

Study the Proportion Prevalence of Cytomegalovirus, Rubella Virus, and Herpes Simplex Virus to Aborted Women in Iraq through the Period from 2021A.D. to 2023A.D

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Abstract: The study aims to investigate Rubella, cytomegalovirus [CMV], and herpes simplex virus [HSV] in aborted women and find the proportion prevalence of infections with these viral causes. To achieve this goal, 963 Blood samples were taken from all participants for screening for this viral infection. The samples were collected from different hospitals and outside labs in Iraq, through the period [from 4 January 2021 A.D. to 20 December 2023 A.D.]. A cross-sectional and analytical study [for the TORCH test] was conducted on pregnant women [age ≥ 20 and ≤ 41 years] with miscarriage history.

The result of the current study illustrated the distribution of aborted women according to the age of viral infections, the highest frequency was in the age group [31-35 years] [28%] and the lowest frequency was in the age group [≤ 41 years] [7%]. The study also shows the distribution of aborted

women according to the proportion of viral infection. The highest frequency was in CMV [50%] and the lowest frequency was in Rubella [34%], and HSV [27%] respectively. The distribution of aborted women according to several abortions shows the highest frequency was in one abortion [50%] and the lowest frequency was in three or more abortions [23%]. Also, the present study shows the distribution of aborted women according to viral infections in the pregenual period. The first trimester had the highest frequency of HSV [41%] and the lowest frequency was in other infections [34%]. The distribution of aborted women in the second trimester showed that the highest frequency was in HSV [33%] and the lowest frequency was Rubella [27%]. Also, in the third trimester was the highest frequency in other infections [36%] and the lowest frequency was in HSV [26%]. The study showed the distribution of aborted women according to viral infections through three years ago. In 2021 A.D. the highest frequency was in CMV [38%] and the lowest frequency was in other infections [31%]. While the distribution of aborted women in 2022 A.D. the highest frequency was in other infections [43%] and the lowest frequency was in CMV [32%]. Also, in 2023 A.D. the highest frequency was in Rubella [34%] and the lowest frequency was in in other infections [26%].

Keywords: CMV, Rubella, HSV, TORCH and Aborted Women.

Introduction:

An abortion occurs naturally when the fetus weighs less than or equal to 500 grams, or before the twentieth week of pregnancy when the fetus cannot adjust to life outside the womb, abortion is a common pregnancy problem [1].

Genetic and uterine abnormalities, endocrine and immunological dysfunctions, environmental pollutants, psychogenetic factors, endometriosis, infectious agents, and viral infections [such as cytomegalovirus, rubella virus, and herpes simplex virus] are some of the factors associated with pregnancy loss. The term "spontaneous abortion" refers to its effects on society and the economy. [2].

Rubella, cytomegalovirus [CMV], and herpes simplex virus [HSV] are part of TORCH, that can cause disorder in pregnant women and may cause abortions and birth defects in their newborns [3].

Congenital infections have the human cytomegalovirus [CMV] as one of its main reasons. Congenital herpes virus [CMV] is the most prevalent infection in infants. Mothers can contract CMV by intercourse or coming into contact with bodily fluids, such as saliva from an infected individual. CMV can result in long-term issues for infants, such as hearing, vision, and mental health issues [3]. Due to the virus's propensity to reactivate regularly during the childbearing age and to spread to the fetus despite maternal immunity, CMV infection during pregnancy is significantly more complicated than other infections [4].

Rubella, Also, called German measles, is a virus that spreads readily from person to person by coughing or sneezing. Nowadays, rubella is less frequent because of a vaccine that guards against it. However, rubella carriers can transmit the virus to their fetus, which could result in a dangerous situation. Rubella can result in stillbirth, early birth, or miscarriage. Additionally, it may result in issues with the baby's growth, hearing, eyesight, and heart [5]

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Among the most common human infectious viral pathogens are herpes simplex viruses type 1 and type 2 [HSV-1 and HSV-2], Between 30 and 60% of women undergoing obstetric care have herpes, and newborns are particularly susceptible to severe herpes disease and neonatal infection. Additionally, mothers who have recently acquired genital HSV infections run a 50% chance of passing the virus to their unborn child during parturition [7].

It's critical to identify these infections early in pregnancy so that, if treatment is feasible, they can be treated before they cause major complications throughout pregnancy, TORCH screening is frequently given to expectant mothers during their initial prenatal appointment. You will be informed by your healthcare practitioner if TORCH screening is required [8].

Toxoplasmosis, Others [HIV, Syphilis, Hepatitis viruses, Varicella, Parvovirus], Rubella, Cytomegalovirus, and Herpes Simplex virus are routinely screened for through TORCH screening tests. These tests utilize the immunoassay principle, recombinant antigens of all pathogens [one parasite and remaining viruses], and anti-human antibodies to the viruses to detect specific antibodies in human serum, plasma, or even blood [9].

The main objective of the study is to find out the rate of Cytomegalovirus, Rubella Virus, and Herpes simplex virus in women with abortion in Iraq three years ago 2021, 2022, and 2023.

Method:

The study collected 963 samples from different hospitals and outside labs in Iraq, during the

period from 4 January 2022 A.D. to 20 December 2023 A.D. Their age range was from 15 to ≤ 41 . The diagnosis was recognized by clinical signs, ultrasound imaging, and blood tests [for the TORCH test]. A single-use needle and plastic syringes were used to draw five milliliters of venous blood from each customer. After letting the blood clot for ten to fifteen minutes at room temperature, it was centrifuged for ten minutes at 3000 xg to produce serum for the TORCH test, which detects viral infections [CMV, Rubella, and HSV].

TORCH test:

Principle of TORCH test [Figure-1], It operates using the immunochromatography principle. The test panel's sample pad wells will react with the antihuman antibody in the membrane strip when the sample, if any, is added, resulting in the formation of an immunocomplex. Chromatographically, these complexes travel along the membrane strip to the test area [T], where the precoated recombinant antigen will ensnare the immunocomplexes. The appearance of a red or pink line signifies a favorable outcome for the particular antibody against the microbe. A red line that appears in the control zone, where the unbound complex is trapped by antimouse antibodies, signifies the validity of the test. The control line offers internal quality control in this manner [10].

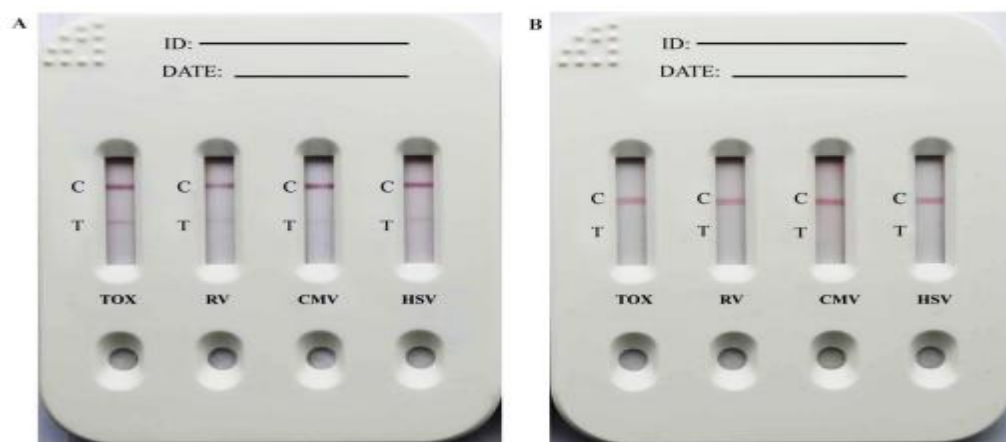


Figure-1: Test Procedure of TORCH Test

Result Interpretation of TORCH Test

- Red or pink line/s only at control region/s: Test Negative.
- Red or pink lines both regions (at control and test): Test Positive.
- No line or band at all or line/s at test region/s: Test Invalid and thus repeat the test with a new test device.
- Note: The same condition is applicable to the TORCH IgG test panel too.

Ethical Committee:

Al-Furat Al-Awast Technical University and The Medical Ethics Committee of the Iraqi Ministry of Health approved the acquisition of all the samples used in this study, which were obtained in accordance with the research procedures for each type and without the use of additional materials or modifications.

Statistical Analyses:

Statistical analyses were done by using Graphed Prism software. The groups of patients were analyzed by chi-square and one-way ANOVA. Values of $p < 0.05$ were measured to be statistically significant.

Result and Discussion:

The distribution of women patients who had abortions by age was displayed in the current study [Figure 2]. According to the age distribution of patients with viral infections, age group A4 had the highest frequency [28%] and age group A6 had the lowest frequency [7%]. According to the

distribution of patients with other infections [control], age group A4 had the highest frequency [22%] and age group A6 had the lowest frequency [10%]. To guarantee a similar frequency distribution, the age groups of all patients who had abortions were chosen. P value = 0.8108 and chi-square = 2.269 are found among research groups based on age distribution.

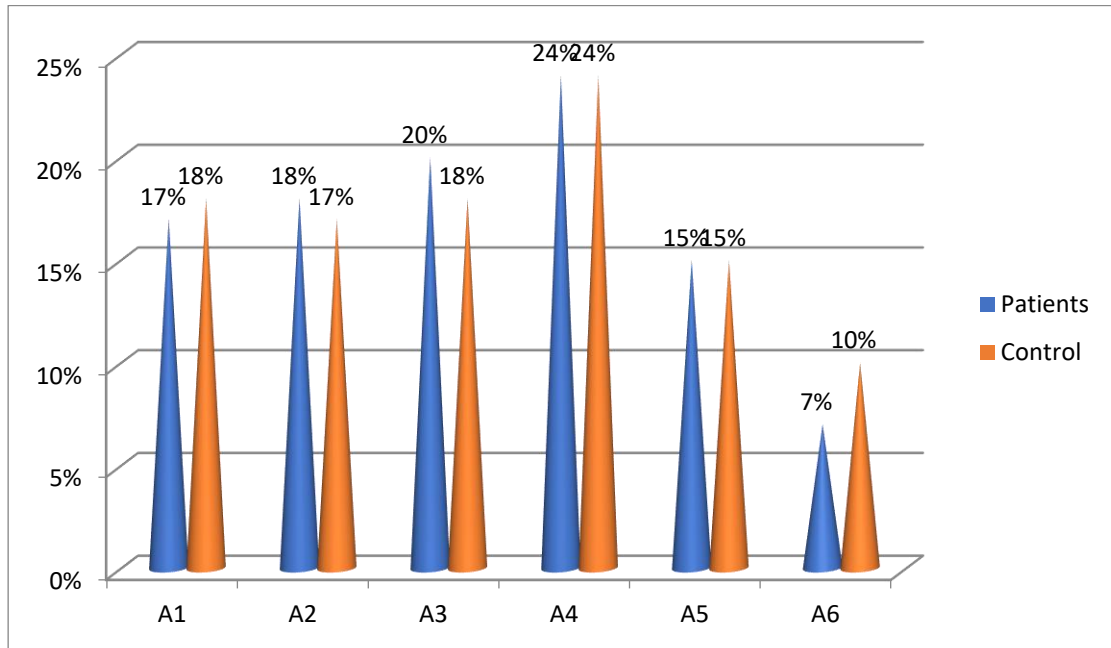


Figure 2: Distribution of aborted women , according to age

- **A1: The group of patients with age (≥ 20) years.**
- **A2: The group of patients with age (21-25) years.**
- **A3: The group of patients with age (26-30) years.**
- **A4: The group of patients with age (31-35) years.**
- **A5: The group of patients with age (36-40) years.**
- **A6: The group of patients with age (≤ 41) years.**

According to a US study, abortion rates varied according to age, and the abortion rate provides a more accurate indication of abortion frequency than the ratio. Like ratios, it is unaffected by variations in birth rates since it connects the number of abortions to the number of women in reproductive years, which is typically between 15 and 44 years. The age-specific abortion rate is a common metric since the number of abortions varies with age [11].

According to Australian studies, women between the ages of 20 and 29 are the most likely to have an abortion. The estimated abortion rate in Australia for women between the ages of 15 and 44 was 19.7 per 1000, which is comparatively high when compared to other nations where the procedure is more easily accessible and legal. Both Germany and the Netherlands have abortion rates that are less than half of those of Australia, and both offer readily available abortion and contraception services in addition to thorough sex education [12].

The current study also shows the dissemination of aborted women patients according to the proportion of viral infection. [Figure-4]. The highest frequency was in CMV [50%] and the lowest frequency was in Rubella [34%], and HSV [27%] respectively. Mean=254.3, Std. Deviation=47.61, Std. Error=27.49.

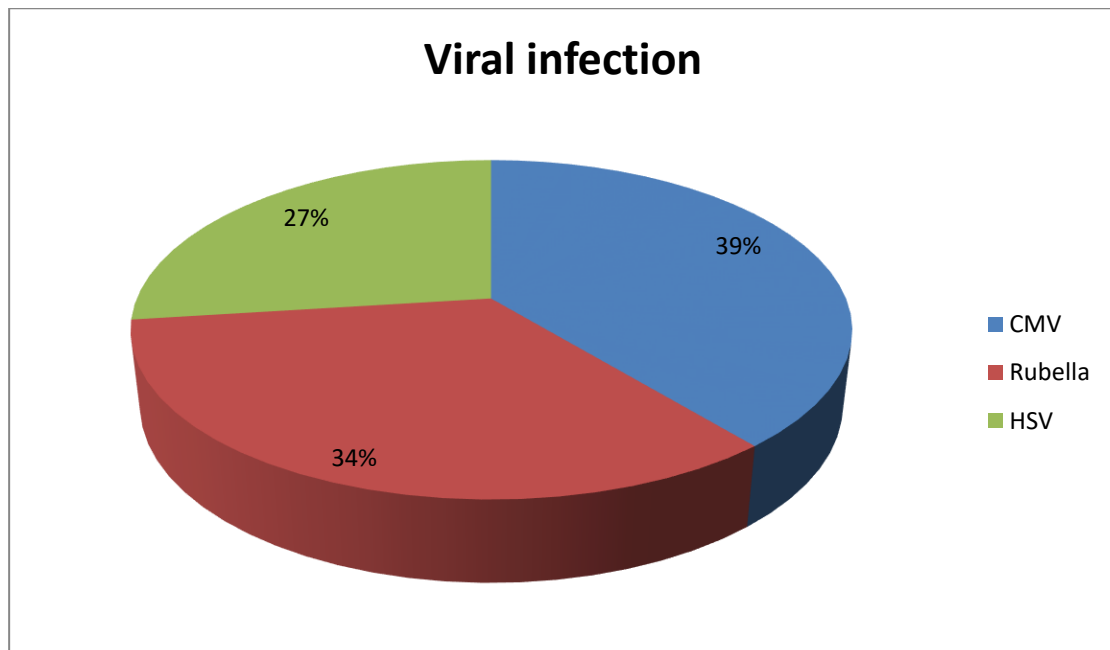


Figure 3: Distribution of Aborted women, according to Viral infections.

The CMV IgG overall seroprevalence is high [92.1%], according to the Hala *et al.* study, and there are no appreciable variations between the rates in women with a bad obstetric history [BOH] and those with a normal pregnancy. As a result, the research population's susceptibility rate was 7.9%, higher than the rates recently reported for Korea, Cuba, Bangladesh, Iran, Nigeria, Brazil, and Turkey. But compared to France, Nepal, India, Switzerland, Croatia, Malaysia, Iran, Poland, Ireland, Russia, Taiwan, Germany, Azerbaijan, Bangladesh, and Brazil, the study's susceptibility was lower. This study's susceptibility rate was comparable to Saudi Arabia's reported rate, greater in Qatar, Sudan, and Tunisia, and lower than in Egypt, Sudan, Syria, and Jordan when compared to other Arab nations [13].

The current study also shows the spreading of aborted women patients according to several abortions. [Figure-4]. The number of abortions with viral infections presented that the highest frequency was in N1 [50%] and the lowest frequency was in N3[23%]. The distribution of patients with other infections [control] presented that the highest frequency was in N1 [38%] and the lowest frequency was in N3[29%]. All Number aborted women patient groups were selected to ensure comparable frequency distribution. Chi-square = 10.30 and P value = 0.0058 among study groups according to age distribution.

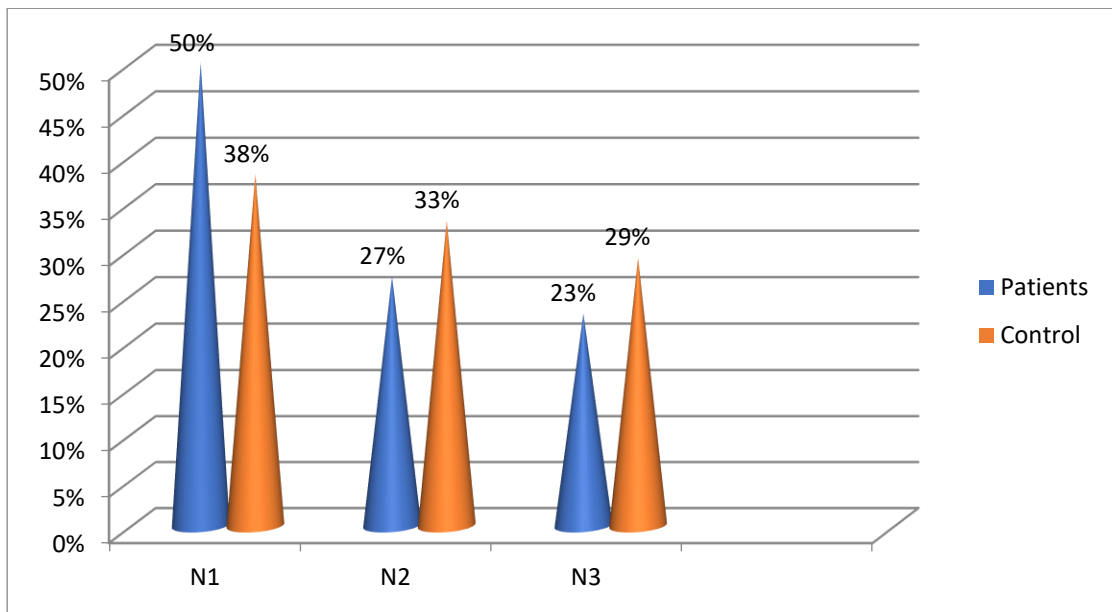


Figure 4: Distribution of Aborted women patients, according to the number of abortions.

- N1= One abortion.
- N2=Two abortions.
- N3= Three or more abortions.

The current study shows the dissemination of aborted women patients according to viral infections and pregnancy period with abortion [Figure-5]. The first trimester of abortion showed that the highest frequency was in HSV [41%] and the lowest frequency was in other infections [control] [34%]. While the distribution of aborted women patients in the second trimester of abortion showed that the highest frequency was in HSV [33%] and the lowest frequency was Rubella [27%]. Also, the third trimester of abortion showed the highest frequency was in other infections [control] [36%] and the lowest frequency was in HSV [26%]. All aborted women patients' groups were selected to ensure comparable frequency distribution. *P* value = 0.0752, *F* = 4.108, and *R* square = 0.1943 among study groups.

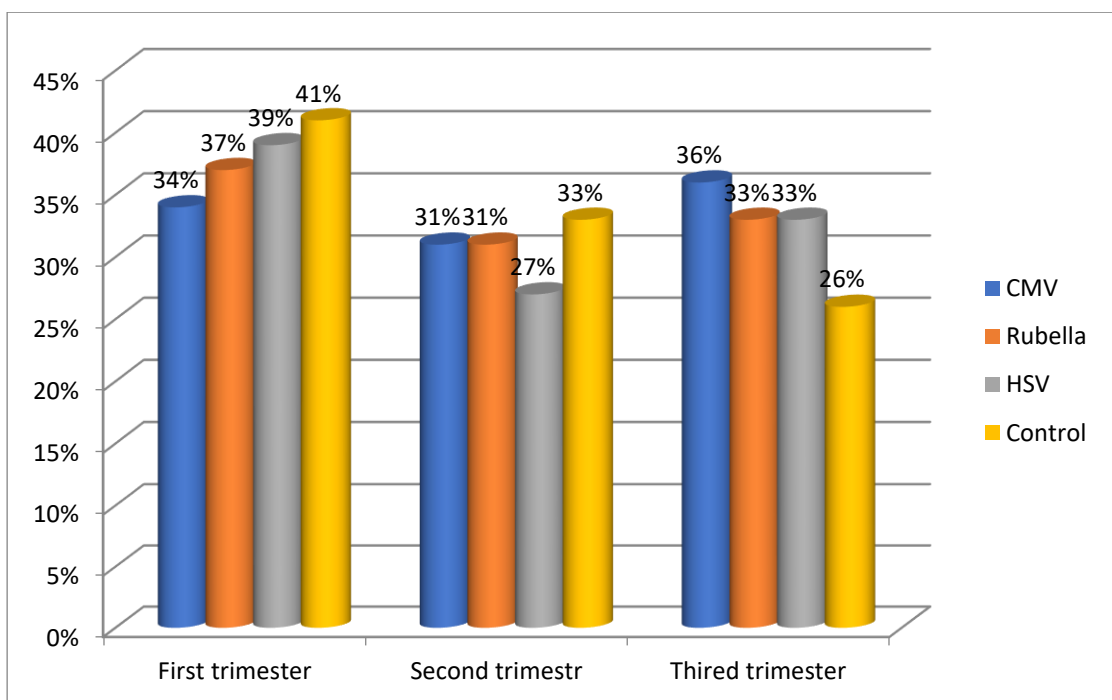


Figure5: Distribution of Aborted women, according to Viral infections and pregnancy period.

According to a study by Ahmed *et al.*, miscarriages were most common in the first trimester of pregnancy, 8% of aborted women had TORCH infections, and TORHC infection made up the largest percentage of TORCH pathogens in aborted women [14].

The current study also shows the dissemination of aborted women patients according to viral infections three years ago [Figure 6]. In [2021] year showed that the highest frequency was in CMV [38%] and the lowest frequency was in other infections [control] [31%]. While the distribution of aborted women patients in [2022] year showed that the highest frequency was in other infections [control] [43%] and the lowest frequency was in CMV [32%]. Also, in [2023] year showed the highest frequency was in Rubella [34%] and the lowest frequency was in in other infections [control] [26%]. All aborted women patient groups were selected to ensure comparable frequency distribution. P value = 0.3504, F = 1.255 and R square = 0.09101 among study groups.

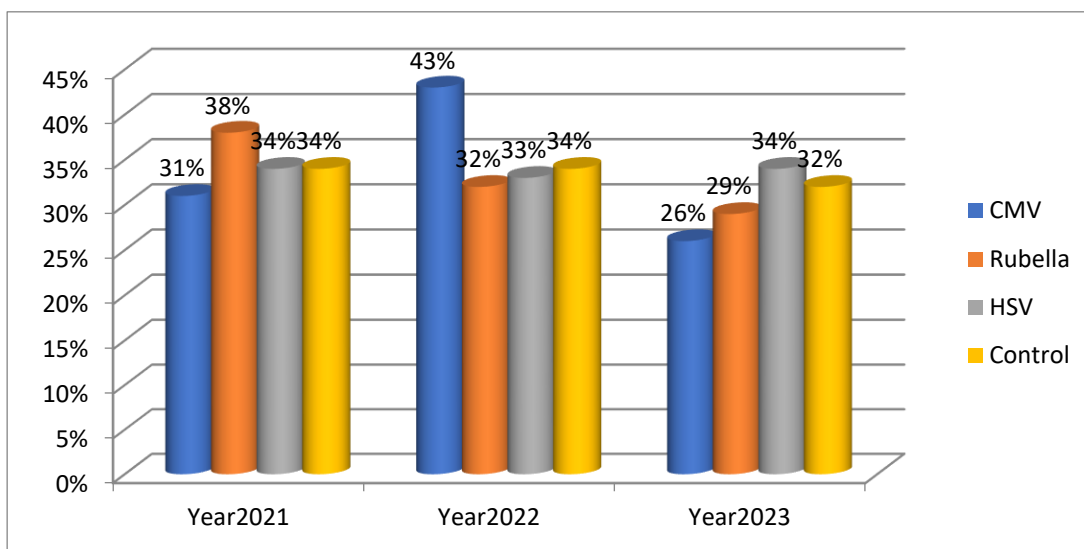


Figure6: Distribution of Aborted women, according to viral infections through three years ago.

According to U.S. research, the CDC requests abortion-related data from the central health agencies of all 50 states, the District of Columbia, and New York City. 48 reporting regions voluntarily provided the CDC with aggregate abortion data for 2021. Overall, among the 47 sites that continuously reported data from 2012 to 2021, the number, rate, and ratio of reported abortions decreased; however, from 2020 to 2021, all indicators increased [15].

According to count estimates, there were 2,200 more abortions overall in 2022 and 2023. Abortion rates varied month by month nationwide, with 2022 seeing the biggest drop and 2023 seeing the biggest increase. Illinois, Florida, North Carolina, California, and New Mexico had the highest cumulative increases in the total number of abortions performed by a physician over the course of a year. States that prohibited abortion, such as Texas, Georgia, Tennessee, and Louisiana, saw the biggest overall drops in the number of abortions [16].

Conclusions:

The result reported the high incidence rates of aborted women aged [31-35] years. The high incidence rates of abortion occur throughout the first trimester of pregnancy. Also, the result showed that high incidence rate of abortion in women who have one abortion. Cytomegalovirus and rubella are the most prevalent viruses among aborted women in Iraq and maybe the causal agents of abortion. Finally in 2022 A.D. was the high rate of abortions among women.

Recommendations:

1. Study of viruses and other microorganisms that cause miscarriage in pregnant women
2. Study the percentage of infections that cause miscarriage each year and find appropriate solutions to reduce miscarriage by providing appropriate vaccines for each pathogen.
3. Spreading community awareness about the danger of infection with these pathogens and how to prevent and treatment.

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