then it appears
that others might make the same errors in thinking. On the
other hand, Erickson may have been suggesting that loss of
gender identity is what is perceived by the patient and/or
what is experienced unconsciously despite intellectually
accurate information. Additionally, as discussed by
Wolfers, an early study by Johnson (1964) of 83 psychiatric
inpatients suggested that the vasectomy which was performed
within one year prior to admission appeared to be a factor
in their disturbed psychological functioning. Several of
these men described themselves as feeling "inadequate" and
"incomplete" after the procedure. This study supports
similar findings in other studies.

The generalization of the results of these early
studies are limited owing to the psychiatric population
which was investigated. Additionally, there were
apparently no objective studies, hence the investigators
relied on personal interviews for their findings.

In a review article, Janke & Weist (1974) pointed out
that existing data do not directly confirm or contradict
the interpretation that vasectomy poses a psychological
threat to most men voluntarily obtaining a vasectomy. The
postoperative satisfaction indicated by more than 90% of
the subjects could be a reflection of genuinely experienced
satisfaction with the advantages of vasectomy rather than a
self-deceptive process, according to the authors.
Zeigler, Rogers, & Kriegsman (1966) and Zeigler, Rogers, & Prentiss (1969) reported results from a longitudinal study utilizing psychological tests, questionnaires and interviews. Results indicated that vasectomized men showed evidence of counteractive behavior reactions to threats of masculinity by increasing masculinity-confirming behavior. For example, in comparing a vasectomy group of 22 men with a group of 22 men whose wives used an ovulation suppressant drug, those men who reported that their sexual problems had increased after vasectomy also reported the highest frequency of intercourse of any group in the study. The unexpected reversal of frequencies reported by the vasectomized subgroups suggested to the authors the possibility that those men with sexual problems after vasectomy overcompensated for them by increasing the frequency of intercourse. These findings also suggest support for the dissonance reduction theory discussed earlier. Seventy percent of the men in the group which consisted of those who had increased sexual problems, and who also increased frequency of intercourse after vasectomy, showed an increase on the California Personality Inventory (Gough, 1968) Do (dominance) scale and a decrease on the Re (responsibility) scale. According to the authors, these test results indicated an increase in demandingness and a
decrease in the tendency to assume responsibility. The authors interpreted these test changes to support the inference that this group reacted counteractively to their sexual problems by becoming more demanding or culturally masculine.

Support for these findings was demonstrated in a study by Williams, Swicegood, Clark & Bean (1980). These authors utilized the Personal Attributes Questionnaire developed by Spence and Helmrich (1978) to measure masculinity. The measure of masculinity was positively and significantly related to postoperative expression of an increase in the desire for sexual intercourse among vasectomized males. The authors suggested that these findings provided support for the idea that response to vasectomy may sometimes involve compensatory processes in those men who are likely to perceive vasectomy as demasculinizing.

Hornstein & Houston (1975) obtained results from a study suggesting that vasectomy adversely affected psychological adjustment by the evaluation of the Tennessee Self Concept Scale (Fitts, 1965) before and after vasectomy. The Tennessee Self Concept Scale was administered to a comparison group of 20 men and a group of 20 men who had undergone a vasectomy. The comparison group was made up of volunteers from the university staff and graduate students. None of the men in this group had
or were planning to have a vasectomy. Subjects in the vasectomy group ranged in age from 25 to 48 years, while those in the comparison group ranged in age from 25 to 35 years. Only 60% of the vasectomy group had attended college, but all of the members in the control group were college graduates. The Tennessee Self Concept Scale was administered the day prior to surgery and readministered at six and eighteen months postoperatively. The authors interpreted test results to suggest that adjustment problems, as measured by the General Maladjustment Scale, were experienced in some men after vasectomy and these adjustment problems fluctuated over time as a function of preoperative defensiveness, as measured by the Self Criticism Scale on the Tennessee Self Concept Scale. Subjects were assigned to the high or low defensive categories on the basis of whether they scored above or below the median of the Defensive Positive Scale at the time of the initial testing. Specifically, they found that after six months, higher levels of preoperative defensiveness were associated with an apparent improvement in psychological adjustment, while lower levels of preoperative defensiveness were associated with a decline in adjustment. Although there was an appreciable relationship between defensiveness and change in adjustment after six months, this was not true after eighteen months.
The authors indicated that the data suggested that low defensive subjects were experiencing some difficulty with psychological adjustment six months following vasectomy, but had become better adjusted at the eighteen month follow-up. It was further suggested that the decline in adjustment a year later may have been caused by their inability to maintain the defensive distortions of the six month postoperative period. Specifically, the study suggested that these vasectomized men may have experienced distorted feelings (focused only on the advantages of the procedure) in an attempt to cope with their concerns regarding the consequences of the vasectomy. This study also suggests support for the dissonance reduction theory discussed earlier. Thus, the study, like previous studies, suggests that some men may feel that their masculinity is threatened by vasectomy.

In the Hornstein and Houston study, changes in psychological adjustment following vasectomy were not interpreted to be mirrored to a significant extent by changes in various aspects of self-concept. The authors interpreted the results to suggest that the effects of vasectomy on psychological adjustment were due to psychological factors other than general changes in self-esteem. The authors indicated that in order to gain a better understanding of the psychological effects of
vasectomy, future investigations should employ individual difference measures as preoperative predictors and evaluate psychological functioning at more than one follow-up period.

Janke & Weist (1976), however, concluded from investigative evidence based on a comparison of 33 vasectomized men and 33 nonvasectomized men that men volunteering for vasectomy exhibited as many masculine traits prior to the operation as after it and appeared to have superior psycho-social adjustment to that of nonvasectomized men as assessed by interviews. Evidence from this study was interpreted to indicate that men who become vasectomized do not differ significantly from men who do not choose vasectomy. However, the authors noted that reliability of the interpretation is questionable since the study involved a small number of subjects.

The differences in the studies may be explained somewhat by the difference in sampling methods. In the Zeigler, Rogers & Prentiss (1969) study, the investigators suggested that their sampling procedure did not insure a demographic cross section of the population of men about to obtain vasectomy since they were referred by physicians in private practice. In addition, in the Hornstein and Houston study, the vasectomy sample was selected from men who sought surgery from private practice physicians also.
On the other hand, Janke & Weist (1976) used subjects who were part of a 5% random sample of Kaiser foundation Health Plan subscribers selected for research purposes in Portland, Oregon. The investigators suggested that the population of subscribers comprised about 15% of the residents of the Portland metropolitan area and constituted a nearly representative cross-section of the residents in the area. The vasectomized men in the sample, therefore, were probably representative of the vasectomized men in the Portland area. However, the investigators inferred that reliability of the interpretations of this study is questionable since the number of subjects was only 33 in each of the two groups, and this is considered quite small.

Vaughn (1979), in a review of the literature concerning the behavioral and psychological response of men and their wives to vasectomy, raised the issue of whether the questionnaire is an appropriate tool for gathering information about the sensitive matter of vasectomy. He indicated that there is the possibility of a selection effect in that only those subjects who were pleased with vasectomy returned their questionnaires. In addition, questionnaire based research in this area may be challenged on grounds that it is an impersonal measure and may,
therefore be inappropriate for gathering information about such a sensitive matter.

**Reaction of Wives to Vasectomy**

Vasectomy is generally undertaken after a joint decision is made by the husband and wife. Therefore, it appears important to consider the reaction of wives to the procedure. An earlier publication, (Johnson, 1964), reported the clinical assessment of 83 vasectomized psychiatric inpatients as previously mentioned in this paper. Johnson & Miller (1970) conducted further research to correct the limitations of the initial study by including data from the wives. Forty-one wives were contacted from one to four years after compilation of the original data. Thirty-two wives were still married to the husband who had been a previous psychiatric patient. Seven were divorced and two were widowed owing to their husband's suicide, but all nine participated willingly. None of these women had remarried. Of the 32 women who were still married, 11 indicated that they were satisfied with the results of the vasectomy and would recommend the procedure to other couples. Fourteen of the wives qualified their basically positive answers. Seven women indicated that they would not recommend it. Five of the thirty-two women who still lived with their husbands indicated that they thought the procedure improved their sexual relationship.
Six of the seven former wives would recommend the procedure to other couples. (It is interesting to note that even so, they were ex-wives). Two of the women indicated that the vasectomy impaired their sexual relationship. (No explanation of the meaning of impaired was given.) Five of the seven divorced women indicated that they felt it was their husband's responsibility to limit pregnancies. Six of the 32 women who were still married also expressed that point-of-view.

In the original study, 30 of the 83 husbands indicated that they were vasectomized because of pressure from the wife, her family, or her physician. In 21 of the remaining men, the decision to become sterilized was their own, but the determining factor was unclear for the 32 other men. The wives in the later study corroborated the earlier view.

According to the investigators, there was no open acknowledgement of 'castration fantasies' among the wives. Neither were there any overt comments regarding the loss of masculinity of their husbands. Virtually all of the wives agreed that they were glad to have avoided more pregnancies, and they all liked the certainty of sterilization. Five of the wives gave their reason for not recommending vasectomy to other couples as being 'too personal a decision'. In addition, they indicated that it
was advisable only if the husband was in favor of the procedure.

The relationship between the married couple appeared to be the most important factor in the responses to the procedure, according to the investigators. If the vasectomy was the result of coercion or negativism, then the incidence of marital dissolution was high. On the other hand, in the absence of coercion or negativism, there appeared to be little risk of marital disruption.

An additional study investigating the reaction of wives to vasectomy utilized structured interviews, objective standardized tests before and after surgery and a matched comparison group. The longitudinal study reported preoperative to postoperative changes in 22 couples electing vasectomy for contraception (Zeigler et al., 1966). The comparison group consisted of 22 couples in identical stages of family development who had elected ovulation suppressant pills for contraception. Both groups had consulted a private practicing physician regarding contraception. The wives in the vasectomy group had been matched with the wives in the control group for family status. Preoperatively the two groups of wives did not differ on any of the CPI or estimated MMPI scales.

Postoperatively, the vasectomy wives reported that their husbands were more sociable, outgoing, and assertive
in dealing with problems. The wives indicated that they (themselves) were worrying less about their own ability to succeed and felt less strongly determined to succeed. The wives also reported less interest in doing impressive things, as well as, being less driven to get their way.

According to the investigators, the results of this study suggested that the vasectomy wives were more compliant and sociable postoperatively. In addition, the results suggested that the wives were more companionable and less competitive with assertive, effective husbands.

On the other hand, an increase in general emotional upset could be inferred for the vasectomy wives from the significant pre- to postoperative elevations ($p < .05$) on scales 7 and 8 (Psychasthenia and Schizophrenia, respectively) of the MMPI. When the comparisons included both husbands and wives, the numbers were increased from 22 to 44 per group. The total group showed indications of increased somatic complaints. That is, there was a significant pre- to postoperative increase on MMPI Scale 1, Hypochondriasis (Hs) ($p < .05$). In addition, there were significant decreases on CPI scales of Social Responsibility (Re) ($p < .05$) and Feminine Interest (Fe) ($p < .01$) from pre- to postoperatively. According to the investigators, these findings suggested that masculine role
behavior received increased emphasis postoperatively and that changes in the wives were complementary responses.

Data from structured interviews strengthened the suggestion of adverse postoperative changes. The interviews focused on sexual performance, personal psychiatric adjustment, and marital satisfaction. The trend in all cases was for the vasectomy group to do most poorly. The greatest degree of negative change was that of marital satisfaction. These findings contrast with the subjects' expressed satisfaction with the operation. This study further supports the paradoxical findings of previous studies.
CHAPTER II

Conclusions

An examination of the existing literature revealed that sterilization is the most popular method of birth control among couples over the age of 30 in the United States (Population Reports, 1983). Although vasectomy has many advantages, it does not appear to be the best contraceptive choice for some men.

Research suggested that vasectomy is less expensive than female sterilization and there are fewer health risks involved (Ory et al., 1983; Smith et al., 1985). These studies indicated that there are no reported deaths attributed to vasectomy in the United States, however, female mortality rates from sterilization procedures were demonstrated to be from 2.5 to 10.0/100,000. Vasectomy is virtually 100% effective if performed correctly, and if other methods of contraception are used after surgery until sterility is proven through results from laboratory tests. Thus, vasectomy failure rates are less than 1% in most studies (Population Reports, 1983).

Usually, only minor complications occur after a vasectomy procedure and are associated with discomfort, discoloration, and swelling (Ory et al., 1983). There are a small percentage of reported major complications: approximately .43/1,000 procedures (Smith et al., 1985).
There is no reported proven link between vasectomy and atherosclerosis (Walker et al., 1981; Perrin et al., 1984).

Although vasectomy is considered permanent, the success rate of reversibility (rejoining of the vas deferens during major surgery) judged by the incidence of pregnancy is from 18% to 60% (Ory et al., 1983). Approximately 1% of those men who have undergone vasectomy eventually seek rejoining of the vas deferens, however, successful rejoining of the vas deferens may not restore the ability to procreate owing to the formation of antisperm antibodies which tend to cause sterility (Smith et al., 1984).

The demographic profile of vasectomy patients varies over time and locale. Early studies demonstrated that most men who have been vasectomized in the United States are between 30 and 40 years old, are white, Protestant, and have fathered from three to four children (Rogers et al., 1963; Zeigler et al., 1969). Later studies indicated a trend for men to seek vasectomy at a younger age (Clark et al., 1979). Ninety-two percent of the men were under the age of 32 in a study of 50 couples in the Washington area (Maschhoff et al., 1976). In addition, some vasectomy studies were well represented by men of the Catholic religion, however, very few minority groups were
represented (Lear, 1972). The socioeconomic and educational levels of the vasectomy patients varied across different samples, however, a review article suggested that vasectomy basically represents a white middle to upper class sterilization choice (Paul & Scofield, 1979; Family Planning Perspectives, 1984).

The reasons vasectomy is sought are related to the decision not to have more children (Janke & Weist, 1974; Changing Times, 1981). Vasectomy is also sought for financial and health reasons, as well as, dissatisfaction with other methods of birth control (Rogers et al., 1963; Landis & Poffenberger, 1965; Lear, 1972). Other reasons given for seeking the sterilization procedure are related to the fear of pregnancy (Bean et al., 1982). Sometimes vasectomy was sought because of excessive fears regarding childbirth or inherited disease, however, some couples had taken a responsible and informed step in order not to have children because they were apparently fulfilled by their work (The Staff of the Margaret Centre, 1973). A small percentage of men were apparently coerced by their wives to undergo vasectomy, although it has been reported that the husband and wife usually (approximately 90% of the time) make the decision together (Landis & Poffenberger, 1965; Johnson & Miller, 1970). Investigative evidence suggested that men are influenced to have a vasectomy by talking to
other men who are satisfied with the results of the procedure (Lear, 1972; Clark et al., 1979; Johnson, 1983). The 1979 Gallop Poll results suggested that 64% of men and women 18 years of age and older in the United States approved of voluntary contraceptive sterilization.

Results of interview and questionnaire studies suggested that there are a small percentage of men who appear to suffer psychological problems related to fears of loss of masculinity after undergoing vasectomy (Landis & Poffenberger, 1965; Wolfers, 1970). Wolfers suggested further that screening of vasectomy candidates was required and tentatively suggested that men with marital, sexual, or psychological problems should be discouraged from having the procedure. Previous studies suggested that approximately 90% of the participating subjects indicated satisfaction with vasectomy postoperatively (Landis & Poffenberger, 1965; Rogers et al., 1967; Lear, 1972; Maschhoff et al., 1976). However, investigators utilizing objective standardized tests in addition to interviews and questionnaires suggested that even though the subjects expressed satisfaction with vasectomy, the results from the investigations demonstrated evidence of psychological problems (Zeigler, Rogers, & Kriegsman, 1966; Zeigler, Rogers, & Prentiss, 1969; Williams et al., 1980).
Specifically, the results of these studies suggested that some men showed evidence of counteractive reactions to perceived threats to masculinity by increasing masculinity confirming behavior following vasectomy.

Zeigler et al., (1966) pointed out that the vasectomized subjects tend to blame other life circumstances for adverse changes, while attributing only favorable changes to the sterilization procedure. The authors attributed this paradox to dissonance reduction, i.e., since the subjects reasoned that the choice of sterilization was permanent, they chose to focus primarily on the favorable attributes of the procedure and ignore the unfavorable manifestations. Thus, there is evidence that response to vasectomy may sometimes involve compensatory processes in those men who perceive vasectomy as demasculinizing.

An early study of vasectomized psychiatric inpatients by Johnson (1964), discussed by Wolfers (1970), demonstrated that 17 men from a sample of 83 reported that they regretted having had the operation. Some of the men who regretted having the procedure expressed feelings of inadequacy and incompleteness, in less than a year after undergoing a vasectomy. This study shows evidence of support for the hypothesis that vasectomy is perceived by some men to be demasculinizing, although its
generalizability and strength are attenuated owing to the population investigated. The arguments against vasectomy by psychiatrist, Erickson, (1964) appear to offer an answer to this paradox. Erickson indicated that the destruction of one's gender would lead to the lowering of self-esteem. Vasectomy, however, does not involve the loss of gender. Wolfers suggested that since Erickson apparently confused vasectomy with castration (removal of the testes), it seems reasonable that others could make the same error in thinking, even if on an unconscious level. On the other hand, Erickson may have been suggesting that the patient perceived vasectomy as affecting the loss of masculinity on an unconscious level despite intellectually opposing information.

The strength of the results of the investigations has been questioned by other authors owing to the small samples involved. The generalization of results has been questioned owing to the population selection. The choice of utilization of questionnaire and interview for such a sensitive matter has also been challenged.

Existing data do not confirm the interpretation that vasectomy poses a psychological threat to most men voluntarily undergoing vasectomy for contraception. Some men and their wives have reported an improvement in their
sexual relations after the procedure (Landis & Poffenberger, 1963; Johnson & Miller, 1970; Maschhoff et al., 1976). This is reasonably due to the relief from anxiety owing to the fear of pregnancy.

Conclusive evidence indicated that couples need ample opportunity to have their questions answered in pre-vasectomy counseling, as well as, in post-vasectomy follow-up counseling, as other investigators have suggested. A question and answer brochure as proposed by Leader (1974) and/or an informative film should be of assistance. However, these are not a substitute for personal contact with the surgeon and/or person trained in vasectomy counseling. The details of the procedure to be performed and the ramifications involved should be explained in a language easily understood. The couple should be given detailed information regarding the anatomy of the reproductive system and its physiology, as well as, the available methods of birth control. The risks, advantages, and disadvantages of each method should be discussed. It should be pointed out that testosterone is produced by the testes and vasectomy does not interfere with this function, therefore, no change in masculinity is involved. Most importantly, the difference between castration (removal of the testes) and vasectomy should be explained and delineated. As other investigations have demonstrated, the
possibility of wanting more children in the future, as well as the possibilities of divorce and/or death of the spouse and remarriage should be explored in order to deter future regret. The primary intent of facilitating this discussion is to help the couple address the relative permanence of the procedure. Marital problems, health problems, psychological problems, coercion, sexual dysfunction, and guilt owing to religious beliefs should be contraindicative to vasectomy as results of other studies have suggested. The possibility of and reasons for failure of the procedure to produce sterility should be addressed. Finally, the signing of the consent form is considered a legal contract between the patient and the surgeon. The surgeon contracts to do his best, and the patient signifies that he understands the procedure to be performed and the risks involved. The patient also signifies that he understands the alternate methods of treatment and the risks involved, as well as, the advantages and disadvantages of each. In addition, the patient signifies that he requests the procedure and is free to choose not to be treated without penalty. He promises to follow the instructions of the surgeon regarding the use of contraceptives until laboratory tests indicate sterility.
CHAPTER III

Direction for Future Research

From the review of the literature, it can be determined that it is uncertain if vasectomy is the cause of psychological problems in some men after the operation. Definitive answers regarding the psychological consequences of vasectomy for men, as well as, the marital dyad are needed.

Since some investigators appear to suggest that there are psychological disturbances involving a threat to the sense of masculinity in some men following vasectomy, future investigators should utilize clinical interviews and objective standardized tests for measurement procedures before and after vasectomy. The postoperative testing should be done over several different periods of time. At least one, if not several matched control groups should be used. The dimensions of age, length of time married, education, socio-economic level, and number of children should be considered for matching groups. This would demonstrate whether the changes over time which occurred for the vasectomized men were different from those men in the control group or groups who had not been vasectomized over the same periods of time. The wives should be included and larger samples should be used in order to strengthen conclusions. Objective measurements should be
taken in order to eliminate experimenter bias, as well as, experimenter pleasing behavior on the part of the person being interviewed or tested. Specifically, a double blind technique could be used, that is, the interviewer should not know to which group the person being interviewed belonged, and the interviewee would be uninformed of the specific interests of the investigator. These measures would allow for adequate assessment and evaluation of private thoughts, feelings, and adjustment to the operation.

There is a need to evaluate the personality characteristics of men choosing vasectomy for contraception and men who have decided against the procedure, and those men who either have chosen to have or have already had the operation. Establishing these differences in personality characteristics and attitudes could reasonably assist in the development of screening procedures which would help identify those vasectomy candidates who are poor psychological risks. In addition, these screening procedures would identify probable concerns and possible problems of vasectomy candidates, allowing for more effective pre-surgical counseling.

The advantages of vasectomy should be especially meaningful in the developing countries of the world, where medical and economic resources are scarce (Johnson, 1983).
It is hoped that governments of other countries and future educational programs will help to focus more attention on male sterilization.
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