Author's response to reviews

Title: Sexually transmitted infections in Saudi Arabia

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Editor-in-Chief
BioMed Central Infectious Diseases

Re: Manuscript “Sexually transmitted infections in Saudi Arabia”

Dear the Editor

Please find attached a revised version of the above mentioned manuscript after considering the reviewers’ comments. The following are my point by point responses to the reviewers’ comments:

Reviewer: Dr James Bingham:

1. There is only one author; I cannot believe that there are not others in the Ministry of Health, or elsewhere, who must have contributed to to this work, if only in the collation of the epidemiological data. Surely other names should be on the authorship list, or at least acknowledged in the text.

Response: Reporting sexually transmitted infections to the Ministry of Health was done by thousands of health care workers. The raw data utilized in this study was compiled by many employee in the Department of Preventive Medicine in the Central Office of the Ministry of Health as part of their routine job. Considering that such data on sexually transmitted diseases have traditionally been confidential and not for publication, no one in the Ministry of Health was welling or interested to publish such data. After coming from the Faculty of Medicine at King Abdulaziz University in Jeddah to the Ministry of Health as an advisor to his Excellency the Minister of Health for Infectious Diseases and Preventive Medicine in 2000, I had to evaluate many of the previously available but unpublished data. This study is an example of such data that were entirely analyzed and written up by myself for publication without any assistance and I bear full responsibility for this fact. The data used was from 1995 to 1999, just before I joined the Ministry of Health. It took me that long to write up the manuscript because of the enormous amount of work and commitments and extremely busy schedule I had. I added an Acknowledgment section after the Discussion section as follows: “The author thanks all the staff who reported sexually transmitted infections to the regional Ministry of Health offices, the staff in these offices who submitted the data summaries to the main office in Riyadh, and the staff in the Department of Infectious and Parasitic Diseases, Ministry of Health, Riyadh, who compiled the data.”
2. You say that reporting of the data is "mandated" by the MoH; I assume it is not compulsory as you mention, elsewhere in the text, that there is a possibility of under-reporting.

Response: Even though reporting of STIs is compulsory as mandated by the MOH, under-reporting is a recognized problem throughout the Kingdom for several reasons. One of them is the fact that 80% of the health care workers are expatriates who change frequently. The new comers are often not aware of the mandate.

Apart from laboratories, which clinicians report? It might be useful to say who they are ie infectious disease physicians, primary care physicians, gynaecologists, urologists etc

Response: Unfortunately, information regarding the specialty of the workers reporting STIs to the MOH is not available.

Do you have any idea of the degree of compliance with the mandate.

Response: Unfortunately, there has been no study to evaluate the degree of compliance of health care workers to this mandate.

3. Also, precisely what detail is collected on each case? ie is the patient named, or is there just a case number?

Response: The data that are compiled by the Central MOH office include only number of cases. Patient identification is not required by the central office.

I assume the sex of the patient is known and perhaps also, their sexual orientation. I know that, under Islamic law homosexuality is prohibited but, if a patient declared this, would this be reported to the MoH? Is an address given, as epidemiologists will often find it useful to map where most infections are situated in order to try to put in place control measures?

Response: These details are always obtained by the regional directorate of Health for proper control measures such as contact tracing and treatment. Such details are never shared by sectors other than the Ministry of Health for purposes that are not health-related. A strictly recognized and followed basic fact of such details is that they are top confidential and no one else, including the Ministry of Interior officials, has the right to know them.

You talk about, for example, gonorrhoeae, do you know which orifices are infected eg urethra, cervix, pharynx or rectum?

Response: All forms of gonorrhea are supposed to be reported to the MOH including bacteremia, septic arthritis, conjunctivitis, and proctitis and pharyngitis. All cases of
gonorrhea reported to the MOH were either urethral (in men) or cervical. Gonorreal proctitis or pharyngitis was never reported.

4. You mention that MoH and Ministry of the Interior officials see the reports; I can understand why MoH officials should have sight of the data, but for what purpose do the Ministry of the Interior officials need to know the incidences? Is it because those infected individuals have to have Islamic law applied to them, as acquisition of an STI might imply extra-marital sexual activity? I suppose that this would imply that the notified cases are named, so it is important to have this clarified for readers.

Response: The ministry of Interior officials only receive summary report of the statistics without patients details or identification. Such information help these officials map any foci of potential sources of STIs such as hidden prostitution sites, drug smuggling and abuse (particularly relevant to HIV infection) and to have an idea of the extent of such infections among the youth for national security reasons.

I wonder, also, why the figures are not made public.

Response: So did I when I joined the MOH in 2000. We worked hard with the support of his Excellency the Minister of Health and the Ministry of Interior’s high officials to change this old policy. Fortunately, we managed to change it. As a result, data on HIV in Saudi Arabia were recently published in this journal (Madani TA, Al-Mazrou YY, Al-Jeffri MH, Al-Huzaim NS. Epidemiology of the human immunodeficiency virus in Saudi Arabia; 18-year surveillance results and prevention from an Islamic perspective. BMC Infectious Diseases 2004, 4:25.). This study on STIs in Saudi Arabia is the second paper on data that were previously not for publication. I revised the Data Collection section under the Methods to clarify this point as follows: “Data collection
HIV has been notifiable in SA since 1984. Reporting other STIs has been mandated by the Ministry of Health (MOH) in SA since 1995. The MOH officials rely on health-care providers, laboratories, and other public health personnel to report the occurrence of STIs to the Department of Preventive Medicine in the Central MOH office in Riyadh where all surveillance data are compiled. During this study period, from January, 1995 through December, 1999, annual reports were produced but they were only utilized internally by the concerned officials in the MOH and the Ministry of Interior and they were not made available for the public. Since year 2000, the concerned officials decided to make data on all STIs available for the public as an essential part of health educational campaigns to increase their awareness of the prevalent STIs in SA for preventive purposes.”

5. I was interested to read, in the case definitions section that chancroid is only included as a diagnosis if the organism is grown in the laboratory. Laboratories in most countries have difficulty in culturing H. ducreyi, so it is impressive if, in labs all over the Kingdom of Saudi Arabia, this is achieved. Have you any comment on this?
Response: We do have very well equipped and state of the art Microbiology Laboratories run by well qualified staff in all regions of Saudi Arabia. Additionally, we have several reference laboratories in Riyadh and Jeddah for identification of fastidious organisms such as Haemophilus ducreyi.

6. In a wealthy country like Saudi Arabia, I was surprised that trichomoniasis was the second most common STI. It is an easy disease to treat, is most frequently diagnosed in women but in many countries the male sexual partners often are not treated. Do you think that that might be the case here?

Response: Yes, I suppose this may very well be the case.

7. The whole world is pondering strategies to control the spread of STIs. I was fascinated that, in the Kingdom of Saudi Arabia, the main strategy is the application of Islamic law. Of course, I understand and respect that each country must do as it sees fit within its mores and laws, but I imagine that readers will be interested to learn that this is the sole approach. Most workers in the field agree that attempts should be made at partner notification/contact tracing, but this is not mentioned in the text and I wonder if the author could comment on this in a revised version of this article.

Response: I added a new paragraph (paragraph 5) under the discussion section as follows: “Strategies to prevent STIs in Saudi Arabia include health education, early diagnosis and treatment, contact tracing, routine screening of blood and organ donors, pregnant women, newborns of infected mothers, prisoners, intravenous drug users, patients with other sexually transmitted infections, and expatriates pre-employment, for HIV, syphilis, and viral hepatitis B and C. Partners of patients with STIs are informed and counseled on the appropriate preventive measures and the required tests and, when necessary, treatment. Partners of patients with nongonococcal urethritis, trichomoniasis, or gonococcal urethritis are empirically treated for these infections.”

8. While I note the remark that it is practice to "implement the Islamic penalties on those involved in such illegal acts", I think it would be helpful to readers to know exactly what these penalties are, and if they are implemented across the board.

Response: These penalties are vast and are beyond my specialty or capabilities to explain. For example, from my general knowledge, the penalties for those who commit adultery (non marital sex between a woman and a man) range from just whipping (for those who are not married) to execution (for those who are married). However, these penalties will only be implemented if the act of illegal sexual intercourse was witnessed by four people, which is practically almost impossible. Such penalties, albeit rarely implemented because of the conditions that need to be fulfilled, are scary enough to make most people with weak faith to stay away from adultery. On the other hand, the penalty for adults involved in homosexuality is execution of both partners regardless of whether they are married to women. Again, the actual act of anal intercourse has to be witnessed by four people for the partners to be punished. The penalties for drug abuse usually involves whipping and
do not reach to execution. Of course, detoxification and treatment are always offered to addicts in special hospitals referred to as “Al-Amal hospitals” (Al-amal means “Hope” in Arabic). The penalties for those involved in drug smuggling are vast but in Saudi Arabia, it can reach up to execution. Because of such diversity of rules and penalties and the fact that I am not specialized in Islamic law, I would rather not include this clarification in the manuscript, unless so requested by Dr Bingham.

You have a reference 8 in the text, but it is not listed in the list of references. Please include that

Response: reference 2 and 3 in the original manuscript were both given the same number (no. 2) by mistake. The mistake was corrected and the references numbered 3 to 7 were corrected to 4 to 8.

I note that only the years 1995-1999 are included in the report. Is no more up to date information available?

Response: Please refer to my response to the first comment.

Reviewer: Dr Peter Gray

1. The background, consisting of one paragraph, seems too short. I would recommend moving material from the first paragraph of the Discussion to the introduction. A reorganized introduction could, then, begin with a paragraph on the under-recognized health problems of STIs and reasons for the difficulties tracking them; follow with a second paragraph providing, despite the tracking difficulties, the international data on STIs (largely from the Discussion paragraph), then move into a third paragraph on the relative paucity of data on STIs in Islamic countries. In such a third paragraph, it would be worth addressing reasons why such data from Islamic countries are not readily available.

Response: As requested a second paragraph was added to the Introduction (paragraph 2) moved largely from paragraph 1 of the Discussion as follows:” Despite the tracking difficulties, the estimated global annual incidence of curable STIs (excluding HIV and viral hepatitis) is 333 million cases; gonococcal infections, 62 million cases, chlamydial infections, 89 million cases, syphilis, 12 million cases, and trichomoniasis, 170 million cases [1]. In the United States, estimates in 1999 indicated that more than 65 million people were living with incurable STIs and that 15 million people become infected with one or more STI each year, roughly half of whom contract lifelong infections [2]. Approximately one-fourth of these new infections were in teenagers. And while some STIs, such as syphilis, were brought to all time lows, others, like genital herpes, gonorrhea, and chlamydia, continued to resurge and spread through the population in the United States [3].”
The following underlined statement was also added to the 3rd paragraph: “Information about STIs in Islamic countries, where non-marital sex and homosexuality are prohibited by religion, is notably limited. An assumed low prevalence of STIs and religious and cultural intolerability of non-marital sex and homosexuality in Islamic countries are expected reasons for the limited data. Detailed information on human immunodeficiency virus (HIV) in Saudi Arabia (SA) was recently published for the first time from such a country [4]. However, data on other STIs from this Islamic country have not been published. This study describes the results of surveillance activities for STIs that have been underway in SA from January, 1995 through December, 1999, and the preventive strategies adopted by the country.”

2. In the Methods, can the author expand on the backgrounds (e.g., countries/regions of origin and religious affiliation) of non-Saudi nationals?

Response: Unfortunately, these important details are not available.

3. The paper appears to use interchangeably (a) the number of cases of STIs (e.g., in the Abstract) and (b) number of people presenting with an STI (e.g., Table 1 label of “Total number of patients”). If some patients presented with more than one STI (e.g., syphilis and HIV), then these numbers cannot be used interchangeably. Could the author resolve this issue?

Response: The following changes were made to resolve this issue:

I. All figures’ labels were changed from “Number of Patients” to “Number of Infections”.

II. The labels of Table 1 were changed as follows: “Number of Saudi patients” to “Number of infections among Saudi patients”, “Number of non-Saudi patients” to “Number of infections among non-Saudi patients”, and “Total number patients” to “Total number infections”.

III. The word “cases” was replaced with “infections” in the Result section of the abstract as follows: “Reported STIs included nongonococcal urethritis (14557 infections, 37.3%), trichomoniasis (10967 infections, 28.1%), gonococcal urethritis (5547 infections, 14.2%), syphilis (3385 infections, 8.7%), human immunodeficiency virus (2917 infections, 7.5%), genital warts (1382, 3.5%), genital herpes (216 infections, 0.6%), and chancroid (78 infections, 0.2%).”

IV. The word “cases” was replaced with “number” in all Figures’ legends which were reworded as follows:

a. Figure 1. Annually reported number of non-gonococcal urethritis infections in Saudi Arabia from 1995 to 1999.

b. Figure 2. Annually reported number of trichomoniasis infections in Saudi Arabia from 1995 to 1999.

c. Figure 3. Annually reported number of gonorrhea infections in Saudi Arabia from 1995 to 1999.
d. **Figure 4.** Annually reported number of syphilis infections in Saudi Arabia from 1995 to 1999.

e. **Figure 5.** Annually reported number of HIV infections in Saudi Arabia from 1995 to 1999.

f. **Figure 6.** Annually reported number of genital warts infections in Saudi Arabia from 1995 to 1999.

g. **Figure 7.** Annually reported number of genital herpes infections in Saudi Arabia from 1995 to 1999.

h. **Figure 8.** Annually reported number of chancroid infections in Saudi Arabia from 1995 to 1999.

4. **Can the Results be broken down by gender (male/female) and age groups?** Because the Abstract and Conclusions emphasize the importance of intervention programs targeting the youth, it would be helpful to see data comparing the incidence of STIs in youths vs. other age groups.

Response: Information on age and gender was available for only HIV infected cases (published in the following paper: Madani TA, Al-Mazrou YY, Al-Jeffri MH, Al-Huzaim NS. Epidemiology of the human immunodeficiency virus in Saudi Arabia; 18-year surveillance results and prevention from an Islamic perspective. *BMC Infectious Diseases* 2004, 4:25). Unfortunately, for other STIs, data on age and gender are not available.

5. **Is it possible to standardize the data in this Saudi Arabian study with international data to enable direct comparison of the incidence of various STIs in Saudi Arabia with the incidence of these same STIs globally (or in other regions/countries)? If so, this would strengthen statements such as “The incidence of STIs in SA was found to be low (p.9).”**

Response: Three columns were added to table 1 to show the average annual incidence of STIs per 100 000 Saudi, non-Saudi, and total population. The table title was accordingly changed to “Table 1: Total number and average annual incidence of sexually transmitted infections per 100 000 population in Saudi Arabia from 1995 to 1999.” The following account was added to the 1st paragraph of the Discussion section: “The incidence of STIs in SA was found to be low when compared to other countries such as the United States. For example, in 1999, the average incidence of gonorrhea per 100,000 population in the United States was 131.4, whereas, in Saudi Arabia, it was 4.9 [3]. It estimated that 5.5 million cases of genital warts, 5 million cases of trichomoniasis, 3 million cases of nongonococcal urethritis, 1 million cases of herpes, 650,000 cases of gonorrhea, and 70,000 cases of syphilis are reported every year in the United States [3]. It is possible that the data in SA, as the case in the United States, underrepresented the actual magnitude of STIs in this country because of the possibility of underreporting. In the United States, for example, the cases of gonorrhea reported to the Centers for Disease Control and Prevention are believed to represent about half of the annual infections [3]. However, while an underestimate of actual cases, these data provide a good indication of trends in STIs.”
The Results section of the abstract was revised as follows: “Results: A total of 39049 STIs were reported to the Ministry of Health. Reported STIs included nongonococcal urethritis (14557 infections, 37.3%), trichomoniasis (10967 infections, 28.1%), gonococcal urethritis (5547 infections, 14.2%), syphilis (3385 infections, 8.7%), human immunodeficiency virus (2917 infections, 7.5%), genital warts (1382, 3.5%), genital herpes (216 infections, 0.6%), and chancroid (78 infections, 0.2%). The average annual incidence of STIs per 100,000 population for Saudis and non-Saudis, respectively, was as follows: 14.8 and 7.5 for nongonococcal urethritis, 9.4 and 10.4 for trichomoniasis, 5.2 and 4.2 for gonorrhea, 1.7 and 6.4 for syphilis, 0.6 and 8.0 for HIV, 1.4 and 0.7 for genital warts, 0.1 and 0.4 for genital herpes, and 0.1 and 0.1 for chancroid. The incidence of STIs was somewhat steady over the surveillance period except for nongonococcal urethritis which gradually increased.”

6. The Discussion can be modified in several ways. Importantly, some of the text in the Discussion concerning the control, both internationally and in Islamic countries, of STIs, very closely resembles the Discussion of a paper previously published by Dr. Madani and colleagues in BMC Infectious Diseases 4:25. The redundant material in the present manuscript’s Discussion can be shortened and, ideally, updated to make it sufficiently different from the earlier paper’s Discussion material.

Response: The 1st paragraph of the Discussion section was revised as follows: “Data on STIs in SA and other Islamic countries are very limited. Detailed information on the epidemiology of HIV infection in SA has recently been published [4]. However, data on other STIs in SA have not been published. The current study described the incidence of STIs in SA over a five-year period of surveillance. The incidence of STIs in SA was found to be low when compared to other countries such as the United States. For example, in 1999, the average incidence of gonorrhea per 100,000 population in the United States was 131.4, whereas, in Saudi Arabia, it was 4.9 [3]. It estimated that 5.5 million cases of genital warts, 5 million cases of trichomoniasis, 3 million cases of nongonococcal urethritis, 1 million cases of herpes, 650,000 cases of gonorrhea, and 70,000 cases of syphilis are reported every year in the United States [3]. It is possible that the data in SA, as the case in the United States, underrepresented the actual magnitude of STIs in this country because of the possibility of underreporting. In the United States, for example, the cases of gonorrhea reported to the Centers for Disease Control and Prevention (CDC) are believed to represent about half of the annual infections [3]. However, while an underestimate of actual cases, these data provide a good indication of trends in STIs. Of note, however, that the HIV data likely closely represented the actual magnitude of HIV in SA during the surveillance period because of the known good adherence of health-care providers and laboratories to notification of HIV infection in particular [4].”

The 2nd paragraph of the Discussion section was revised as follows: “The incidence of STIs varied widely between Saudis and non-Saudis. Nongonococcal and gonococcal
urethritis, and genital warts were more frequently reported among Saudis, whereas HIV, syphilis, and genital herpes were more frequently reported among non-Saudis. One possible explanation of the higher incidence of HIV and syphilis among non-Saudi population is the fact that all non-Saudi workers are routinely screened for these infections pre-employment and every two years, thereafter, to have their legal residence permits renewed. The incidence of STIs had been somewhat steady over the surveillance period except for nongonococcal urethritis which had gradually increased.”

A new paragraph (3rd paragraph) was added to the Discussion section as follows:
“Strategies to prevent STIs in Saudi Arabia include health education, early diagnosis and treatment, contact tracing, routine screening of blood and organ donors, pregnant women, newborns of infected mothers, prisoners, intravenous drug users, patients with other sexually transmitted infections, and expatriates pre-employment, for HIV, syphilis, and viral hepatitis B and C. Partners of patients with STIs are informed and counseled on the appropriate preventive measures and the required tests and, when necessary, treatment. Partners of patients with nongonococcal urethritis, trichomoniasis, or gonococcal urethritis are empirically treated for these infections.”

The following paragraph was omitted “The international efforts to control STIs have failed on a global scale to decrease the incidence of STIs despite their partial success in some countries. Limitation of resources in underdeveloped countries makes health education and other preventive strategies difficult to implement. Additionally, the limited access to therapy in the underdeveloped countries has compounded the problem and perhaps contributed to the spread of STIs. The ever-decreasing religious values, the ever-increasing ease of international transportation and communication, and the increasing poverty and unemployment are the main driving forces for non-marital sex throughout the world.”

Paragraph 5 of the Discussion section was revised as follows: “Strategies to prevent STIs in Islamic countries have to abide by the Islamic rules and values and should include strengthening of Islamic and health education, encouraging people to follow and implement the Islamic rules and values that prohibit adultery and homosexuality, and to practice safe sex only through legal marriage. Helping the youth to get married and reducing the cost of marriage are also strongly recommended in Islam and should be the responsibility of both governmental and non-governmental charitable organizations and the population at large. There are several charitable programs in SA successfully helping thousands of young men and women to get married with the cost entirely covered by donations.”

Paragraph 6 was revised as follows: “Other aspects in Islam to prevent non-marital sex include allowing men to be married to up to four women and permitting adolescents to get married with no age limit for marriage. Additionally, Islam obliges women to cover themselves with veils (Hijabs) and to be segregated from men in educational institutes and other gathering places to prevent provocation of men. Islam also fights poverty, a driving force for commercial sex and prostitution, through a well established system of obligatory charity, known as “Zakat”, and voluntary charity, known as “Sadaqa”, taken
from the rich people and given to the poor and needy. Additionally, Islam obliges the rulers to eliminate all means and factors that are conducive to indulging in non-marital sex and intravenous drug use such as sex trade and prostitution and to implement the Islamic penalties on those involved in such illegal acts.”

**7. More of the Discussion section should focus on interpreting the findings. Can the author expand on any potential biases in the data set (e.g., the paper notes that STIs may have been underreported, but further attention to this issue with respect to this particular data set would be helpful)? Can the author interpret why some STIs were more common among Saudi nationals, and others the reverse? If data can be broken down according to gender and age groups, these findings can be discussed.**

Response: The 1st paragraph of the Discussion section was revised as follows: “Data on STIs in SA and other Islamic countries are very limited. Detailed information on the epidemiology of HIV infection in SA has recently been published [4]. However, data on other STIs in SA have not been published. The current study described the incidence of STIs in SA over a five-year period of surveillance. The incidence of STIs in SA was found to be low when compared to other countries such as the United States. For example, in 1999, the average incidence of gonorrhea per 100,000 population in the United States was 131.4, whereas, in Saudi Arabia, it was 4.9 [3]. It estimated that 5.5 million cases of genital warts, 5 million cases of trichomoniasis, 3 million cases of nongonococcal urethritis, 1 million cases of herpes, 650,000 cases of gonorrhea, and 70,000 cases of syphilis are reported every year in the United States [3]. It is possible that the data in SA, as the case in the United States, underrepresented the actual magnitude of STIs in this country because of the possibility of underreporting. In the United States, for example, the cases of gonorrhea reported to the Centers for Disease Control and Prevention (CDC) are believed to represent about half of the annual infections [3]. However, while an underestimate of actual cases, these data provide a good indication of trends in STIs. Of note, however, that the HIV data likely closely represented the actual magnitude of HIV in SA during the surveillance period because of the known good adherence of health-care providers and laboratories to notification of HIV infection in particular [4].”

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Please see also my response to comment no. 4 of Dr Gray.
8. Some minor typographical suggestions: Background of Abstract: (Data…are limited.); Second paragraph of Discussion (p.9): (Data on STIs…are very limited.); Same paragraph: (However, data on other STIs in SA have not been published.

Response: All corrected as suggested.

Finally, I wish the revised manuscript satisfies the reviewers and to be accepted for publication in this journal.

Thank you

Sincerely,

Tariq A. Madani (author)