

Infertility, Infection, and Iatrogenesis in Egypt: The Anthropological Epidemiology of Blocked Tubes

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In this article, we integrate medical anthropological and analytical epidemiological methods, forms of data analysis, and interpretive insights to examine the culture-specific behavioral factors that place poor, urban Egyptian women at risk of tubal-factor infertility (TFI). Such risk factors include biomedically and ethnomedically produced iatrogenesis, including the consequences of the practice of female circumcision, and male sexual behavior leading to sterilizing sexually transmitted diseases (STDs) in their female sexual partners. We examine the socio-cultural and political-economic context in which infertility-producing behavioral risk factors are maintained, and we explore the ways in which these risk factors are perceived by biomedically trained Egyptian gynecologists.

Key words: infertility, iatrogenesis, female circumcision, sexually transmitted diseases (STDs), Egypt

HIND'S STORY

Hind,¹ the second of four daughters of a farmer who had migrated to Alexandria, Egypt, in search of work, was widely considered within her poor urban neighborhood to be a young, voluptuous beauty. Despite the twelve-year-old Hind's protestations, her father gave her in marriage to another rural migrant, who Hind felt treated her like "his donkey." When Hind became pregnant after a brief but socially defined and stigmatizing period of infertility, her husband beat her with a boot in her pregnant belly. This, Hind believes, caused her future postpartum complications. When the baby was delivered by the *dāya*, or midwife, he had pus in his eyes and could not open them. Hind herself experienced severe pelvic pain for three months. When she recovered, her son developed boils over his entire body and, shortly after his first birthday, succumbed to a fatal respiratory infection. Abused and miserable, Hind successfully pleaded with her father to help her obtain a divorce. Unfortunately, as a divorcee, Hind was a burden on her poor family, even though she served as a surrogate mother and wetnurse to her two infant sisters.

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At the age of sixteen, Hind was married again—this time to a handsome young man named Rayda. The marriage of Hind and Rayda—which has survived twelve years against all odds—has been plagued with difficulties, the most important of which is the couple's inability to have children. Hind, in a desperate "search for children," as she calls her quest for infertility therapy, has subjected her body to numerous costly, painful, and according to her, revolting therapies, some performed by traditional healers and some by physicians. Traditional ethnogynecologists, for example, have performed *kasr*, or cupping, on Hind's lower body until she turned black and blue; have inserted *ṣūwāf*, or herbal suppositories, deep into her vagina, causing huge amounts of liquid to gush "from down," as the genitals are known; and have made her wash her body with water in which a preserved, miscarried fetus has been placed. For their part, biomedical gynecologists have performed numerous painful, invasive "therapies" on Hind, including *kayy*, or electrocauterization of her cervix with a heated metal instrument, and *nafq*, or tubal insufflation, a procedure in which carbon dioxide is insufflated, or pumped, into the uterine cavity to supposedly "open up" blocked fallopian tubes. In Hind's case, the problem was that none of the four physicians who independently performed *nafq* on her verified that she suffered from *anābīb masdūd*, or blocked tubes, as infection-scarred fallopian tubes are called in Egypt.

Eventually Hind found her way to the university hospital in Alexandria, hoping to learn something meaningful about the cause of her childlessness. There, the doctor told her that she needed *ṣūra ashi'a bi ṣibgha*, or an x-ray by dye (i.e., hysterosalpingography, or HSG) to assess the status of her fallopian tubes. After Hind underwent the HSG, the young doctor told her that she must have had an infection in the past that damaged both of her fallopian tubes beyond repair and rendered her infertile. Despite Hind's distress, which caused her to faint in his office, he urged Hind to "Give up and let God take care of you."

Later, when Hind consulted an older physician in the same hospital, he told her, "I can help you by doing an operation." When Hind explained that she had already had many operations, he asked, "Did these gynecologists open your belly?" Hind replied, "No, they were from down (i.e., vaginal)." The doctor responded, "The thieves! To open your tubes you need an operation to open your abdomen. They just stole your money and did nothing for you." Eventually Hind underwent tubal surgery—surgery which she was told by a young resident has a success rate of only 5%. Unfortunately, despite powerful medicines administered postoperatively to "keep the tubes open," Hind was not among the lucky 5%.

Today, Hind is a candidate for in vitro fertilization (IVF), or the creation of a so-called baby of the tubes. Although eight months have passed since Hind was told about IVF, she is still far from undergoing the procedure. IVF is very expensive, even at the public university hospital, and it will be affordable to Hind only if she can convince her husband Rayda to sell the TV and stop smoking two packs of cigarettes a day. This, she concedes, will never happen. So, she must discover some other way of obtaining the necessary money. Although Rayda has been good to Hind and says he will never "remarry for children," Hind worries about his commitment to her, given the pressures from his family to replace her with another wife. For Hind, the future is the source of uncertainty and fear, but she hopes that

IVF may someday provide her with the solution to the infertility she suffers because of her blocked tubes.

THE ANTHROPOLOGICAL-EPIDEMIOLOGICAL NEXUS

Hind's case is typical of the thousands of Egyptian women who suffer from tubal-factor infertility (TFI), known in Egypt as *anābīb masdūd*. Tubal-factor infertility involves postinflammatory damage to the fallopian tubes (i.e., complete or partial obstruction) or to the surrounding pelvic structures, causing pelvic adhesions that adversely affect tubal function. Tubal changes do not occur normally; rather they result from upper genital tract infections (also known as pelvic inflammatory disease, or salpingitis). Given the significant rates of TFI found in recent clinical studies of infertile women in both Cairo (Serour 1991) and Alexandria (El-Gezery 1988; Mehanna 1989), we found it necessary to examine the causal factors that place poor urban Egyptian women at risk of sterilizing infection.

We argue that identifying causal factors requires a merging of medical anthropological and analytical epidemiological perspectives—perspectives that share a fundamental concern with the causes of poor health. Although many medical anthropologists approach illness causation from the perspective of ethnomedicine (e.g., Foster 1976; Young 1976, 1991; Ngokwey 1988), in recent years, a number of scholars have pointed to the merits of an interdisciplinary anthropological-epidemiological approach to the study of health problems (e.g., Janes, Stall and Gifford 1986; Robert, Bouvier and Rougemont 1989; Myntti 1991; True 1990).

Essentially, epidemiology seeks the origins and patterns of disease within given populations and investigates populations' exposures to disease-causing risk factors. In fact, epidemiology is often defined as the study of the distribution and *determinants* of diseases and injuries in human populations (Mausner and Kramer 1985). This emphasis on determinants is crucial to this discussion. While early epidemiologists focused their attention on describing patterns of disease prevalence, transmission, and spread, studies conducted during epidemiology's "boom period" (Rothman 1981) of the past forty years tend to focus on identifying the determinants, or causes, of disease in defined populations (Kelsey, Thompson and Evans 1986). Analytical epidemiology is the branch of epidemiology specifically concerned with discovering the underlying causes of diseases in various populations, especially populations manifesting levels of disease higher than statistically normal (Kelsey, Thompson, and Evans 1986).

These causal factors may be of many types. Most early epidemiological studies were concerned with "single-agent/single-disease" theories of causation and focused particularly on infectious agents and their interactions with human and animal "hosts" within particular environments (Dunn and Janes 1986; Trostle 1986). Over the years the definition of "agent" has been expanded to include a number of disease-producing factors, in addition to the infectious agents. Furthermore, epidemiologists now realize that a single agent rarely serves as a sufficient cause of a given disease, especially chronic diseases. Rather, causal forces of many types—biological, chemical, physical, behavioral, and psychological—interact in what

various theorists have termed "causal webs" (MacMahon and Pugh 1960), "causal wheels" (Mausner and Bahn 1974), or "causal assemblages" (Dunn and Janes 1986).

Given the recognition of the variety of causative factors, epidemiologists have largely abandoned the term "agent" of disease and replaced it with "risk factor." The purpose of analytical epidemiology is to identify risk factors and to quantify their impact on disease causation (Kelsey, Thompson, and Evans 1986). As analytical epidemiology recognizes, culturally prescribed behaviors may serve as risk factors. In fact, epidemiology, like anthropology, is behaviorally oriented; according to Dunn and Janes this focus on human behavior is the "basis of the complementarity of the two disciplines." They note:

It is the goal of epidemiology to identify and measure the relative importance of factors within the causal web of a disease or disorder. Because all diseases are caused, at least in part, by the behavior of individuals, groups, or communities, epidemiology must be a behavioral science. . . . Whereas epidemiology may be concerned primarily with determining the relationship of behavior to disease, medical anthropology most often focuses on the social and cultural correlates of behavior, or on the contexts of such behavior. The point of greatest possible complementarity and practical collaboration thus lies in exploring the nexus between the health consequences of behavior and the social and cultural correlates of that behavior. (Dunn and Janes 1986:3)

Anthropology's and epidemiology's mutual interest in human behavior—especially behavior that places human beings at risk of disease—has been noted by a number of medical anthropologists, many of whom have specified culturally prescribed human behaviors that may be deleterious to human health (Fabrega 1974; Dunn 1976; Helman 1984; Heggenhougen and Shore 1986; Nations 1986; Brown and Inhorn 1990; Inhorn and Brown 1990). Heggenhougen and Shore (1986:1235) muse, "We need only read Fabrega's 1974 volume *Disease and Social Behavior* and scan its 30 pages of references to be convinced that behavior and disease prevalence and incidence are interconnected."

Thus epidemiology and medical anthropology have an important task in examining the behavioral component of health problems. As Dunn and Janes (1986) note, medical anthropology's contribution in this process is the exploration of social and cultural contexts in which health-demoting behaviors are maintained.

In this paper, we examine the case of TFI in urban Egypt, applying both anthropological and epidemiological methods of data collection and analysis to identify behavioral risk factors for TFI. In addition to identifying these risk factors, we explore the cultural norms which support "risky" behaviors leading to TFI, as well as the historically determined, political-economic context in which TFI-producing cultural practices are encouraged.

Following an introduction to the study, we will focus on significant findings. Our results suggest that iatrogenesis (Illich 1976), or the health-demoting consequences of putative health-promoting practices, is significantly associated with TFI in the urban Egyptian setting. We will examine the specific practices associated with iatrogenic TFI in both the biomedical and ethnomedical realms in Egypt, arguing that, in the biomedical realm, practices intended to "treat" infertility may in fact produce more cases of TFI than they cure. In addition, we will focus on sexual practices leading to sexually transmitted diseases (STDs). A significant

proportion of women with TFI in this study had serum antibody evidence of past sexually transmitted genital chlamydial infection. We argue that in order to understand STD seroprevalence data among urban Egyptian women, it is necessary to examine the political-economic history of male labor migration from Egypt and the contemporary context in which STDs are introduced into the urban Egyptian female population.

BACKGROUND TO THE STUDY: EGYPT'S ANTHROPOLOGICAL-EPIDEMIOLOGICAL LACUNA

Although anthropology and epidemiology are well established in the West, their disciplinary reproduction in academic circles in non-Western settings, especially those of the Third World, has yet to transpire fully. Egypt, despite its ancient and well-established university system and its young but flourishing biomedical one (Gallagher 1990; Kuhnke 1990; Sonbol 1991), lacks well-defined disciplines of either anthropology or epidemiology. Anthropology, or *'ilm il-insān* (the science of man), is a branch of knowledge that is recognized by some Egyptian universities but by few Egyptians, including the educated. The struggling discipline of epidemiology is subsumed within the marginal biomedical branch of "preventive and social medicine" (i.e., family and community medicine) or within public health institutes which are also marginal. In other words, although anthropologists and epidemiologists do exist in Egypt, they are few in number and poor in influence; their disciplines lack both the power and prestige of the other "human sciences" (Foucault 1973), especially biomedicine.

Because of the underdevelopment of epidemiology and the associated field of biostatistics in Egypt, as well as substantial differences in the ways in which Egyptian (as opposed to American) epidemiology is practiced,² reliable descriptive epidemiological data on most health problems—including such major public health problems as schistosomiasis, tuberculosis, neonatal tetanus, and diarrheal illness—are lacking. Not surprisingly, little statistical data exist on the problem of infertility in Egypt, especially given the preoccupation of the Egyptian government and donor countries with Egypt's purported "overpopulation problem" (Mitchell 1991).

Nevertheless, data on the "infertility problem" have begun to emerge from Egypt's southern neighbors—nations that comprise the STD-induced, tubal-factor "infertility belt" of sub-Saharan Central Africa (Population Reports 1983; World Health Organization 1987; Collet et al. 1988). As part of a World Health Organization (WHO)-sponsored effort to trace global infertility patterns, especially those of Africa, a general estimate of infertility rates in Egypt has been made (Farley and Belsey 1988). However, according to a preeminent Egyptian infertility researcher (Serour 1989), the estimate that 8% of all married Egyptian couples are infertile is probably low by several percentage points.

Despite the lack of statistical information, most Egyptian gynecologists who treat infertility perceive it to be a significant problem in their practices. For example, two gynecologists practicing in Alexandria, who participated as informants in this study, estimated that a third of their patients are infertile women; one

of these gynecologists kept computer-based records to confirm this. Similarly, in the university ob/gyn teaching hospital in which this study was based, several staff physicians estimated the population of infertile women desiring treatment to be at least as large as the population of fertile women desiring contraception.³ According to gynecologists' perceptions, the problem of infertility in Alexandria, Egypt, is neither statistically, nor socially insignificant, despite the frustrating "lack of statistics" on morbidity and mortality patterns in their country.

In addition to this absence of epidemiological surveillance of infertility prevalence and incidence in Egypt—due in part to problems inherent in collecting reliable data of this type in Egypt and other Third World settings (Fabrega 1974; Heggenhougen and Shore 1986)—little is known about causal factors associated with infertility here. In the West, tremendous research efforts have been made over the past two to three decades to reveal the various factors associated with the etiology of male and female infertility. However, comparable studies from the Third World have yet to emerge.

Given this scenario, one of us (M. C. I.), who will be referred to hereafter as "Inhorn," decided to undertake an anthropologically informed, analytical epidemiological study of infertility causation in Egypt, with special focus on the problem of TFI. This study was conducted as part of a larger ethnographic research project on infertility among Egyptian women. The study lasted 15 months (October 1988 to December 1989) in the infertility clinic of the University of Alexandria's Shatby Hospital, the public ob/gyn teaching hospital serving the northwestern Nile Delta region of Egypt.

Prior to Inhorn's study an Egyptian physician, Mohamed El-Gezery, completed a study of infertility causation among women in the same hospital (El-Gezery 1988). That study represents the first analytical epidemiological study of infertility causation for this region.⁴ El-Gezery's study, however, is substantially different from ours; he focuses on a much narrower range of potential risk factors, largely excluding those involving culturally prescribed behaviors specific to Egyptian women. Differences between the two studies also reflect El-Gezery's status as an Egyptian, male physician and Inhorn's status as an American, female anthropologist. As a physician, El-Gezery was more interested in the association between various biomedically defined risk factors and infertility (e.g., history of vaginitis), whereas Inhorn was more interested in cultural patterns of behavior and their relation to infertility (e.g., practices of female circumcision). As a woman, Inhorn was also able to obtain much more specific information on matters of sexuality and infertility. Egyptian women are often reluctant to discuss sexual behaviors and problems with male physicians.⁵ Many religiously conservative women deem discussion of intimate matters with or examination of their bodies by a male physician to be sinful in Islam—a view that is becoming increasingly prevalent as a result of the contemporary rise in Islamic fervor in Egypt.

Because of her gender and status as an anthropologist, Inhorn was able to collect, through in-depth, formal and informal interviewing and observation, detailed information on culturally-based behavioral risk factors for infertility among a population of predominantly lower- to lower-middle-class Egyptian women. Anthropological insights were crucial in all three stages of this epidemiological study, including: (1) the design of the standardized, semi-structured epidemiological

questionnaire, which utilized knowledge of Egyptian culture and behavioral practices; (2) collection of data, by orally administering the questionnaire in Egyptian colloquial Arabic; and (3) interpretation of the epidemiological results in light of previous and ongoing ethnography in urban Egypt.

THE STUDY: DESIGN, POPULATION, AND DEFINITIONS

This was a case-control study in which 190 women representing the patient population of Shatby Hospital were selected to participate. They were lower- and lower-middle-class women primarily from Alexandria; however, some were from the provincial cities outside Alexandria and the outlying rural areas of the Nile Delta. One hundred of the women were infertile cases, and 90 were fertile controls. A comparative demographic profile of cases and controls is presented in Table I.

Of the 100 infertile women, 56 were primarily infertile (i.e., they had never conceived following at least one year of unprotected intercourse). Thirty-seven women were secondarily infertile (i.e., they had failed to become pregnant following a previous pregnancy). Seven women were "possibly" secondarily infertile (i.e., they suspected they had been pregnant and spontaneously aborted, although the spontaneous abortions were unconfirmed). Of these cases of proven and possible secondary infertility, 11 women had at least one living child; the other 33 women had no children. Of those without children, nine had delivered stillborn or live infants that had later died; the remaining 24 spontaneously aborted at various stages of gestation.

Based on their biomedical records, women in this study were categorized according to types of infertility, or infertility "factors," as shown in Table II. It is important to note that women's records were subject to error, along with missing information. Most of the women in this study had undergone a full range of diagnostic tests, by virtue of their participation as patients at the university hospital. Many of these women, furthermore, were participants in another unrelated infertility study being conducted by a Shatby staff physician, who made his own careful records available to Inhorn. Thus, complete information on infertility factors could be ascertained by Inhorn for the majority of the women in the study. However, a few women were new patients to the infertility clinic and had not yet undergone the full range of infertility diagnostic tests available at Shatby Hospital. These women had usually been tested in various ways by other physicians, whose records were made available to Inhorn by study subjects. However, the comprehensiveness of their diagnoses remains uncertain. Thus, the information on definitions of "disease" (i.e., infertility factors) presented in Table II reflects what was known about the entire population of 100 infertile women and their husbands at the conclusion of this study.

Fertile controls were selected for the study if they had living children and were free from infertility problems, as defined by them. Most of these women were outpatients seeking contraception or treatment for minor gynecological complaints. Others were receiving prenatal care or were hospitalized for deliveries, hysterectomies, post-miscarriage care, or IUD removals. Although fertile controls were not

TABLE I. Comparative demographic profile of 100 infertile cases and 90 fertile controls.

	Cases (n = 100) (%)	Control (n = 90) (%)
Age		
0-19	2	2
20-29	41	47
30-39	49	40
40+	7	11
Marital Duration (years)		
0-4	20	25
5-9	40	30
10-14	22	23
15-19	14	12
20+	4	10
Ethnicity		
Lower Egyptian	64	77
Upper Egyptian	32	21
Bedouin	2	2
Nubian	2	0
Religion		
Muslim	94	98
Christian	6	2
Residency		
Urban	62	65
Transitional	25	22
Rural	13	13
Education		
None	32	27
Primary	43	46
Preparatory	4	12
Secondary/Vocational	17	11
University/Graduate	4	4
Literacy		
Illiterate	51	40
Partial	20	27
Literate	29	33
Employment		
Never	62	53
Ever	18	30
Current	20	17
Combined Monthly Income (in Egyptian pounds, \$1 = LE 2.5)		
0-49	7	8
50-99	30	26
100-199	35	37
200+	26	24
no information	2	5

TABLE II. Infertility factors by biomedical type in study sample of 100 infertile Egyptian women*.

Male Factors:	40/87	= 46%
Female Factors:	82/100	= 82%
Ovarian	49/87	= 56%
Tubal	41/89	= 46%
Cervical	25/56	= 45%
Uterine	19/100	= 19%
Miscellaneous	10/100	= 10%
Unknown Factors:	6/100	= 6%
Coital Factors:	13/100	= 13%

*These percentages do not equal 100 percent because many couples were affected by more than one factor.

was made to ensure that all controls, like cases, were women of reproductive age (in this case, 15 to 45).

Each fertile and infertile woman selected for the study agreed to participate in a confidential interview in which information about a wide range of potential risk factors for infertility was obtained. The complete list of potential risk factors considered in this study is shown in Table III; relatively few of these factors appeared to be significantly related to TFI outcomes, as will be shown in the next section.

Information about both women and their husbands was obtained by interviewing women alone and was not based on interviews with their husbands or structured observations of behaviors.⁶ Husbands were not formally interviewed in this study for two major reasons: (1) the vast majority of husbands did not accompany their wives to the hospital for infertility treatment, because infertility is widely perceived as a woman's rather than a couple's problem in Egypt and because most husbands were working during hospital hours; and (2) the gender of the anthropologist would have been an obstacle to obtaining information of a personal nature from men of this social class in this sex-segregated society. As a result, all epidemiological information regarding husbands was secondarily obtained through interviews with wives, and is thus less reliable. On the other hand, because of the rapport established by the anthropologist with most of the women in the study (see Inhorn 1991), the strict privacy of the interview setting, and the careful attention given to maintaining confidentiality, interview bias was probably minimized. In most cases, women appeared very comfortable talking about matters of sexuality and about their husbands' behaviors. Furthermore, most were eager to explain their histories in the biomedical system, as well as their gynecological health profiles.

Nevertheless, this and other possible sources of bias—defined as any process at any stage of inference which tends to produce results or conclusions that differ systematically from the truth (Sackett 1979)—must be recognized. Other possible sources of bias include: (1) non-random sampling, which may affect our ability to make inferences beyond the sample; (2) prevalence-incidence sampling, wherein

TABLE III. Potential risk factors for infertility in Egypt.

Contraceptive Practices
Oral contraceptive usage
Intrauterine device usage
Other contraceptive practices
Genital "Purification" and Hygiene
Female circumcision (type, practitioner)
Douching with device
Manual douching
Postcoital manual douching
Use of genital depilatories
Use of female hygiene sprays, other substances
Sexual Practices
Number of sexual partners (husband, wife)
Age at first intercourse (husband, wife)
Use of prostitutes (husband)
Sexual frequency
Sexual infrequency due to absent husband (labor migration, marital separation)
Sexual intercourse during menses
Anal-to-vaginal intercourse
Male sexual dysfunction (impotence, premature ejaculation, etc.)
Female sexual dysfunction (vaginismus, coitus interferfeminium, etc.)
Lack of knowledge of fertile period
History of sexually transmitted disease (STD) (husband, wife)
History of recurrent vaginal infections (wife)
History of recurrent urinary tract infections (UTIs) (husband, wife)
History of chronic prostatitis
Serum chlamydial antibodies (wife)
Nutritional and Consumption Practices
Obesity, husband/wife
Diabetes, husband/wife
Consumption of raw beef
Caffeine consumption (tea, coffee, soft drinks; husband, wife)
Alcohol consumption (beer, "hard" liquor; husband)
Cigarette smoking (husband, wife)
Waterpipe smoking (husband)
Iatrogenesis
Previous delivery (biomedical, traditional)
History of postpartum infection
Induced abortion
Appendectomy
Splenectomy
Dilatation and curettage (D&C)
Tubal insufflation
Reproductive surgery
Cervical electrocautery
Marriage Practices
Cousin marriage between husband/wife
Two generations of cousin marriage
Occupational Exposures
History of schistosomiasis (husband, wife)
History of pesticide exposure (husband)
History of occupational chemical exposure (husband)
Occupational heat exposure (husband)
Miscellaneous
Exposure to cats (i.e., toxoplasmosis)

we may be unable to confirm exposure to a risk factor before the onset of disease; (3) misclassification, wherein a case or control was misclassified according to exposure to the risk factor, due to the "nonblindness" (and subsequent potential bias) of the investigator, the difficulty of operationalizing some behavioral risk factor variables, or the exaggerated recall of exposure to risk factors among cases. Furthermore, small subdivided infertility type samples may not be able to show a significant association when one is, in fact, present. Although biases and problems of small sample size may be present in this study, it is important that studies such as this one be carried out, given what can be learned about possible associations between risk factors and health outcomes.

RESULTS: INFERTILITY, INFECTION, AND IATROGENESIS

In this study, 41 of the 87 infertile cases (46%) who underwent diagnostic evaluation for fallopian tubal pathology (through either diagnostic laparoscopy or hysterosalpingography) had evidence of TFI. Given that nearly half of all cases in this study were diagnosed with TFI, it is important to understand the factors that place lower-class, urban Egyptian women at risk of sterilizing pelvic infection.

Of the potential risk factors listed in Table III, those significantly associated with TFI in this study are all iatrogenic, including "ethno-iatrogenic." In other words, infections leading to TFI are likely to be induced by physicians or traditional healers. Although these procedures are intended to *promote* the health of women—including, ironically, to "treat" the problems of infertile women—their unintended consequence may be the production or exacerbation of TFI.

Although TFI-inducing iatrogenesis has been considered in numerous studies in the West—including in studies of IUD usage (Daling, Weiss, Voight, Moore et al. 1985; Daling, Weiss, Metch et al. 1985), prior induced abortion (Daling et al. 1981; Daling, Weiss, Voight, Spadoni et al. 1985), appendectomy (Mueller et al. 1986, 1987), and gynecological surgery (ovarian cystectomy, wedge resection of the ovaries, and operative correction of uterine retroversion) (Trimbos-Kemper, Trimbos, and van Hall 1982)—the potential association between TFI and reproductive practices in Egypt has never been adequately examined.

For this reason, we evaluated a number of potentially iatrogenic practices as risk factors for TFI. In the discussion that follows, biomedical and ethnomedical practices that were found to be significantly associated with TFI are considered separately, and the context in which these practices are maintained in Egypt is explored.

Biomedical Iatrogenesis: Infertility "Treatments"

In Egypt, most of the invasive procedures commonly employed by gynecologists to *treat* infertility, usually in the absence of a definitive diagnosis of TFI or other types of infertility, potentially produce TFI in women without this condition. This occurs when infectious agents are introduced into the upper genital tract. Although a

treat infertility are potentially iatrogenic, as acknowledged by many university-based gynecologists.⁷ These include tubal insufflation (*naḥq*), an obsolete diagnostic procedure which has been used therapeutically in Egypt to "blow open" the fallopian tubes; dilatation and curettage, or D & C (*tausi' wi qaḥṭ*), involving the "cleaning" of the uterine cavity through removal of the endometrial lining, a procedure that is also obsolete in the treatment of infertility in the West; and cervical electrocautery (*kayy*), another obsolete procedure in which the purportedly "eroded" cervix is thermocauterized. Additionally, the widespread practice of reproductive surgeries, including ovarian cystectomies, wedge resections of the ovaries, uterine fibroid tumor removals, and tubal surgeries, is another potential source of pelvic infection.

Given this rather "untherapeutic" environment for Egyptian women, we attempted to assess the TFI-related consequences of potentially iatrogenic biomedical procedures performed here. To do this, we examined only the population of infertile women, comparing those with TFI ($n = 40$) to other cases (i.e., all those with non-TFI-related infertility, $n = 49$), in order to determine whether undergoing procedures with iatrogenic potential leads to a significantly increased risk of TFI.

The results of bivariate analyses of individual risk factors that appear to be significantly associated with TFI are shown in Table IV, and unadjusted and adjusted odds ratios (ORs) are shown in Table V. When considered independently, only tubal insufflation appears to be significantly associated with TFI as shown in Table IV. Moreover, the increase in risk of TFI with increasing numbers of insufflations performed on a woman's body (many women undergo two or more insufflations) is significant ($\chi^2 = 8.67$; $p = .03$), although the relationship is not linear, as determined through logistic regression.

However, given that many infertile Egyptian women undergo multiple invasive procedures, often simultaneously, these potentially iatrogenic procedures (i.e., insufflations, D & C's, and various reproductive surgeries) are considered together as a composite "iatrogenic" risk factor in a logistic regression model,⁸ as shown in Table V. An adjusted and unadjusted OR of 1.3 indicates that, with each additional iatrogenic procedure, the risk of TFI increases by 30%.

According to many university-based Egyptian gynecologists, iatrogenic potential in Egypt is great, with many Egyptian women being subjected to multiple reproductive procedures that may be complicated by TFI-producing infection. In both biomedical and ethnomedical settings in Egypt, the Western cultural ideal of "sterile technique," based on notions of "germ theory," is often lacking. Instead, techniques are often septic.

In the area of reproductive health, most Egyptian women over the course of their lifetimes are subjected to one or more potentially septic procedures. Ethnogynecological procedures may include female circumcisions, traditionally induced abortions, deliveries by traditional midwives, and a variety of vaginally invasive procedures used by traditional healers to treat infertility (Inhorn 1991). Although Egyptian gynecologists are often quick to point to *dāyas* (traditional midwives) as the primary contributors to problems of sepsis in women, many university-based Egyptian gynecologists also acknowledge the significant problem in biomedical settings. For example, virtually all university-

TABLE IV. Bivariate associations in tubal-factor infertility (TFI).

Risk factor	TFI cases (40)		controls (90)		X ²	(p-value)
	N	(%)	N	(%)		
Type of female circumcision						
excision	26	(66.7)	44	(51.1)	2.62	(0.11)
clitoridectomy	13	(33.3)	42	(48.8)		
Type of female circumciser						
traditional	33	(84.6)	60	(71.4)	2.51	(0.11)
medical	6	(15.5)	24	(28.6)		
Composite of circumcision risk						
both excision and traditional	23	(59.0)	31	(36.9)	4.71	(0.03)
either excision or traditional	13	(33.3)	41	(48.8)		
neither excision nor traditional	3	(7.7)	12	(14.3)		
	TFI cases (40)		Other cases (49)		X ²	(p-value)
	N	(%)	N	(%)		
Number of tubal insufflations						
more than two	9	(23.7)	3	(6.4)	8.67	(0.03)
two	0	(0.0)	5	(10.6)		
one	15	(39.5)	19	(40.4)		
none	14	(36.8)	20	(42.6)		

secondary infertility in Egypt. Included among the possible biomedical sources of sepsis cited by them were hospital and clinic (private and public) deliveries, both vaginal and cesarean; intrauterine fetal deaths and miscarriages followed by D&C; so-called criminal abortions by physicians (abortions are illegal in Egypt); IUD insertions; and unindicated abdominal surgeries, especially appendectomies and urinary tract operations undertaken for complications of schistosomiasis.

In addition, many of these physicians pointed to the septic potential of practices used in the putative treatment of infertility in Egypt. In their discussion of these potentially harmful procedures, they identified two major reasons why these invasive procedures continue to be practiced on a widespread basis throughout the country. First, iatrogenic infertility treatments are performed by many gynecologists as money-making ventures in a climate of stiff competition for paying clientele. Because Egypt is a poor country with a "stalled" economy (Ansari 1986); because an ill-coordinated national health policy has led to the training of excessive numbers of Egyptian physicians, most of whom want to practice in urban areas (USAID 1979); and because women desperate to become pregnant are willing to subject their bodies to costly invasive procedures and may even request these procedures from physicians (Inhorn 1991), Egyptian gynecologists are under considerable pressure to perform invasive infertility treatments as a source of significant income and as a means of attracting patients. Indeed, many gynecologists interviewed for this study described the considerable pressure they feel to "do something" for their infertile patients (and their struggling practices), even when

TABLE V. Multivariate associations in tubal-factor infertility (TFI): Unadjusted and adjusted odds ratios and 95% confidence intervals.

Risk factor	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Excision vs clitoridectomy (TFI cases vs controls)	1.9 (0.9, 4.2)	1.9 (0.8, 4.2) ^a
Traditional vs medical circumciser (TFI cases vs controls)	2.2 (0.8, 5.9)	2.1 (0.8, 5.7) ^b
Composite of circumcision risk (TFI cases vs controls)	2.0 (1.1, 3.6)	2.0 (1.1, 3.7) ^c
Composite of iatrogenic risk (increasing number of procedures) (TFI cases vs other cases)	1.3 (1.0, 1.9)	1.3 (0.9, 2.5) ^d

^aAdjusted for type of circumciser, marital duration, and wife's age^bAdjusted for type of circumcision, marital duration, and wife's age^cAdjusted for marital duration and wife's age^dAdjusted for marital duration, wife's age, wife's education, and wife's literacy

these procedures are deemed standard practice throughout most of Egypt. In fact, tubal insufflation, D&C, and cervical electrocautery constitute the "traditional" treatment triad of long lines of Egyptian gynecologists, beginning with the now deceased university professors who introduced these practices decades ago. As one university-based gynecologist lamented:

[These procedures are] very commonly done because of money. Some doctors do [them] because they believe this is the treatment. If you open a book written by [a professor] thirty years ago, you will find it. But things change. If this was a good treatment thirty years ago, it doesn't have to be kept because a professor mentioned it in a book. People here are sensitive about this; they say, 'We are insulting our professor.' Because here there is no democracy at any level. . . . In places like the United States and England, these are democratic countries, and any young doctor will question anything which is not logical.

Thus, to some degree, biomedicine has been reproduced in Egypt without concomitant Western, Enlightenment-inspired notions of "progress" and "modernity." Because biomedical "traditions" are upheld, old biomedical customs die slowly in Egypt. Some even "trickle down" to the ethnomedical community, where traditional healers can be found to practice antiquated forms of biomedical therapy once practiced by Egyptian physicians (Millar and Lane 1988).

As it now stands, women in Egypt who go to physicians hoping to receive help in becoming pregnant, whether or not they are actually infertile, may be at significant risk of irreparable, infertility-producing tubal damage through procedures currently used to treat them. The irony of this situation is not lost on many university-based Egyptian gynecologists, who decry the current state of affairs in their country. However, as they also acknowledge, even with the coming of new conceptive technologies to Egypt's urban areas, the current climate of "irrationality" and iatrogenesis in Egyptian infertility management is unlikely to change substantially without radical transformations in Egyptian biomedical education and the elimination of the physician glut that has promoted truly "unhealthy" competition.

Ethnomedical Iatrogenesis: Female Circumcision

Physicians in Egypt are not solely responsible for TFI-linked iatrogenesis. As the results of this study show, the deleterious effects of female circumcisions performed by traditional practitioners in Egypt can be considered a form of ethnogynecological iatrogenesis, given that traditional practitioners intend to make women healthy and "normal" through circumcision rather than to harm them.

The risk of post-circumcision infection leading to TFI has been noted by a number of biomedical investigators working with Sudanese women (e.g., Shandall 1976; Rushwan 1980). Likewise, in Egypt, the possibility of infertility-producing, post-circumcision infections in Egyptian girls has been mentioned by the Cairo Family Planning Association (1983). Pubescent Egyptian girls who undergo circumcision by traditional practitioners may be at an increased risk of post-circumcision infections leading to TFI through subcutaneous, parasalpingial spread of these infections to the internal reproductive organs, resulting in pelvic infection.

It is important to note that, in Egypt, female circumcision, called *tahāra* (meaning both circumcision and cleanliness) actually refers to three different procedures, including: (1) clitoridectomy, in which the clitoris or only the prepuce of the clitoris are removed, leaving the labia minora and majora intact; (2) excision, in which usually the clitoris and part or all of the labia minora are removed, leaving the labia majora intact; and (3) infibulation ("Sudanese" or "pharaonic" circumcision), in which all of the external genitalia are removed and the two sides of the vulva are sutured together, leaving only a tiny opening for the passage of urine and menstrual blood (Koso-Thomas 1987a).

Throughout most of Egypt, only clitoridectomy and excision are performed, although infibulation is found in the southernmost region of Egypt, especially among the Nubians. According to the findings of this study, Bedouins are the only ethnic group in Egypt who do not practice female circumcision routinely. As the Cairo Family Planning Association (1983) has also pointed out, female circumcision is a distinctively class-based phenomenon; it is not practiced by most middle- and upper-class Egyptians, who are generally unaware of the extent of the procedure among the general population.

In this study, virtually all of the 190 women interviewed were *mutāhharīn*, or circumcised (also meaning pure). Only six women, or 3% of the entire study population, were not circumcised—in most cases, because of their employment as childhood domestic servants in the homes of upper-class Egyptians, who disallowed the procedure. The rest of the women were circumcised: 42% by clitoridectomy, 53% by excision, and 2% by infibulation. The vast majority of the women in this study—160 of 190, or 82%—had been circumcised by a traditional practitioner, either a *dāya* (midwife), *ghagarīya* (gypsy woman), or another woman specializing in circumcision. The remainder had been circumcised by a medical practitioner, either a physician, nurse, or nurse's aide, all of whom had charged fees for their services.⁹

Given this background and the fact that the association between female circumcision and TFI in Egypt has never been systematically explored, we decided to

include female circumcision and type of circumciser as possible risk factors for TFI in this study. Bivariate results are shown in Table IV; it is clear that women with TFI (67%) are more likely to have undergone the more extensive form of excision than are fertile controls (51%). Likewise, women with TFI (85%) are more likely to have been circumcised by a traditional practitioner than are controls (71%). A composite chi-square analysis of circumcision risk—in which women who had had both excision and a traditional circumciser are compared to those who had had either excision or a traditional circumciser and to those who had had neither—shows a statistically significant association with TFI ($X^2 = 4.71$; $p = .03$).

When the individual circumcision risk factors are considered independently in a logistic regression model, the strength of the associations remains, as shown in Table V. Women who had undergone excision are at 1.9 times greater risk of TFI than are women who had undergone clitoridectomy, while women who had been circumcised by a traditional practitioner are at 2.1 times greater risk of TFI than are women who had been circumcised by a medical practitioner. Additionally, we found that when the type of circumcision and circumciser are considered together, there is a significant association with TFI, as shown in Table V. Women who had had either an excision or a circumcision by a traditional practitioner are at 2.0 times greater risk of TFI than are women who had had neither, and women who had had both an excision and a traditional practitioner are at four times greater risk of TFI than are women who had had neither.

Interestingly, most women in this study did *not* believe that female circumcision is harmful in any way, despite the reported trauma of the circumcision event itself. In terms of the latter, women who had undergone traditional circumcisions had usually not been anesthetized nor had the sterility of the procedure been ensured. Circumcision was typically performed with a razor blade, knife, or scissors, and post-circumcision bleeding was often controlled by the application of oven ashes to the wounded area. Although most women in this study reported that their post-circumcision healing was uneventful, a few women recalled post-circumcision hemorrhaging and infection that resulted in their hospitalization.

Despite the pain and potential complications of circumcision, the vast majority of women in this study supported the procedure, were astonished to learn that it was not practiced uniformly on women worldwide (including the American researcher), and planned to circumcise their pubescent daughters. Common rationales for circumcision cited by these women included: (a) *sexual concerns*: the need to control the girl's sexuality, thereby protecting her honor by preventing her from making a "mistake" with a man, and the need to control the married woman's sexuality, thereby reducing her sexual insatiability and preventing her from making unreasonable sexual demands on her husband; (b) *religious concerns*: the need to follow the perceived Islamic mandate of female circumcision (even though Islamic scriptures do not prescribe this practice); (c) *health concerns*: the need to ensure a girl's pubertal maturation and health and the need to "purify" the genital region, given that the uncircumcised genitalia are thought to be unclean and to grow over time (becoming elongated like a penis or hanging out of the vulva like leaves or a "rooster's comb"), causing irritation and even blockage of the vaginal opening; and (d) *aesthetic concerns*: the need to make the genitalia "pretty" so that a husband will not be repulsed by his wife.

Given this normative support among lower-class urban and rural Egyptian women, it is not surprising that the practice of female circumcision continues unabated in Egypt today—despite legal prohibition, campaigns by Egyptian and international health organizations to eradicate it,¹⁰ and the growing awareness among lower-class Egyptian women that female circumcision is neither uniformly practiced in Egypt nor in the rest of the world.

What remains to be done is to convince Egyptian women of the health consequences of female circumcision—especially its effect on a teenaged girl's fertility. If the results of this study are correct, Egyptian girls who undergo traditional circumcisions are at significant risk of subsequent TFI, an iatrogenic outcome that can literally destroy a woman's reproductive and marital future. If this message can be effectively delivered to Egyptian women, including the traditional practitioners who perform the bulk of female circumcisions on pubescent girls, then perhaps the practice of female circumcision, as well as its health-demoting consequences, can be avoided.

Sexual Practices and STDs

Biomedical and ethnomedical iatrogenic practices are not the only potential behavioral risk factors for TFI in urban Egypt. In studies around the world, the relationship between TFI and sexual practices leading to contraction of sterilizing STDs, especially gonorrhea and genital chlamydial infection, is well established (Population Reports 1983; Maybe et al. 1985; Millar 1987; WHO 1987; Collet et al. 1988; Sellors et al. 1988; Dixon-Mueller and Wasserheit 1991). Over the past decade, studies have emerged from the Alexandria vicinity that show STDs—which are often asymptomatic in women¹¹—are not only present among married women at rates similar to those found in the West (Kotkat 1978; Ali 1980; El Ghazzawy 1980; Kholeif 1980; Basha 1981; El-Latiff 1982; Elhefnawy 1985; Amer 1987), but also are associated with pelvic infections in women and the sterilizing sequelae of these infections (Fathalla 1986; Ghamri 1986; El Lakany 1988; Mehanna 1989).

Given this scenario, we attempted to investigate the relationship between sexual practices (of both women and their husbands), STDs, and TFI among Egyptian women. As shown in Table III, we considered as possible risk factors for TFI (1) sexual practices themselves (e.g., number of reported sexual partners of both wife and husband, husband's use of prostitutes); (2) medical histories indicative of possible STDs (e.g., history of vaginal infections, urinary tract infections of both husband and wife); (3) sexual infrequency due to extended marital separation (i.e., periods of possible extramarital sexual activity); and (4) serum antibody evidence of sexually transmitted genital chlamydial infection among women.

With regard to the last factor, blood samples for serum antibody investigation were drawn from 153 of the 190 women who participated in this study. Unfortunately, due to a lack of (1) adequate provisions for the separation of blood samples, (b) their storage in well-sealed vials, and (c) constant refrigeration in the Egyptian setting, 20 of the sera samples were degraded or spilled in transit to the United States, resulting in a total of 133 sera samples for investigation (33 TFI, 50 non-TFI, 50 controls). Furthermore, because of possible degradation, serum anti-

body titers were not as high as expected, and it was difficult at times to determine whether samples were positive for genital chlamydial infection or trachoma, a blinding eye disease common to Egypt that is caused by the same bacterium.

Nevertheless our results suggest a significant presence of genital chlamydial infections. Among women with TFI, 33% were positive for serum chlamydial antibodies, indicating possible past or present genital chlamydial infection among these women. Surprisingly, the prevalence of chlamydial antibodies among *fertile* control women was also high—30%. As a result, the association between the presence of serum chlamydial antibodies and TFI could not be demonstrated statistically. Nevertheless, these seroprevalence data suggest that sexually transmitted genital chlamydial infections are present, and even common, among Egyptian women, and that they may lead to TFI in those cases that ascend to the upper genital tract.

This information presents another question: How might Egyptian women contract these infections? Either Egyptian women are contracting infections from sexual activity with infected pre- or extramarital partners, or Egyptian women's husbands are becoming infected through pre- or extramarital sexual activity and then infecting their wives. In all likelihood, husbands are the primary reservoir of infection in this setting.

In Egypt, especially among the rural and urban lower classes, women's sexuality is the source of great anxiety; a girl's virginity and a woman's marital fidelity are the main source of her natal family's *sharaf* (also known as *'ird*), or honor. Because *sharaf* infractions are the cause of great shame to the extended family, the sexuality of female members is strictly guarded. Girls are circumcised to "calm" their budding libidos and prevent them from "making mistakes." Proof of their virginity, in the form of a bloodied cloth known simply as *sharaf*, is expected by most families on or shortly after the wedding night. Postmarital behavior is also subject to scrutiny by both family and community members. Indeed, there is little opportunity for women to "go astray," given these direct social controls and the indirect threat of severe physical, social, and spiritual punishment should a woman deviate from these standards.

Men, on the other hand, have much greater sexual liberty. Although virginity at marriage and marital fidelity are also cultural ideals for men, it is widely expected that young men may deviate from these standards, especially before marriage, when they attempt to "gain experience." Marital fidelity is the stronger of these ideals, given the sinfulness of adultery in Islam. Yet, Egyptians acknowledge that men are likely to veer off the "straight path" of Islam, especially during periods of prolonged separation from their wives, as is the case during male labor migration.

Given these sexual standards, women in this study were questioned about their own sexual experiences and those of their husbands. As expected, all women who had been married only once (92.0%) said that they had had only one sexual partner: i.e., their husbands. Indeed, the implications of a situation different from this were so unthinkable to these women that many of them were openly incredulous at being asked such a question. However, it is important to note that Inhorn's status as a foreigner was a distinct advantage during this phase of the questioning. Essentially, her informants forgave her for asking such impertinent questions and often reasoned aloud that "foreigners like you" are allowed to have free sexual

relations, which they had surmised from watching the American television serials, *Dallas*, *Dynasty*, *Knots Landing*, and *Falcon Crest*, all of which had been popular nighttime television fare in Egypt.

When asked about their husbands' sexual behavior, however, women's reactions were quite different. The majority were quite certain and even adamant that their husbands had been virgins at marriage and faithful in marriage, even if they had been married previously, which was true of 14.0% of husbands. Many women noted additionally that their husbands were "religious," implying that religious faith would prevent them from sinning in this way. However, a significant proportion of both infertile and fertile women believed that their husbands had had premarital or extramarital sexual experiences with prostitutes or other "bad women." In several cases, women had been told this by their husbands or had discovered this themselves. For example, one secondarily infertile woman's labor-migrant husband of twelve years informed her, "I've had more women than hairs on your head." At least one of these women had given him a genital chlamydial infection, which he unwittingly transmitted to his wife.

Interestingly, STDs, contracted by husbands and transmitted to wives, were discounted as "rare" or "not so common" in Egypt by all but two of the seventeen gynecologists who participated as informants in this study. Most of these physicians pointed to Egypt's status as a religiously conservative "Muslim community" and to the lack of clinical cases of STDs, especially gonorrhea, in their gynecological practices as evidence to support their contention that STDs are uncommon in Egypt. In short, whether or not STDs are present in Egypt and whether or not they are a major factor in the numerous TFI cases in Egypt are issues that the Egyptian gynecologists in this study were loath to consider.

Only two were candid about what they perceived to be the significant problem of STD-induced infertility in their country. As one of them stated:

[Sexually transmitted disease] is, I think, the major factor [in TFI]. Many of these husbands get some sort of practice before marriage. Many times, it is a eunuch [i.e., homosexual] practice! He may take some sort of antibiotic or chemotherapy, but this is not enough to overcome the infection, and he can't go to a doctor and tell him he is practicing [i.e., sex], so the infection becomes chronic in his prostate. A real factor in primary infertility in our community is husbands who have chronic prostatitis. The first night [i.e., the wedding night], they inject the pus, or organism, into the vagina of their wives, causing ascending infection, which destroys the tubes. After some time, the doctor discovers the cause [i.e., TFI]. The man can be treated and sometimes he is OK. So he's the origin. And many of the wives lost their fertility and their marital life while they were just innocent and didn't know.

Before marriage, many things should be put on the table—if he had an infection, by semen analysis, and any hereditary disease. From the wife's side, if there is a major fault regarding menstruation—for example, primary amenorrhea—this should be explained to the husband before marriage. But you know theoretical ideas cannot always be put into practice! If a father is responsible for his newly married daughter, he should ask for a semen analysis to be sure [about STDs], because [her husband] can destroy her tubes from the first night.

Although most of the Egyptian gynecologists interviewed tended to attribute the TFI problem to factors other than STDs, the widespread problem of TFI is probably

Given the contemporary economic climate in Egypt—which is marked by low wages, spiraling inflation, un- and underemployment, inflated housing prices, and occasional “bread riots” over the increasing cost of subsidized foodstuffs (El-Sokkari 1984; Ansari 1986)—it is not surprising that many Egyptian men choose or are forced to migrate abroad. For example, 30% of informants’ husbands had migrated abroad—79% during the post-marital period and, in almost every case, without their wives.

Studies from around the world and from Africa in particular have shown that male labor migration brings with it a variety of social ills, one of the primary ones being infertility-producing and even life-threatening STDs, including AIDS. In a recent anthropological review of infectious disease problems (Inhorn and Brown 1990), the triad of migration, prostitution, and STD was linked to the serious sociomedical problem of infertility in populations in Africa and other parts of the Third World.

In Egypt, the vast majority of men migrate within the Muslim Middle East, especially to the Arab Gulf, Libya, and, before the recent Gulf War, to Iraq. Although information about prostitution in the religiously conservative nations of the Middle East is limited, both male and female prostitution is said to exist in most Arab countries, including the urban areas of Egypt. Egyptians claim that women who become prostitutes are forced to do so because of economic circumstances beyond their control or situations of coercion. For example, stories abound in Egypt of unfortunate Egyptian girls from poor families who are taken as brides by men from petro-rich Arab countries, only to find themselves serving as prostitutes in the homes of their supposed “husbands.” Furthermore, following the Iran-Iraq war, women widowed or abandoned by the deaths of Iraqi soldiers were said by Egyptians to be entering prostitution out of economic desperation. Egyptian men, thousands of whom were living as migrants in Iraq before the Gulf War, were said to make up a large part of the clientele of these women.

Although the extent of prostitution, both male and female, is difficult to determine and the information presented here is based on unsubstantiated information from women who participated in this study, as well as their husbands and other informants, prostitution most certainly exists in this environment. It is likely, furthermore, that changing sexual expectations on the part of Egyptian men have increased their use of prostitutes in recent years. Because of a thriving black market in pornographic videos from Western countries, Egyptian men are exposed to sexual practices that are culturally prohibited among the Egyptian lower classes (e.g., oral-genital sex, anal sex). When asked, their wives are often unwilling to engage in such practices, so Egyptian men may resort to prostitutes in order to experiment. Moreover, sexual practices encountered during visits to prostitutes may also lead some men to request these practices from their wives. Either way, that Egyptian men are interested in what Egyptian women deem to be sexually “abnormal” and even sinful is apparent from the reports of many women informants, who said that they had refused their husbands’ requests for fellatio in particular.

Thus, the migration-prostitution-STD triad found in sub-Saharan Africa and other parts of the Third World may operate in Egypt as well. That it is linked to

(Mehanna 1989). Yet, in the study reported here, few women had ever heard of "sexually transmitted diseases" or the Arabic terms for syphilis and gonorrhea, although many of them pointed in a different context to the problem of "pus" in their husbands' urine or semen analyses (for which their husbands had often sought treatment). Moreover, when women in this study mustered the courage to ask their physicians, "Why are my tubes blocked?" they were often informed of an "infection" that they never knew they had contracted. That their husbands may have transmitted the infection to them is a possibility that few Egyptian women or their physicians appeared to realize. That these infections may have been contracted by husbands during periods of economically forced labor migration is a political-economic reality that likely underlies the TFI problem in Egypt.

CONCLUSION

We began this article with the case of Hind, a poor, urban Egyptian woman whose infertility is due to TFI, or infection-scarred "blocked tubes." In Hind's case, the source of the pelvic infection that has literally scarred her for life is unclear; but, it may have been due to any of a number of factors, including: the complications of her early delivery by a traditional midwife, an STD given to her by one of her two husbands, or the numerous invasive ethnomedical and biomedical procedures to which she has subjected her body over the years in her attempt to become pregnant.

Arguing that Hind's case is typical of Egyptian women suffering from TFI, we have posed the question: What places poor, urban Egyptian women like Hind at risk of sterilizing infection?

This article has attempted to answer that question, through an integrative anthropological-epidemiological exploration of various behavioral risk factors leading to TFI outcomes among urban Egyptian women. Numerous potential, culture-specific risk factors for TFI were identified through preliminary ethnographic research. However, epidemiological analysis of case-control study data collected through in-depth, formal interviewing allowed us to identify *which* potential risk factors appear to be significantly associated with TFI. Of the factors shown in Table III, only the iatrogenic biomedical procedures used in the putative treatment of female infertility and the ethno-iatrogenic practice of female circumcision appear to be significantly associated with TFI outcomes. In addition, epidemiological seroprevalence data demonstrate relatively high rates of serum chlamydial antibodies among women in this study population, indicative of sexually transmitted genital chlamydial infection, a known risk factor for TFI. Ethnographic data concerning sexual practices among this population suggest that Egyptian women may contract potentially sterilizing STDs from their husbands, who may have contracted these infections during periods of labor migration.

Together, anthropology and epidemiology have a crucial role in identifying factors, especially culture-specific behavioral factors, that place populations at risk of health problems such as TFI. Anthropological research designs, methods of ethnographic data collection, and forms of qualitative data analysis may be

about the relations between potential behavioral risk factors and disease outcomes (Nations 1986). However, alone, anthropological approaches are insufficient to sort out from the myriad possibilities—which behaviors, identified through ethnographic research, place groups of individuals at *most significant risk* of disease. Identifying significant factors is necessary to prioritize needs in behavioral intervention programs; this is where epidemiological approaches to risk assessment become necessary. Conversely, epidemiology is certainly not ethnography and hence lacks the ability to identify the many *potential*, culturally embedded risk factors that require further investigation in most cross-cultural studies. Most important, epidemiology is useful in identifying the most significant risk factors, but falls short in interpreting the social, cultural, and political-economic context in which these risk factors are found, maintained, and even encouraged at the population level.

It is in this interpretive arena that anthropology, with its methodological tradition of intensive ethnography, has perhaps the most important role to play in integrative anthropological-epidemiological research. Through ethnography focusing on the social, cultural, and political-economic correlates of behavior, anthropology can provide epidemiology with interpretations of the causes of poor health leading to understandings which are greater than the sum of either disciplines' individual contributions.

Thus, we urge the continuing development of a synthetic "anthropological epidemiology" through interdisciplinary training and collaboration. Through such efforts, we can achieve superior understanding of the causes of poor health and begin to develop meaningful strategies for intervention.

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infertile and fertile, who participated in her research and entrusted her with the most intimate details of their lives. Her gratitude to these women is profound.

NOTES

1. All names used in this article are pseudonyms.
2. For example, computers and software are in short supply in Egypt, even among epidemiologists, who must therefore perform much of their data management and analysis by hand. The substantial national divergences in the practice of epidemiology have been noted by Spruit and Kromhout (1987).
3. Because the hospital did not keep standardized records on outpatients, including those presenting for infertility services, accurate statistics on these populations of infertile and fertile women were not available. This lacuna is related to a general problem of medical record-keeping in Egypt.
4. An informative study of possible etiological factors in infertility has been carried out by Serour (1991) for Cairo. However, Serour's study does not employ an analytical epidemiological research design.
5. In the study to be discussed, Inhorn was often asked by her female informants to relay information of a particularly intimate nature (e.g., about sexual problems) to the mostly male physicians treating these patients for infertility. Informants were embarrassed to discuss such matters with male physicians themselves, but felt comfortable telling Inhorn and then encouraging her to transmit the information to those in charge of treatment. In this way, Inhorn served as a sort of clinical liaison.
6. However, informal interviews with a number of husbands were conducted outside of the hospital in informants' homes.
7. There tends to be a substantial difference between "town and gown" (i.e., community-based versus university-based) gynecologists in Egypt. Gynecologists at universities have better access to current literature, current technology, and opportunities for innovation. Although some community-based gynecologists attempt to keep "up to date" with innovations in the field, they do so on their own and at their own expense. Egypt lacks continuing medical education (CME) requirements of any kind, professional associations that meet regularly, or a system of malpractice litigation. As a result, there is very little regulation of, or peer pressure upon, physicians in the community. However, university-based gynecologists tend to be critical of many of the features of community-based infertility management (Inhorn 1991).
8. Logistic regression is a powerful statistical tool for studying the association between multiple risk factors and a disease outcome. Logistic regression allows the confounding effects of other variables to be controlled (i.e., "adjusted for") simultaneously, while the relationship of a potential risk factor and a disease outcome is assessed through the estimation of an odds ratio (OR). In analytical epidemiological studies, the OR offers a means of estimating the so-called relative risk of contracting the disease under study, given past exposure to the risk factor. The calculation of the OR is based on the assumption that the disease being studied is relatively rare. If that is true, then the ratio of the odds in favor of exposure to the risk factor among the cases to the odds in favor of exposure among the controls—i.e., the OR—provides an estimate of the risk of becoming a case given exposure to the risk factor.
9. Because female circumcision is so common in Egypt, some medical personnel believe they are meeting an important need by performing less painful, less extensive circumcisions with the aid of local anesthetics and antiseptics. Although physicians who perform female circumcisions are certainly in the minority in Egypt, it is interesting to note that most of the gynecologists who participated as informants in this study and who had seen thousands of *fertile* circumcised women during their careers as practitioners agreed that female circumcision as it is practiced in Egypt (i.e., clitoridectomy or excision) is *not* damaging to women's fertility, despite its negative effects on women's sexuality.
10. The scholarly and semi-scholarly literature on female circumcision, much of it propagandizing against this practice, continues to grow. See, for example, Hayes 1975; Shandall 1976; Lowenstein 1978; Cook 1979; Baasher 1979; Taba 1979; Assaad 1980; Hosken 1980; McLean 1980; Giorgis 1981; Hall

and Ismail 1981; Paige and Paige 1981; Gruenbaum 1982; Assaad 1982; El Dareer 1982; Cloudsley 1984; Al Naggar 1985; Koso-Thomas 1987a, 1987b; Paige 1987; Boddy 1989; and Gordon 1991. Furthermore, two of the W. H. R. Rivers Prize Essays in medical anthropology have been devoted to this subject—Gruenbaum's in 1982 and Gordon's in 1991. Gordon's is accompanied by five commentaries by anthropologists, all women, either working in Egypt or Sudan or interested in issues of gender and health. The reader is referred to this issue of *Medical Anthropology Quarterly* for a recent, provocative discussion of female circumcision by medical anthropologists.

11. One gynecologist reported that cervical smears taken from more than 1,000 Alexandrian women participating in an internationally sponsored study of contraceptive methods showed gram-negative gonorrhea unaccompanied by clinical symptoms in 20.0% of cases. This gynecologist, who was in charge of the study, said he believed that the cultural practice of at least twice-daily manual vaginal douching by most Egyptian women was responsible for the asymptomatic nature of most gonorrhea cases in women in Egypt.

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