

Original Article

Knowledge and attitude towards Herpes Simplex Virus-2 in Al-Jouf region, Saudi Arabia

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Abstract

Introduction: Herpes simplex virus type-2 (HSV-2) infection is a sexually transmitted disease (STD) that causes genital ulcers. The prevalence of HSV-2 increases because of its asymptomatic shedding. This study aimed to evaluate community knowledge and attitude toward HSV-2 infection in Al-Jouf region.

Methodology: 410 participants were enrolled in the study and they filled out a questionnaire on HSV-2 and its complications.

Results: Of the 410 participants, 106 individuals were excluded from the study because they resided outside Al-Jouf. Of the remaining 304 participants, 56% were females, 44% were aged between 21–30 years, 84% were university graduates, 56% were single, and 40% were married. Only 58% of participants knew that HSV-2 is an STD, and less than 50% knew that HSV-2 infection can occur many times and can be transmitted from asymptomatic individuals. Regarding their attitude, only 32.5% participants agreed to use a condom if they had sores, 27% agreed to use the condom if they had more than one wife, and more than half of participants responded that they did not know.

Conclusions: A considerable proportion of the youth (21–30 years old) did not know that HSV-2 infection is an STD that can occur many times, may remain asymptomatic, and is transmitted from asymptomatic partners or from the mother to her fetus. They were also not aware how to protect themselves from this infectious disease. Thus, educational and health awareness campaigns are required to raise the level of knowledge on HSV-2 infection, including its prevention, and control.

Key words: HSV; sexually transmitted diseases; knowledge; attitude; Al-Jouf region; Saudi Arabia.

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Introduction

Herpes simplex virus (HSV) is a DNA virus, and a member of the Herpesviridae family. It is transmitted mainly through direct contact with the viral particles in sores, saliva, or oral surfaces of the infected patient during oral-oral or oral-genital contact causing oral herpes or genital herpes, respectively [1,2].

Globally, HSV infections have been reported among 67% of people under the age of 50 years [1], and the most prevalent human HSVs are type 1 and 2 (HSV-1 and HSV-2, respectively). They cause a variety of diseases, including cold sores, genital herpes, herpes stromal keratitis, meningitis, and encephalitis [3].

Genital herpes, caused by HSV-2, is a sexually transmitted disease (STD) that is associated with genital ulcers. Most HSV-2 infections (about 70%) are asymptomatic or show mild symptoms and are more vulnerable to HIV acquisition. Despite increased public awareness and the initiation of efforts to prevent its transmission, the prevalence of HSV-2 continues to

increase, particularly in the presence of epidemiological synergy with HIV/AIDS. What makes HSV so difficult to control is that most sexual and perinatal transmission occurs during a period of unrecognized or asymptomatic shedding [4].

An assessment of the community's awareness about HSV-2 risk factors, manifestations, complications, and ways of disease prevention is essential in order to manage the spread of this disease. Appropriate coherent prevention and control strategies depend mainly on the community needs, and analyses of real time data. Thus, the current study aimed to assess the knowledge, and attitudes of the local community towards HSV-2 and HSV-2-associated STDs in Al-Jouf region, Saudi Arabia.

Methodology

We conducted a questionnaire-based cross-sectional study. The Local Committee of Bioethics (LCBE), Jouf University approved the research

proposal (No. 3-07-44, on 27 Feb 2023). We distributed an online questionnaire to employees, householders, university students, workers, and educated persons in the Al-Jouf region during the period between March and September 2023.

Any person who was a resident of the Al-Jouf region and over 18 years of age could be included in this study. A total of 304 participants (74.1% of respondents) were enrolled in the study.

Data collection

We used an open-source and validated questionnaire on HSV and HSV-associated STDs [5,6]. The questionnaire included 4 sections: section 1 was a short summary of the research aim and approval to participate in the study; section 2 requested participants’ sociodemographic data (including age, gender, education level, marital status, and occupation); section 3 included questions on HSV (including general information, manifestations, transmission, treatment, and neonatal infection); and section 4 included questions on STDs.

The Statistical Package for the Social Sciences (SPSS) version 21 (IBM Corp, Armonk, NY, USA) was used to analyze the data. The level of significance was determined at $p < 0.05$.

Results

Demographic data

A total of 410 participants filled out the questionnaire, and 106 (35.9%) were excluded because they were residents of areas outside Al-Jouf region. Of the selected 304 participants (74.1%), 56% were females and 44% were aged between 21–30 years. A high percentage of participants graduated from the university (84%), and the educational levels of their fathers (46%) and mothers (45%) were also high. In terms of participants’ marital status, 56% were single, and 40% were married (Table 1).

Knowledge and attitude towards HSV-2 and STD

The responses to the questions regarding HSV-2 indicated that 58% of participants knew that HSV-2 is an STD and 40% did not know this. 50% of the respondents did not know that HSV-2 infection can occur more than once, they can get infected with genital herpes, and that HSV-2 can be transmitted from any asymptomatic individual (Table 2). Regarding perinatal transmission, more than 50% of the participants did not know if a pregnant woman can transmit genital herpes to her newborn baby, and its impact on the baby (Table 2).

In terms of their attitude, if they or their partners had HSV-2 infection, only 32.5% agreed to using a condom if they had any sores and 27% agreed on the use of a condom in case of having more than one wife; more than half of the participants did not have knowledge about this (Table 3).

Finally, when asked about the source of their information on HSV-2 and STD, the participants indicated that 54% received their information from the internet, 17% from their parents, 11% from television, 10% from an educational campaign, and 8% from schools. Thus the proportion receiving information from schools was very low.

Discussion

Globally, there is no cure for genital herpes. Thus, effective educational and prevention interventions that include measures such as health education and screening programs are essential [7]. The level of knowledge, attitude, and practices towards HSV-associated STDs are key constituents of individuals’ safety and quality care and can vary across our communities. Therefore, it is important to know the level of community awareness and attitude towards HSV-2 infection and its complications in order to be able to decide what an effective preventative program would require.

Table 1. Demographic data of participants.

| Demographic data | n | % |
|---|-----|-------|
| Gender | | |
| Female | 171 | 56.0 |
| Male | 133 | 44.0 |
| Age (years) | | |
| 18–20 | 48 | 15.5 |
| 21–30 | 133 | 44.0 |
| 31–40 | 47 | 15.5 |
| > 40 | 76 | 25.0 |
| Residency | | |
| In Al-Jouf region | 304 | 100.0 |
| Educational level | | |
| Intermediate | 6 | 2.0 |
| Primary | 2 | 1.0 |
| Secondary | 40 | 13.0 |
| University | 256 | 84.0 |
| Educational level of your father | | |
| Intermediate | 33 | 10.0 |
| Primary | 58 | 20.0 |
| Secondary | 73 | 24.0 |
| University | 140 | 46.0 |
| Educational level of your mother | | |
| Intermediate | 41 | 13.0 |
| Primary | 88 | 27.0 |
| Secondary | 47 | 15.0 |
| University | 128 | 45.0 |
| Marital status | | |
| Divorced | 10 | 3.0 |
| Married | 122 | 40.0 |
| Single | 169 | 56.0 |
| Widow | 3 | 1.0 |

A study was conducted in the UK to evaluate the epidemiology and attitude towards genital herpes infection and its serotyping, before and after counseling among STD clinic attenders in Coventry [8]. The study reported that HSV-2 antibody test was positive in 20% (18% for males and 21% for females), and HSV-1 antibody test was positive in 60% of both genders [8]. HSV-2 seropositivity was higher among black people and those with a history of genital herpes. HSV-1

seropositivity was independently associated with lower levels of education, increased years of sexual activity (between 14–25 years), and history of cold sores. The majority of patients requested that this test be available in the clinic and 97% accepted the test when offered. The researchers concluded that HSV-2 infection is common and largely unrecognized among the study population. In addition, the vast majority of the study population accepted the test when offered and agreed that counseling could improve patients' awareness of the infection [8]. Furthermore, it was reported that HSV-2 positive patients have an increased risk of acquiring HIV infection due to the disruption of the genital mucosa in patients with genital ulcer disease and the decreased immunity in HSV-2 positive individuals [9].

In Saudi Arabia, there are only few reports that describe the prevalence of HSV-2 infection and the level of community awareness about HSV-2 being a cause of sexually transmitted genital herpes. Thus, this study aimed to evaluate the level of awareness about HSV-2 — including its mode of transmission, symptoms and complications — among employees,

Table 2. Knowledge about herpes simplex virus-2 (HSV-2).

| Questions about HSV-2 | n | % |
|--|-----|------|
| 1. Genital herpes is an STD. | | |
| Do not know | 122 | 40.0 |
| No | 5 | 2.0 |
| Yes | 177 | 58.0 |
| 2. There is a chance that you can get infected over and over | | |
| Do not know | 157 | 51.0 |
| No | 43 | 14.0 |
| Yes | 104 | 35.0 |
| 3. You can have genital herpes and not know it/not have symptoms | | |
| Do not know | 145 | 47.0 |
| No | 69 | 23.0 |
| Yes | 90 | 30.0 |
| 4. There are drugs that treat the symptoms. | | |
| Do not know | 130 | 42.5 |
| No | 19 | 7.0 |
| Yes | 155 | 50.5 |
| 5. There are drugs which cure genital herpes completely. | | |
| Do not know | 178 | 59.0 |
| No | 45 | 14.5 |
| Yes | 81 | 26.5 |
| 6. People are contagious when they have symptoms. | | |
| Do not know | 149 | 49.0 |
| No | 69 | 23.0 |
| Yes | 86 | 28.0 |
| 7. People can be contagious even when they don't have symptoms. | | |
| Do not know | 175 | 58.0 |
| No | 42 | 13.5 |
| Yes | 87 | 28.5 |
| 8. People can get genital herpes from oral sex. | | |
| Do not know | 168 | 55.0 |
| No | 41 | 13.5 |
| Yes | 95 | 31.5 |
| 9. If you or your partner have genital herpes, you need to use a condom if you have multiple wives. | | |
| Do not know | 175 | 58.0 |
| No | 46 | 15.0 |
| Yes | 83 | 27.0 |
| 10. If you or your partner has genital herpes, you need a condom if you have sores. | | |
| Do not know | 169 | 55.0 |
| No | 37 | 12.5 |
| Yes | 98 | 32.5 |
| 11. A pregnant woman can give genital herpes to her newborn baby. | | |
| Do not know | 174 | 57.5 |
| No | 69 | 22.0 |
| Yes | 61 | 20.5 |
| 12. If a baby gets herpes from his/her mother, it is no big deal. | | |
| Do not know | 174 | 57.5 |
| No | 69 | 22.0 |
| Yes | 61 | 20.5 |
| 13. If a baby gets herpes from his/her mother, the baby can die from it. | | |
| Do not know | 180 | 59.0 |
| No | 23 | 7.5 |
| Yes | 101 | 33.5 |

STD: sexually transmitted disease.

Table 3. Knowledge and attitude towards HSV-2-associated STDs.

| Questions about STDs | n | % |
|--|-----|------|
| 1. Are STDs treatable? | | |
| Do not know | 98 | 32.0 |
| No | 41 | 13.0 |
| Yes | 165 | 55.0 |
| 2. Do you know how to protect yourself from STDs? | | |
| Do not know | 84 | 27.0 |
| No | 31 | 10.0 |
| Yes | 189 | 63.0 |
| 3. Do you think that condoms provide 100% protection from STDs? | | |
| Do not know | 93 | 32.0 |
| No | 151 | 49.0 |
| Yes | 60 | 19.0 |
| 4. Would you like to know if you already acquired any STDs? | | |
| I don't know | 94 | 31.0 |
| No | 83 | 27.0 |
| Yes | 127 | 42.0 |
| 5. Do you think you have the right to know if your partner has any STD? | | |
| I don't know | 74 | 24.0 |
| No | 24 | 7.0 |
| Yes | 206 | 69.0 |
| 6. Do you think you should consider studying these diseases in school? | | |
| I don't know | 43 | 15.0 |
| No | 17 | 5.0 |
| Yes | 244 | 80.0 |
| 7. If you found out your partner has acquired one of the STDs, what would you do? | | |
| Get a checkup | 139 | 45.0 |
| Ask him/her to get treated | 142 | 46.0 |
| Avoid sexual contact | 148 | 48.0 |
| Ask for divorce | 62 | 20.0 |
| I don't know | 34 | 11.0 |
| Do nothing | 9 | 3.0 |

HSV-2: herpes simplex virus-2; STD: sexually transmitted disease.

householders, university students, workers, and educated persons in Al-Jouf, to be able to design appropriate health education programs that better address their needs. Out of the 304 participants, 58% knew that HSV-2 is an STD, and 40% did not know this fact. About 50% did not know that HSV-2 infection can occur many times; they can get infected with asymptomatic genital herpes; and HSV-2 can be transmitted from asymptomatic persons, or the mother to her fetus. Furthermore, only 32.5% agreed to use a condom if they had any sores and 27% agreed to use a condom in case they had more than one wife; while more than half of participants did not know about the use of condoms.

These results were in agreement with studies conducted in different parts of the world [6,10–13]. Pica and Volpi [10] reported that 20–40% of the population suffered from recurrent herpes labialis, although few reports have addressed the public awareness of this infection in the general population. They aimed to determine the level of public awareness and knowledge on herpes labialis. They found that 89% of those surveyed had some knowledge of herpes labialis, and the majority of those who suffered from herpes labialis self-medicated using a topical therapy. Women were more likely to recognize the disease and to seek medical advice [OR 1.38 (1.12–1.70)].

Fageeh evaluated the prevalence of STIs among HSV-positive patients at a tertiary hospital in Jeddah and found that 57.9% of HSV-positive females had their genital ulcers diagnosed during labor [11]. One newborn developed neonatal herpes with subsequent delayed psychomotor development. Genital herpes was also diagnosed in one patient's partner; however, there was no documentation of screening for STIs in the partners of other patients. They concluded that STDs are common among HSV-positive patients in the King Abdulaziz University Hospital. The author recommended adoption of the STD screening protocol for the partners of persons who are positive for any STI, because early detection and appropriate treatment can improve the outcome [10].

Looker *et al.* reported that HSV-2 infection among adolescents and adults may present with painful genital ulcers, and among neonates HSV-2 infection may be fatal [12]. The authors reviewed published literature of HSV-2 prevalence studies worldwide, from 2003 to 2012, and reported that in 2012, about 417 million people aged 15–49 years were living with HSV-2 infection (11.3% global prevalence), of whom 267 million were women [12]. The highest burden was in Africa. It was concluded that the global burden of HSV-

2 infection is large, leaving over 400 million people at increased risk of genital ulcer, HIV acquisition, and transmission of HSV-2 to partners or neonates. These estimates highlight the critical need for the development of vaccines, microbicides, and other new HSV prevention strategies.

Korr *et al.* have assessed the changes in the HSV1/2 seroprevalence in Germany [13] and reported that the overall, HSV1 seroprevalence decreased significantly from 1997–1999 (82.1%) to 2008–2011 (78.4%). In the same period, overall HSV2 seroprevalence decreased from 13.3% to 9.6%, notably among 18–24-year-old men (10.4 to 0%) in East Germany. Women were more likely than men to be seropositive for HSV1 or HSV2. A lower level of education and smoking were associated with HSV1 in both genders. Women of older age, who smoked, or had a history of abortion; and men of older age were more often seropositive for HSV2. They concluded that despite the decrease in HSV1/2 seroprevalences, there were still people susceptible to genital HSV1/2 infections and practitioners should be aware of HSV infection as a differential diagnosis for genital ulcers. They suggested the implementation of educational programs to raise awareness on the sexual transmission route of HSV1/2, possible consequences, and prevention; especially for pregnant women, their partners, and people at risk of HIV.

El-Tholoth *et al.* concluded that STDs are one of the most serious diseases worldwide [6]. Despite the low incidence of STDs in Saudi Arabia, there is an increased risk of exposure due to more individuals travelling overseas for education. They conducted a cross-sectional survey to assess the knowledge and attitude among the Saudi youth toward STDs. They reported that among 5,040 responses, 71.7% gained their knowledge about STDs from the internet and only 43.61% knew that HSV is an STD. Only 55% of the participants considered themselves capable of protecting against STDs and 95.8% agreed that information on STDs should be taught in schools. They concluded that there is a lack of participant knowledge regarding the HSV-associated STDs and ways of protection; and they recommended organizing awareness programs.

Conclusions

A large proportion of our young (21–30 years old) participants did not know that HSV-2 infection is an STD that can occur many times, can remain asymptomatic, can be transmitted from asymptomatic partners or from the mother to her fetus, and were unaware on how to protect themselves from this

disease. We conclude that designing and implementing health education and medical campaigns are required to raise awareness about HSV-2 infection, its prevention, and control, particularly among the deprived communities.

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Data availability

The raw data supporting the conclusions of this article are available with the authors.

Ethics statement

Ethical approval for the research proposal was provided by the Local Committee of Bioethics (LCBE), Jouf University (No. 3-07-44, on 27 Feb 2023). The participants provided their consent by checking the agreement in the first section of the questionnaire.

Authors' contributions

All authors participated in the study conception and design, data analysis and interpretation, drafting of the manuscript revision of the manuscript and critical revision for important intellectual content.

Data acquisition: MAA, OKA, SDA, AHA, AYA, AMA, AKMA; statistical analysis: YAS; administrative, technical, and material support, and supervision: AAG.

References

- World Health Organization, WHO (2024) Herpes simplex virus. Available: <https://www.who.int/news-room/fact-sheets/detail/herpes-simplex-virus>. Accessed: 6 November 2024.
- Samies NL, James SH (2020) Prevention and treatment of neonatal herpes simplex virus infection. *Antiviral Res* 176: 104721. doi: j.antiviral.2020.104721.
- Zhu S, Viejo-Borbolla A (2021) Pathogenesis and virulence of herpes simplex virus. *Virulence* 12: 2670–2702. doi: 10.1080/21505594.2021.1982373.
- Keller MJ, Tuyama A, Carlucci MJ, Herold BC (2005) Topical microbicides for the prevention of genital herpes infection. *J Antimicrob Chemother* 55: 420–423. doi: 10.1093/jac/dki056.
- Lewis LM, Rosenthal SL, Succop PA, Stanberry LR, Bernstein DI (1999) College students' knowledge and perceptions of genital herpes. *Int J STD AIDS*. 10: 703–708. doi: 10.1258/0956462991913376.
- El-Tholoth HS, Alqahtani FD, Aljabri AA, Alfaryan KH, Alharbi F, Alhowaimil AA, Alkharji A, Alrwaily A, Obied A, Al-Afraa T (2018) Knowledge and attitude about sexually transmitted diseases among youth in Saudi Arabia. *Urol Ann* 10: 198–202. doi: 10.4103/UA.UA_14_17.
- Tuddenham S, Hamill MM, Ghanem KG (2022) Diagnosis and treatment of sexually transmitted infections: a review. *JAMA* 327: 161–172. doi: 10.1001/jama.2021.23487.
- Narouz N, Allan PS, Wade AH, Wagstaffe S (2003) Genital herpes serotesting: a study of the epidemiology and patients' knowledge and attitude among STD clinic attenders in Coventry, UK. *Sex Transm Infect* 79: 35–41. doi: 10.1136/sti.79.1.35.
- Sartori E, Calistri A, Salata C, Del Vecchio C, Palù G, Parolin C (2011) Herpes simplex virus type 2 infection increases human immunodeficiency virus type 1 entry into human primary macrophages. *Virol J* 8: 166. doi: 10.1186/1743-422X-8-166.
- Pica F, Volpi A (2012) Public awareness and knowledge of herpes labialis. *J Med Virol* 84: 132–137. doi: 10.1002/jmv.22233.
- Fageeh WM (2013) Sexually transmitted infections among patients with herpes simplex virus at King Abdulaziz University Hospital. *BMC Res Notes* 6: 301. doi: 10.1186/1756-0500-6-301.
- Looker KJ, Magaret AS, Turner KM, Vickerman P, Gottlieb SL, Newman LM (2015) Global estimates of prevalent and incident herpes simplex virus type 2 infections in 2012. *PLoS One* 10: e114989. Erratum in: *PLoS One*. 2015; 10: e0128615. doi: 10.1371/journal.pone.0114989.
- Korr G, Thamm M, Czogiel I, Poethko-Mueller C, Bremer V, Jansen K (2017) Decreasing seroprevalence of herpes simplex virus type 1 and type 2 in Germany leaves many people susceptible to genital infection: time to raise awareness and enhance control. *BMC Infect Dis* 17: 471. doi: 10.1186/s12879-017-2527-1.

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