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Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women: A systematic review and meta-analysis

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Abstract

Introduction: Herpes simplex virus type 2 (HSV-2) infection is one of the most common human infections. The aim of this study was evaluated Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women.
Methods: The methods used in this systematic review are developed based on the Checklist Guidelines (PRISMA). The searches were conducted by two independent researchers and the objective was to find studies published from 1/1/2009 to 30/5/2019.
Results: According to the random effects model, the overall Seroepidemiology of Herpes simplex virus-2 in 1455 pregnant women was 4.8% (3.7- 5.9% at 95% confidence interval and I^2 = 99.5%).
Conclusion: Because of the asymptomatic removal of the virus from the female genitalia, especially during childbirth, there is a risk of transmission to the baby and subsequent infections in infants. This leads us to do cesarean delivery in asymptomatic seropositive mothers. In seropositive individuals, as there is a risk of transmitting the virus even without clinical symptoms to a sexual partner, Sexual intercourse should include health tips such as condom use in order to prevent the spread of the virus. Because the virus can severely affect the fetus and infant, and can have adverse consequences, seronegative mothers are advised to consider health tips to avoid the virus. Overall, observing ethical,religious and health issues as well as providing appropriate health education to people in the community can help prevent the spread of the virus.

Keywords: Herpes simplex virus-2, Epidemiology, Pregnancy, Females.

Introduction

Herpes simplex virus type 2 (HSV-2) infection is one of the most common human infections. Humans are the only natural repository of these viruses, and infection with the virus has been reported in most parts of the world (1). Between 80 and 100 percent of middle-class adults and 30-50 percent of upper-class adults in Western societies have had anti-HSV antibodies. In the United States alone in 2005, 20 percent of the population had anti-HSV-2 antibodies (2). HSV-2 is transmitted primarily in an asexual way and usually by contact with contaminated saliva. It belongs to the Herpesviridae family and to the sub-family of alpha herpes viruses andis transmitted through sexual contact and causes genital herpes, which is an acute infection in the male or female genital tract, and may be an initial infection or a recurrence of previous infection (3-5).Genital herpes is the third most common sexually transmitted disease in terms of prevalence after gonococcal and chlamydial infections (6). The virus is transmitted from an infected mother to the baby at the time of delivery, and is a major cause of genital herpes, neonatal herpes, and herpes simplex infection of the lower back (7). The transmission of the disease from mother to baby (neonatal herpes) occurs during childbirth andcausesdamage to eyes, skin, mouth, central nervous system and other internal organs, fetal growth restriction and even the death of the baby (8).

Therefore, it is of great importance to study the current status and viral markers in each country and determine its influencing factors for planning against the disease.

Methods

Inclusion Criteria (eligibility criteria)

The methods used in this systematic review are developed based on the Checklist Guidelines (PRISMA). Cross-sectional studies, case control study, and cohort study are included in this study and case reviews, letters to editors, case reports, clinical trials, study protocols, systematic reviews, and review studies are excluded.

Sampling Methods and Sample Size: All observational studies were included in the systematic review regardless of their design. The minimum sample size was 25 patients or more.

Search Strategy

The searches were conducted by two independent researchers and the objective was to find studies published from 1/1/2009 to 30/5/2019. Studies were searched in Cochrane Library and the English database, and studies published in MEDLINE were searched through PubMed, and those published in EMBASETM were searched through Ovid. We searched the national database of Magiran and SID to find studies published in Iran. To ensure the adequacy of the studies, a list of references or related reviews found through searches was studied. Systematic review studies were searched through MESH and open-ended terms in accordance with publication standards. After finalizing the MEDLINE strategy, the results were compared to search other databases, and PROSPERO was searched for recent or ongoing systematic reviews. The key words used in the search strategy include: Herpes simplex virus-2, Epidemiology, Pregnancy,Females.

Study Selection and Data Extraction

Two researchers independently analyzed the titles and abstracts of the studies according to eligibility criteria. After excluding additional studies, the full texts of the studies were analyzed based on eligibility criteria and information about authors were collected if necessary. General information (relevant author, province, and publication year), study information (sampling technique, diagnostic criteria, data collection method, research conditions, sample size and risk of bias) and exclusion criteria were collected.

Quality Assessment

Hoy et. al.'s developed scale was used to assess the quality of the method and the risk of bias of observational studies.

Data Collection

All eligible studies were included in the data collection after systematic review and data were integrated using the forest plot. The random effects model was evaluated based on the overall prevalence of the disease among the participants. The heterogeneity of the initial studies was assessed using I^2 test. In addition, subgroups were analyzed based on the participants' age, publication year, and country to determine heterogeneity. Finally, a meta-analysis was performed in STATA14 statistical software.

Study Selection

A total of 273 studies were extracted through initial searches in various databases. Among 273 studies identified by analyzing titles and abstracts, 232 studies were removed due to irrelevant titles. Of the remaining 42 studies, 5 met the study criteria. (Figure 1).

Research Properties

A total of 1455 patients undergoing dialysis were evaluated. Of the 5 studies, 4 were retrospective, 1 was prospective and the study design was not mentioned in the other study. A total of 5 studies from 5 provinces that met the inclusion criteria were evaluated. 5 studies conducted in Mashhad, kermanshah,save,Hamadan,Isfahanwere included in the study. Simple sampling method was used to select the sample (n = 5). In most studies the risk of bias was low. The main method of data collection was medical records. The main study sites were the hospitals (Table 1).

Meta-analysis of Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women: According to the random effects model, the overall Seroepidemiology of Herpes simplex virus-2 in 1455pregnant women was 4.8% (3.7- 5.9% at 95% confidence interval and I^2 = 99.5%)(Figure 2, Table 2).

Subgroup Analysis:

Meta-Regression Results:

Results of Meta-Regression Between Participants' year and Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women:

Regression of the study was analyzed based on the relationship between Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women and publication year. There was no significant linear trend in univariate meta-regression to explain the change in effect size of participants' age (Figure 3).

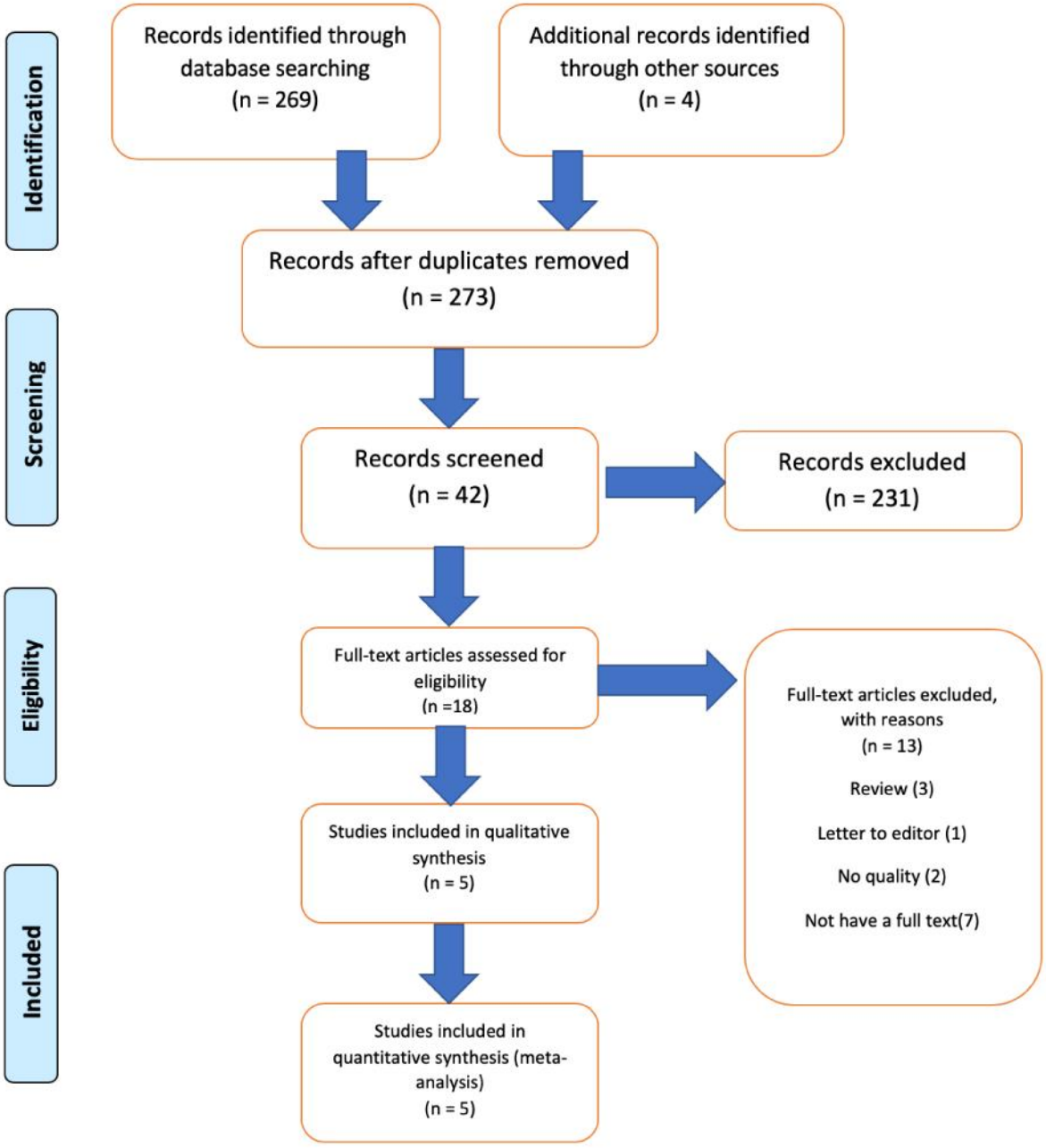

Figure 1. PRISMA flow diagram

Table 1. characteristics of the included studies

ID	Author	Province	Publications year	Number of patients	Mean of age
1	seyyed Mansour Altaha (18)	Kermanshah	2013	239	32.6
2	Fatemekave(19)	Saveh	2018	60	48
3	Masoud Sabouri (20)	Hamadan	2015	921	----
4	Fateme Habibi (21)	Mashhad	2014	135	--
5	Payam Ghasemi (22)	Isfahan	2009	100	---

Table 2:The meta-analysis of the Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women

First author	95% conf. interval				Publication year	Participants
	Down	Up	ES	Weight		
seyyed Mansour Altaha	0.022	0.078	0.050	15.29	2013	239
Fateme kave	-0.050	0.105	0.050	3.84	2018	60
Masoud Sabouri	0.036	0.064	0.50	58.87	2015	921
Fateme Habibi	-0.001	0.053	0.026	16.41	2014	135
Payam Ghasemi	0.034	0.126	0.080	5.59	2009	100
Pooled ES	0.037	0.059	0.048	100	----	239

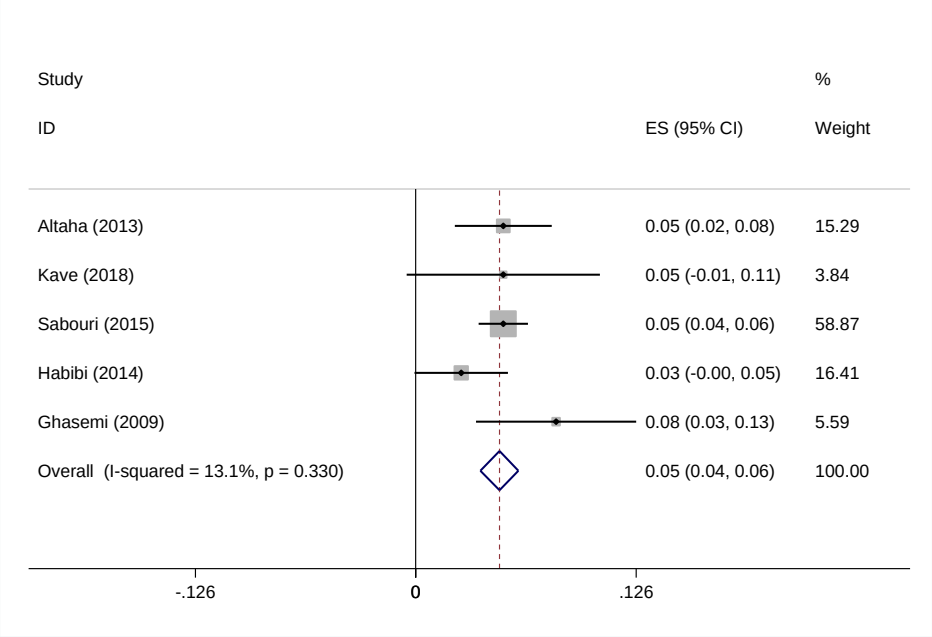

Figure 2. The meta-analysis of the Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women

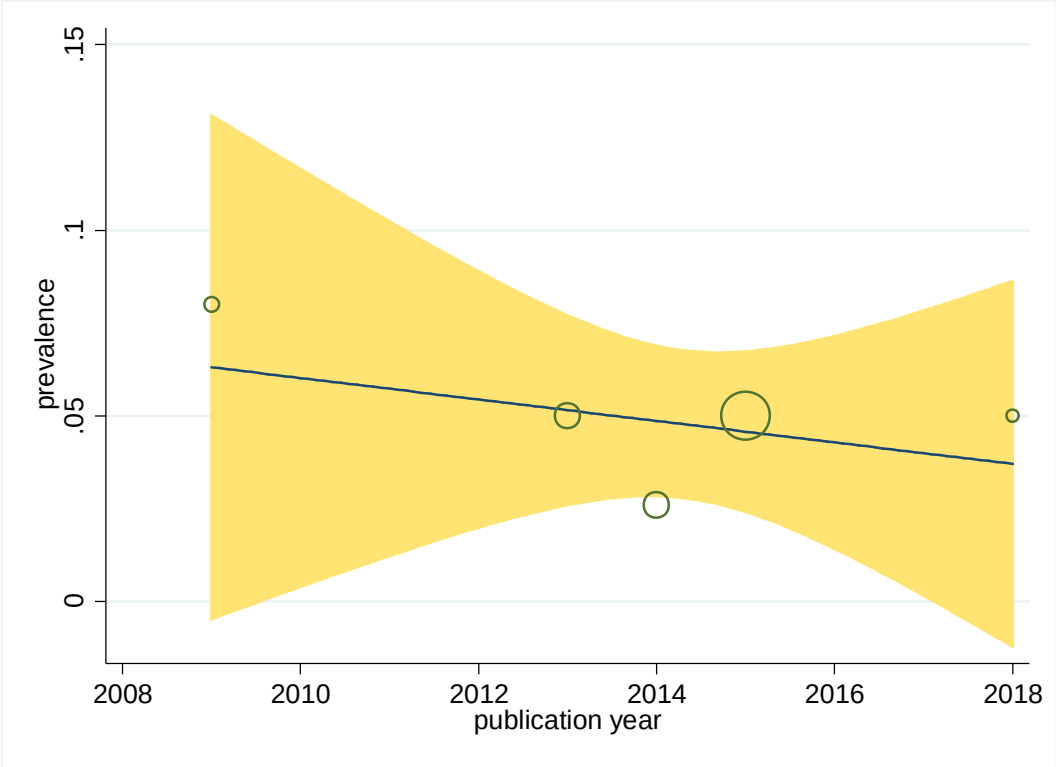

Figure 3.Meta-regression between publication year of study and the Seroepidemiology of Herpes simplex virus-2 among Iranian Pregnant women

Discussion

According to the random effects model, the overall Seroepidemiology of Herpes simplex virus-2 in 1455 pregnant women was 4.8% (3.7- 5.9% at 95% confidence interval and I^2 = 99.5%). Herpes simplexviruscan affect different parts of the body such as the lips, genitalia, skin, eyes and sometimes the central nervous system and other internalorgans including the lungs, liver, esophagus and so on (9). In congenital infection, in the early months of a fetus's life, herpes simplex virus may disrupt the formation of organs. It can also cause microcephaly, intracranial calcifications, chorioretinitis, cataract, liver calcification, heart defects and fetal growth restriction, and even the death of the baby (10-12). In most studies, 33 percent of neonatal herpes infections are caused by herpes simplex virus type 1 and 73 percent are caused by herpes simplex virus type 2.Generally, there has been a serotype outbreak,45.7% in blacks, 53.6% in Mexicans and 53% in whites (13-15).Most HSV infections are spontaneously controlled, last from a few days (for recurrent infections) to two to three weeks, and heal without scarring. Genital herpes, as a sexually transmitted disease, can have psychological consequences far beyond its physiological effects (16 and 17). Some HSV infections can be severe, and can cause serious complications without a prompt antiviral treatment. Life-threatening complications include neonatal herpes, herpes simplex encephalitis and HSV infections in immunocompromised patients, burn patients, infants, and children with severe malnutrition. Recurrent ocular herpes can lead to corneal scar and blindness.

Conclusion

Because of the asymptomatic removal of the virus from the female genitalia, especially during childbirth, there is a risk of transmission to the baby and subsequent infections in infants. This leads us to do cesarean delivery in asymptomatic seropositive mothers. In seropositive individuals, as there is a risk of transmitting the virus even without clinical symptoms to a sexual partner, Sexual intercourse should include health tips such as condom use in order to prevent the spread of the virus. Because the virus can severely affect the fetus and infant, and can have adverse consequences, seronegative mothers are advised to consider health tips to avoid the virus. Overall, observing ethical,religiousand health issues as well as providing appropriate health education to people in the community can help prevent the spread of the virus.

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