REVIEW ARTICLE

Seroepidemiology of Parvovirus B19 (PVB19) and Human Papillomavirus [HPV] 16 and 18 in Women with Abnormal Pregnancy Outcomes: A Review

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Abstract

Background: The role of Parvovirus B 19 (PVB19) and human papillomavirus (HPV) was not fully understood as there is a limited study that reported the seroepidemiology of these agents.
Aim: To evaluate the role of PVB19 and HPV 16 and 18 as risk factor on pregnancy outcomes
Materials and methods: Published articles on the role of PVB19, HPV 16 and 18 in women with bad obstetrics history retrieved from Google and reviewed. For PVB19 thirty-five global studies and 9 studies in Arab countries were reviewed.
Results: PVB19 median for IgG seroprevalence was 53.3%, while for IgM the median seroprevalence was 10.3%. Additionally, the mean IgG seroprevalence was 53.04±23.6%, while IgM mean seroprevalence was 20.01±27.71%. HPV seroprevalence of HPV-16 was with a range of 0.72% to 97.71%, while, HPV-18 seroprevalence was with a range of 0.5% to 27.6%.
Conclusions: HPV and PVB 19 were with a wide range of seroprevalence, however, may play a role in the development of bad obstetric outcome.
Key words: Global, Arab countries, Bad obstetrics history, Bad obstetrics outcome, Human parvovirus B19, Human papilloma virus.

1. Parvovirus B 19
1.1. Virus characteristics

Parvovirus is non enveloped viruses and has a linear and single-stranded DNA (ssDNA) genome of 5 to 6 kb, which is flanked by two terminal hairpin structures [1, 2]. B19V was discovered in 1975 by Cossart and colleagues during screening for hepatitis B virus [3]. Three viral genotypes were identified [4-19], however, all three genotypes appear to have similar biological, pathogenic, and antigenic properties and make up a
single serotype [14, 20-22]. Genotype 1 was the most common worldwide genotype [8], while genotype 2 predominant in Finnish, [23] and genotype 3 is endemic in Ghana, but it has sporadically been encountered in Europe, Brazil, India, and South Africa [8,9, 14, 24-29].

1.2. Transmission

Human papilloma virus B 19 (PV B19) may be transmitted by respiratory droplets, transfusion of blood and blood products or to the fetus by transplacental passage [30-36].

1.3. Epidemiology

HPVB19 infection is with worldwide distribution [28; 29]; however, age and location influenced the seroprevalence rate [37-54]. Previous studies reported seroprevalence rate of about 15% in pre-school children, 50% in adults and 85% in the elderly [55-59]. Additionally, the HPVB19 infection prevalence was lower in isolated communities, while it was higher developing countries [60-63]. The infection is followed by lifelong immunity in immunocompetent subjects and with seasonal variation and higher prevalence in hot climates [37, 38, 55]. Disease epidemicity follows 3 to 6 year cycles [37, 55, 64-67], during which groups at risk are children and their domestic contacts, school or nursery workers [34, 35, 56, 68-70]. During epidemics 50% of susceptible children and 25% of susceptible population are prone to secondary attack [41, 69-72].

1.4. Human Parvovirus B19 Reported Studies in Women with BOH.

Thirty-five studies [73-107] outlining the prevalence of maternal parvovirus is shown in Table 1. These studies detected the presence of antibodies to parvovirus as a marker of maternal infection in women with history of BOH. The highest seroprevalence of IgG was 97.9% which was reported for USA [83], while the lowest prevalence rate was 13.2% which reported for Nigeria [85]. Concerning IgM, the highest prevalence in women with BOH was reported in Ireland (97.9%) [88], while the lowest rate was reported in Korea (0.5%) [99]. The mean of IgG parvovirus B19 OF the global studies was 52.80±25.21%, while it was 17.69±26.67% for IgM. However, the median was 53% and 10.3% for IgG and IgM respectively.

In Arab countries, ten studies [50,108-116] outlining the prevalence of maternal parvovirus is shown in Table 2. In women with BOH, the higher IgG seroprevalence was 74.7%, which was reported in Diyala, Iraq [112], while the lowest parvovirus IgG seroprevalence was reported in Diyala, Iraq (19.9%) [114]. Concerning IgM, the highest prevalence was 84%, which reported for Egypt [111] in women with BOH. While the lowest IgM parvovirus seroprevalence was reposted for Sudan (0.2%) [116]. The mean of IgG parvovirus seroprevalence was 53.88±18.78%, while it was 26.11±31.30% for IgM. The median for IgG seroprevalence was 61%, while it was 5% for IgM. When all the 44 studies pooled, the median for IgG seroprevalence was 53.3%, while for IgM the median seroprevalence was 10.3%. Additionally, the mean IgG seroprevalence was 53.04±23.6%, while IgM mean seroprevalence was 20.01±27.71 %.

86. Human Papilloma Virus 16 and 18

Human papillomavirus (HPV) is one of the most prevalent sexually transmitted viral infections in women worldwide [117]. The virus is with more than 180 genotypes with varied virulence [118]. HPV is an oncogenic virus and divided into high risk and low risk HPV. HPV 16 and HPV 18 were classified as high risk HPV [119]. High risk HPV infection is associated with cervical cancer, oropharyngeal, head, and colorectal carcinomas [120,121]. Additionally, HPV infections were associated with bad obstetric outcomes [122-137]. A systematic literature review and meta-analysis [138] indicated that there was no significant association between HPV infection and spontaneous abortion. However, pooled OR indicated that HPV infection increased the ratio of
spontaneous abortion. HPV infection is common in the general population with a wide range infection rate (0.6% in Iran to 83.3% in Jamaica [139].

2.2. Human papillomavirus studies in women with bad obstetric history.

Seventeen studies [140-156] outlining the prevalence of maternal HPV is shown in Table 3. The seroprevalence of HPV-16 was with a range of 0.72% in Saudi Arabia [154] to 97.71% in China [144]. While, HPV-18 seroprevalence was with a range of 0.5% in China [143] to 27.6% in Brazil [146].

In women with normal cervical cytology, HPV 16 was with global variable ranges. In Africa, detection range was 0.5% in Algeria to 12.8% in Tanzania. However, within the same country, there HPV 16 infection is varies in different studies. The rate range of infection was 0.5-6.8%, 3.5-7.5%, 1.3-4.1%, 1.5-3%, and 1.6-5.2% for Algeria, Kenya, Morocco, Nigeria, and Tunisia respectively [139].

In women with normal cervical cytology, HPV 16 was with global variable ranges. In America, the range of HPV 16 infection rate was 0.5% in Brazil to 36.6% in Colombia. Additionally, the infection rate was 0.5-9.6% for Brazil, 3.3-36.6% for Colombia, 1.2-11.3% for Mexico, 1.9-8.7% for Canada, 3.2-15.1% for Argentine and 0.5-26.7% for USA [139].

In Asia, the HPV16 infection rate was 0.2% in Kuwait to 22.9% in Korea. However, the rate varies between the studies performed in the same country. The infection rate was 0.7-22.9% for Korea, 0.3-4.5% for Japan, 1.8-4% for Iran, 0.5-10.1% for India, 0.9-10.9 for China, 0.2-3.1% for Taiwan 1.4-7.1% for Turkey and 0.7-12.9% for Thailand [139].

In Europe, the HPV 16 infection rate was 0% in Greece to 24.1% in Russia. HPV 16 infection rate range was 0-4% for Greece, 0.1-4.4% for UK, 0.4-3.1% for Spain, 0.9-2.7% for Netherland, 0.9-8.8% for Italy, 1-5.8% for Sweden, 1.1-6.6% for Germany, 1.4-5.6% for Belgium, 1.8-10.6 for France, 2.7-24.1% for Russia, and 4-8.4% for Denmark. In Australia, one study reported infection rate of 5.8% of HPV 16 in women with normal cervical cytology [139].

References
41. Stelma FF, Smismsans A, Goossens VJ, Bruggeman CA, Hoebe CJ. Occupational risk of human Cytomegalovirus and Parvovirus B19 infection in female day care


