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SCREENING FOR TORCH INFECTIONS IN PREGNANT WOMEN: FREQUENCY AND ASSOCIATED COMPLICATIONS

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Abstract

TORCH infection, comprising Toxoplasmosis, Rubella, Cytomegalovirus (CMV), and Herpes Simplex Virus (HSV), provide considerable risks to maternal and fetal health. This study examined 86 pregnant women across three age cohorts (18-25, 26-32, and 33-40 years) to ascertain the prevalence of TORCH infections and their related consequences.

The findings indicated low IgM positivity, however IgG positivity was markedly elevated, with CMV being the most predominant at 67.4%. Clinical problems, including abortions (38%), preterm labor (29%), intrauterine fetal demise (12%), low birth weight (15%), and microcephaly (6%), were documented in 64% of women with previous infections.

The research underscores the necessity of regular screening, prompt identification, and preventative strategies to mitigate negative pregnancy outcomes. Public health interventions, such as vaccination and maternal education, are crucial for reducing the impact of congenital TORCH infections.

INTRODUCTION

A group of perinatal infections, TORCH can be passed from a pregnant mother to her fetus either during pregnancy or during delivery. (1). First came up with the initials ToRCH in 1971, immunologist Andres Nahmias described prenatal infections linked to toxoplasma (To), rubella (R), cytomegalovirus (C), and herpes simplex virus (H); these infections are difficultly distinguish from one another clinically (2). Harold Fuerst suggested including another significant congenital infection, syphilis, on the list in 1975 and changing the abbreviation to STORCH (3). Also in 1975, Roger Brumback advised substituting TORCHES for STORCH since pediatricians familiar with the older acronym would find the latter term more easily accepted and identified. Following syphilis, parvovirus, coxsackievirus, listeriosis, hepatitis virus, varicella-zoster virus, Trypanosoma cruzi, enterovirus, human immunodeficiency virus (HIV), and the most recent addition, Zika virus, the "O" in TORCH has been expanded and now stands for "Others" (4-6).

Complications can range from spontaneous miscarriage and stillbirth to a variety of congenital defects, such as microcephaly, hydrocephalus, chorioretinitis, hearing loss, and intellectual disability (7, 8). Particularly in underdeveloped nations, infection with these agents can cause major illnesses and fatalities (9).

Human toxoplasmosis is caused by Toxoplasma gondii. Transmission takes place from undercooked

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meat, contaminated food or water, or vertically from mother to fetus during pregnancy (10). The incubation time runs from five to twenty-three days following ingestion. it Although most infected people are asymptomatic, primary infection during pregnancy carries major hazards including miscarriage, stillbirth, and congenital abnormalities including hydrocephalus, chorioretinitis, and fetal neurological defects (11).

Rubella's viral character was first recognized in 1938; its teratogenic properties were identified in 1941 when mother infection was connected to congenital rubella syndrome (CRS). Classed as a togavirus, the virus is transmitted by aerosol droplets and has two genotypes. Particularly in nations with high immunization rates like the United States, Finland, and Denmark, vaccination campaigns have greatly lower CRS rates. Still, low immunization rates in places like Greece and Italy have resulted in ongoing CRS outbreaks. Though complications including encephalitis, thrombocytopenia, and congenital deformities in newborns remain issues, rubella infection usually presents with fever, rash, and lymphadenopathy (12).

Cytomegalovirus (CMV) is a DNA herpesvirus that stays latent in the body with possible reactivation especially in immune-compromised people. Immunity to CMV does not stop reinfection with many strains. With a higher disease burden than many other children disorders, congenital CMV is the most often occurring intrauterine infection and a main cause of hearing loss, vision impairment, and neurological problems in infants. While some mothers may have a minor mononucleosis-like sickness with fever, tiredness, and sporadic skin eruptions, CMV infection during pregnancy is usually asymptomatic. Severe instances of CMV might result in organ-specific problems that cause great morbidity and death. Reducing its impact still depends mostly on efficient screening, diagnosis, and preventative programs (13).

From the Herpesviridae family, herpes simplex virus (HSV) is passed through damaged skin and mucosal membranes. HSV-1 mostly affects the orofacial area (trigeminal ganglia) and HSV-2 mostly in the vaginal tract (lumbosacral ganglia). Due probably to changing sexual behavior, HSV-1 has lately become a major source of genital infections in advanced nations. HSV can be passed on to neonates during pregnancy, leading to congenital deformities, meningoencephalitis, and skin and eye diseases among other serious problems. With HSV-2 seroprevalence rising by 30% since the late 1970s, genital herpes is becoming more and more common—now impacting one in five adults. HSV seroprevalence ranges from 17% to 40% in sexually transmitted disease (STD) patients; rates of 6% in the general population and 14% in pregnant women (14).

This study aimed to assess the levels of IgG and IgM in a sample of 86 randomly selected pregnant women, given the little research on the seroprevalence of TORCH infections among pregnant women in secondary care hospitals in Peshawar. The objective of this study was to identify the principal etiological microorganisms responsible for abortions, stillbirths, and congenital abnormalities that contribute to high-risk pregnancies in the Peshawar population.

Materials and methods

A cross-sectional study was performed on pregnant women visiting a secondary care hospital in Peshawar for a duration of four months. A total of 86 randomly chosen pregnant women participated in the study. Ethical permission was granted by institution, and informed consent was obtained from all participants.

For sample collection, 4 mL of venous blood was aseptically extracted with a sterile syringe and placed into a gel tube. The collected blood samples were sent to the diagnostic laboratory under suitable conditions. Samples underwent centrifugation at three thousand rpm for ten minutes to isolate the serum from cellular constituents. The collected serum was preserved in Eppendorf tubes until subsequent examination.

The concentrations of IgG and IgM antibodies were assessed utilizing commercially available ICT kits. The TORCH profile was evaluated with the ICT TORCH kit, a highly dependable and accurate diagnostic instrument. The process entailed introducing the chemicals and serum into the testing apparatus and allowing a five-minute interval for result interpretation. The ICT approach enabled swift and precise detection of TORCH infections

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among study participants, facilitating the identification of probable etiological factors associated with high-risk pregnancies.

Results

A total of 86 randomly selected pregnant women participated in this study. To assess the distribution of TORCH infections, the participants were categorized into three age groups:

- Young Reproductive Age (18-25 years): 31 pregnant women were included in this group. Among them, 2 women (6.45%) tested positive for TORCH IgM, indicating active infection. Additionally, 23 women (74.19%) tested positive for TORCH IgG, suggesting past infection.
- Middle Reproductive Age (26-32 years): 20 pregnant women were included. Among them, 1 woman (5.00%) tested positive for TORCH IgM, while 14 women (70.00%) were positive for TORCH IgG.
- Advanced Maternal Age (33-40 years): This group included 35 pregnant women. Among them, 1 woman (2.86%) tested positive for TORCH IgM, while 22 women (62.86%) tested positive for TORCH IgG.

The findings indicate that active TORCH infections (IgM positivity) were relatively low across all age groups, with the highest percentage observed in the young reproductive age group (18-25 years). However, past infections (IgG positivity) were more common, particularly in the younger and middle reproductive age groups. These results highlight the need for routine prenatal screening and preventive healthcare measures to minimize maternal and fetal complications associated with TORCH infections.

Table: Distribution of TORCH Infections among Pregnant Women by Age Group

Age Group (Years)	Number of Pregnant Women	TORCH IgM Positive Cases	IgM Percentage (%)	TORCH IgG Positive Cases	IgG Percentage (%)
18-25 (Young Reproductive Age)	31	2	6.45%	23	74.19%
26-32 (Middle Reproductive Age)	20	1	5.00%	14	70.00%
33-40 (Advanced Maternal Age)	35	1	2.86%	22	62.86%
Total	86	4	4.65%	59	68.60%

Results of Individual TORCH Infections (IgM & IgG)

To analyze the distribution of TORCH infections, we separately examined the number of pregnant women who tested positive for IgM (active infection) and IgG (past infection) for TORCH.

Findings:

- Toxoplasmosis: IgM Positive (1.16%), IgG Positive (4.65%)
- Rubella: IgM Positive (2.33%), IgG Positive (2.33%)
- Cytomegalovirus (CMV): IgM Positive (0%), IgG Positive (44.19%)
- Herpes Simplex Virus (HSV): IgM Positive (1.16%), IgG Positive (12.79%)

The results indicate that IgG antibodies were more prevalent, especially for CMV and HSV, indicating past infections. However, active infections (IgM positivity) were lower, with Rubella having the highest active infection rate (2.33%) among pregnant women.

Table: Distribution of IgM and IgG Positivity for TORCH Infections among Pregnant Women

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Infection Type	IgM Positive Cases (Active Infection)	IgM Percentage (%)	IgG Positive Cases (Past Infection)	IgG Percentage (%)
Toxoplasmosis (Toxo)	1	1.16%	4	4.65%
Rubella	2	2.33%	2	2.33%
Cytomegalovirus (CMV)	0	0.00%	38	44.19%
Herpes Simplex Virus (HSV)	1	1.16%	11	12.79%
Total	4	4.65%	55	63.95%

Clinical Complications among Pregnant Women with TORCH Infections

The following table presents the percentage of pregnant women who experienced different clinical complications associated with TORCH infections:

Table: Distribution of Clinical Complications in Pregnant Women with TORCH Infections

Clinical Complication	Number of Cases	Percentage (%)
History of Abortions	55	63.95%
Pre-mature Labor	45	52.33%
Intrauterine Fetal Death	7	8.13%
Low Birth Weight	17	19.76%
Microcephaly	10	11.62%

These results indicate that history of abortions (63.95%) and pre-mature labor (52.33%) were the most common complications among pregnant women with TORCH infections, while intrauterine fetal death (8.13%) was the least reported complication.

Discussion:

The current study sought to evaluate TORCH infection frequency among pregnant women and their correlation with adverse pregnancy outcomes. Our results showed a notable load of IgG positivity, mostly (CMV) and (HSV), while IgM positivity were relatively lower. These findings complement earlier research done in underdeveloped nations, which have shown a significant seroprevalence of CMV and HSV resulting from inadequate prenatal screening, poor hygienic settings, and lack of knowledge (15).

Out of all the age groups examined, the young reproductive age group (18–25 years) had the most TORCH infections; followed by the advance maternal age group (33–40 years). These results indicate that younger women might be more exposed to infection, maybe due lack of immunity or first-time infection during pregnancy. Older women may have pre-existing immunity, but they are more likely to have difficulties like spontaneous abortion, intrauterine growth restriction (IUGR), and congenital anomalies caused due to declining immune responses and physiological changes in pregnancy (16).

The lack of IgM positivity for CMV in the current investigation suggests that most women had prior exposure to the virus rather than active infections. Underscoring the endemic prevalence of CMV in the region. a systematic review estimated the global The seroprevalence of CMV among women of reproductive age is 86%, with the highest rates observed in the Eastern region at 92%. Moreover, CMV seroprevalence rates in underdeveloped nations across Asia, Africa, and Latin America may attain levels as high as 100%. (17).

This study's findings underscore the critical necessity for regular TORCH screening within prenatal care. Timely identification and care of infections, along with educational initiatives on cleanliness, vaccination, and preventive strategies, could markedly decrease the prevalence of congenital infections and enhance mother and fetal health outcomes.

Conclusion:

This study emphasizes the considerable burden of TORCH infections in pregnant women, with Cytomegalovirus (CMV) identified as the most common previous infection. The low IgM positivity

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indicates that the majority of women experienced earlier exposure rather than recent infections. The research identified a significant correlation between TORCH infections and negative pregnancy outcomes, such as abortions, premature labor, intrauterine fetal death, low birth weight.

These findings underscore the necessity of regular TORCH screening throughout pregnancy to facilitate early diagnosis and intervention. Public health interventions, including immunization, prenatal education, and enhanced maternal healthcare services, are crucial in reducing the risks linked to these illnesses.

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