

## Evidence of Inbreeding Depression: Saudi Arabia

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### Saudi Intermarriages Have Genetic Costs

*[Important note from Raymond Hames (your instructor). Cousin marriage in the United States is not as risky compared to cousin marriage in Saudi Arabia and elsewhere where there is a long history of repeated inter-marriage between close kin. Ordinary cousins without a history previous intermarriage are related to one another by 0.0125. However, in societies with a long history of intermarriage, relatedness is much higher.*

*For US marriages a study published in The Journal of Genetic Counseling in 2002 said that the risk of serious genetic defects like spina bifida and cystic fibrosis in the children of first cousins indeed exists but that it is rather small, 1.7 to 2.8 percentage points higher than for children of unrelated parents, who face a 3 to 4 percent risk — or about the equivalent of that in children of women giving birth in their early 40s. The study also said the risk of mortality for children of first cousins was 4.4 percentage points higher.]*

**By Howard Schneider Washington Post Foreign Service Sunday, January 16, 2000; Page A01**

RIYADH, Saudi Arabia--In the centuries that this country's tribes have scratched a life from the Arabian Peninsula, the rule of thumb for choosing a marriage partner has been simple: Keep it in the family, a cousin if possible, or at least a tribal kin who could help conserve resources and contribute to the clan's support and defense.

But just as that method of matchmaking served a purpose over the generations, providing insurance against a social or financial mismatch, so has it exacted a cost--the spread of genetic disease. And now, after years of looking the other way because the subject is so sensitive in this ultraconservative society, the kingdom's public health officials, media and religious authorities are beginning to openly counsel Saudis about the risks of marrying too close to home.

Quantifying the problems is difficult and discussion is colored by Saudi Arabia's deeply held religious and social values. But research at hospitals and medical centers indicates that the rates of some metabolic diseases may be as much as 20 times higher among Saudi Arabia's 14 million people than they are in populations where the gene pool is more widely mixed.

Blood disorders such as thalassemia--a hemoglobin deficiency--and sickle cell anemia, as well as diabetes are widespread, particularly in some provinces with high intermarriage rates. College professors tell of being able to identify where students are from by their fatigue level at the end of class. Intermarriage between close relatives, which magnifies the chance that defective genes from a man and woman will combine in a way that causes a disease or disorder in their children,

also is being studied as a factor in obesity, heart disease and other problems.

Rare genetic abnormalities have become like clinical markers for certain tribes.

Potentially profound in its implications for Saudi mores and society, breaking the pattern of parentally brokered, intra-family or intra-tribal marriages almost by definition implies letting young men and women meet, mingle and make their own choices to a degree not tolerated here.

Nevertheless, even in a country hesitant to discuss its most intimate problems with the outside, a public dialogue is developing. Official bodies like the medical school of King Saud University have produced material in which religious sheiks counsel young men to "choose a wife carefully" and with an eye toward health. Health officials are debating the possibility of making genetic tests mandatory before marriage, and newspapers carry stories such as this from a December edition of Arab News:

"Basmah and Muhammad are first cousins. . . . Their first child, a hydrocephalic boy, was born dead. Their second child, also hydrocephalic, was also born dead. It was the same with their third."

"There is always the element that says 'you don't want to touch it,' " said Prince Salman bin Sultan, chairman of the Prince Salman Center for Disability Research. But that, he said, is no longer possible or wise. The effects of intermarriage will be part of a comprehensive disability study that the center expects to complete in coming months, and international groups including the World Health Organization are trying to help develop policies to address the issue.

"Families should know what kind of diseases they are carrying," said Abear Manabry, the mother of a thalassemic boy who is featured in one educational video discussing the hardships of his regular blood transfusions. "If we had done the tests before we got married, perhaps we would not have gotten married, because living with this is not easy."

Intermarriage is common throughout Africa, the Middle East and Southeast Asia, although the rate of marriages between first cousins, second cousins and other relatives in the Persian Gulf region, estimated at more than 55 percent in Saudi Arabia, is considered high by world standards.

It is seen as a way to preserve wealth by keeping dowries and inheritances within the same line. It is also, many in Saudi Arabia say, the surest way to avoid the uncertainty that goes with marrying someone from an unknown family or an unfamiliar region. As one elderly father explained, marriage discussions can involve intense investigations to ensure that a son or daughter is not taking a step down the social ladder, or compromising the family's interests. In that environment, marrying relatives is always a safe bet.

Most of the offspring of such unions are healthy, to an extent that even health officials studying the issue say they would hesitate to disrupt a family or community's most intimate plans with what is only an assessment of risks. Even cousins who are carriers of a particular blood disorder, for example, could produce a family with no evidence of the disease.

However, rising concern over the risks poses a particularly complex set of problems in the Gulf region, where, because of the large numbers of foreign workers, marriage to one's own kind is seen as an issue of national survival. To help sustain a distinct identity, given relatively small populations, countries such as Kuwait occasionally stage subsidized "mass weddings" in which public funds are used to offset the expense of setting up a home and encourage local nationals to marry one another. Similarly, the government of the United Arab Emirates offers a \$20,000 stipend if an Emirati man marries an Emirati woman.

Saudi law makes marriages with foreigners difficult, although less so for men than women. The cultural pressure for Saudis to marry Saudis is intense, and the bureaucratic barriers to doing otherwise enormous.

Islam does not call on believers to seek an intra-family or intra-tribal marriage. But neither does it prohibit unions as close as that of first cousin. Arguments, however, are made from both sides. Some recall that the prophet Muhammad's daughter married her cousin, while others point to the words of later caliphs encouraging the people of Islam to intermarry freely.

Beyond any religious interpretation, Saudi Arabia remains a place of intensely tribal and generally restrictive social affiliations, where claims of the extended family and tribe still take

precedence over any broader sense of nationality. As one doctor put it, genetic problems associated with certain Saudi tribes--from a nervous tic to severe neural disorders--involve "mutations that occurred 10,000 or 20,000 years ago," but remained isolated and intact because of breeding patterns that kept the gene pool restricted.

In modern times, parents and relatives more often than not conduct the hunt for eligible mates on behalf of their children. As a guard against scandal or a bad marriage, or even to avoid unwarranted risk, the search is still often focused by blood and geography--a practice followed within Saudi Arabia's royal family as well as by commoners.

There are few alternatives. Unmarried men and women are not allowed to associate freely. There are no movies, no nightclubs, no venues for ogling on the street or chatting about the weather. With the exception of a souk, or market, and a few malls patrolled by morality police who keep an eye out for imprudent behavior, downtown Riyadh tends to be deserted outside business hours.

Some Western-oriented, upper-middle-class Saudis hold discreet parties for their children, but the music is never too loud and an ear is always tuned nervously to the door for fear that the police might come knocking.

Parents in these families say pressure is developing, particularly among an upcoming generation of educated girls, to have more say in whom and when they marry. But that change will come slowly. Saudis joke that to the extent they are able to choose their own mates, they meet and court "at Disneyland"--a reference to summer vacations that well-to-do families take in the United States and Europe. "It is bound to change," said one Saudi parent. "Girls see themselves differently. They see men differently. . . . They will marry elsewhere, and the society will be opened."

The most severe problems attributed to inbreeding remain comparatively rare. Far more widespread are blood disorders that leave the patient faced with a lifetime of periodic transfusions, which doctors here say are already taxing the Saudi public health system. Also common are defects involving a single gene. While this results in some diseases that are manageable, it also produces potentially fatal metabolic defects, such as an inability of the body to process ammonia or other toxins.

It is only as the ability to diagnose and treat these problems has improved that researchers are becoming aware of the extent to which they exist. During less sophisticated times, the affected newborns would simply have died, their deaths unconnected to any broader social phenomenon.

Pinar Ozand, a Turkish doctor who has led research into genetic errors at the King Faisal Specialist Hospital and Research Centre here, said problems that occur once in every thousand births in a robustly mixed gene pool are being found as frequently as once in every 50 births in Saudi Arabia.

The fact that treatment is now available that allows some affected people to survive and pass the gene defect on to another generation quickens the debate, Ozand said. By simply improving

diagnostic techniques, researchers at the center "created an epidemic," Ozand said. "When I came they absolutely denied it. Now they accept it."

### MARRYING CLOSE TO HOME

Marriages between relatives are widespread in the Middle East, particularly in Saudi Arabia, where a government study has found that 56.8% of all marriages are between first and second cousins or more distant relatives.

Percentage of marriages between relatives in several Saudi provinces surveyed as well as other countries in the region:

JORDAN	50.2%
IRAQ	57.9%
KUWAIT	54.3%
BAHRAIN	39.4%
U. A. E.	61.6%
EGYPT	28.9%
<b>Saudi Arabia (overall)*</b>	<b>56.8%</b>
Northern Province	52.1%
North Western Province	67.7%
South Western Province	54.2%
Central Province	60.8%
Eastern Province	59.1%

\*The Saudi government study involved a survey of 3,212 families in five Saudi provinces in 1995.

SOURCE: Saudi Arabian government agencies



