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Pregnancy, Infection, and Refugee Health: A Study on Seroprevalence of Key Pathogens in Turkey's Refugee Population

Gebelik, Enfeksiyon ve Sığınmacı Sağlığı: Türkiye'deki Sığınmacılarda Önemli Patojenlerin Seroprevalansı Üzerine Bir Çalışma

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Abstract

Objective: Pregnant refugees in Turkey are at high risk for infectious diseases due to limited access to healthcare services and suboptimal hygiene conditions. This study aims to assess the risks posed by infections, particularly toxoplasmosis, Rubella, hepatitis, human immunodeficiency virus (HIV), and cytomegalovirus (CMV), during pregnancy. These pathogens have adverse effects on maternal and fetal health during gestation, and early diagnosis and management are crucial.

Methods: This retrospective study analyzes serological test results from pregnant refugees who presented at University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital between March 1, 2018, and March 1, 2020. Tests evaluated included anti-Toxoplasma immunoglobulin (Ig)M, anti-Toxoplasma IgG, anti-hepatitis C virus (HCV), hepatitis B surface antigen (HBsAg), anti-HIV, anti-HBs, anti-Rubella IgM, anti-Rubella IgG, anti-CMV IgM, and anti-CMV IgG. Seroprevalence rates were analyzed annually.

Results: Of the pregnant participants, 94.7% were Syrian, and 5.3% were Afghan. Seroprevalence rates for Toxoplasma IgG, Rubella IgG, and CMV IgG were found to be 51.3%, 85.3%, and 57.6%, respectively. No significant variation in test results was observed over the years. The positive rates for anti-HCV, HBsAg, and anti-Rubella IgM were low; chi-square analysis was limited by low cell frequencies, affecting statistical power.

Conclusion: This study reveals a high prevalence of infections such as toxoplasmosis, Rubella, hepatitis B, and CMV among pregnant refugees in Turkey. Expanding screening and vaccination programs for refugee women is recommended to mitigate infection risks. Improving access to healthcare services and regular screenings is crucial to curbing the spread of these infections.

Keywords: Pregnancy, refugees, seroprevalence

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Öz

Amaç: Türkiye'deki sığınmacı gebeler, sağlık hizmetlerine erişim ve hijyen koşullarındaki kısıtlılıklar nedeniyle enfeksiyon hastalıkları açısından yüksek risk altındadır. Bu çalışma, özellikle toksoplazma, Rubella, hepatit, insan immün yetmezlik virüsü (HIV) ve sitomegalovirüs (CMV) enfeksiyonlarının gebelik sürecinde oluşturduğu riskleri değerlendirmeyi amaçlamaktadır. Bu patojenler, gebelik döneminde anne ve fetüs sağlığı üzerinde olumsuz etkiler yaratabilir ve erken tanı ile yönetilmesi önem taşır.

Yöntem: Bu retrospektif çalışma, 1 Mart 2018-1 Mart 2020 tarihleri arasında Sağlık Bilimleri Üniversitesi, İzmir Tepecik Eğitim ve Araştırma Hastanesi'ne başvuran sığınmacı gebelerin serolojik test sonuçlarını analiz etmektedir. Anti-Toksoplazma immünoglobulin (Ig)M, anti-Toksoplazma IgG, anti-HCV, hepatit B yüzey antijeni (HBsAg), anti-HIV, anti-HBs, anti-Rubella IgM, anti-Rubella IgG, anti-CMV IgM ve anti-CMV IgG testleri değerlendirilmiştir. Yıllara göre seroprevalans oranları analiz edilmiştir.

Bulgular: Çalışmaya katılan gebelerin %94,7'si Suriye, %5,3'ü ise Afganistan uyrukludur. Toksoplazma IgG seroprevalansı %51,3, Rubella IgG %85,3 ve CMV IgG %57,6 olarak bulunmuştur. Test sonuçlarında yıllara göre anlamlı bir değişiklik saptanmamıştır. Anti HCV, HBsAg ve anti Rubella IgM testlerinde pozitiflik oranları düşük kalmıştır, ki-kare analizinde bazı hücre frekanslarının düşük olması nedeniyle istatistiksel güç sınırlanmıştır.

Sonuç: Bu çalışma, Türkiye'deki sığınmacı gebeler arasında toksoplazma, Rubella, hepatit B ve CMV gibi enfeksiyonların yüksek prevalansını göstermektedir. Sığınmacı kadınların enfeksiyon hastalıkları açısından korunması için tarama ve aşı programlarının genişletilmesi önerilmektedir. Sağlık hizmetlerine erişim koşullarının iyileştirilmesi ve düzenli taramalar, bu enfeksiyonların yayılımını azaltmak için kritik öneme sahiptir.

Anahtar Kelimeler: Gebelik, sığınmacılar, seroprevalans

Introduction

Globally, migrant and refugee populations are at high risk for infectious diseases due to restricted access to healthcare and suboptimal hygiene conditions[1]. Infections such as toxoplasmosis, Rubella, hepatitis, human immunodeficiency virus (HIV), and cytomegalovirus (CMV) pose significant health concerns, particularly among pregnant women[2]. The World Health Organization estimates that around 1.5 million people globally are infected with the hepatitis B virus each year, with migrant populations showing higher prevalence rates[3]. HIV infection rates are also elevated among migrant populations, especially among individuals from low- and middle-income countries[4,5]. Migrants from conflict zones such as Syria and Afghanistan face increased risks for infectious diseases due to poor living conditions, lack of hygiene, and limited access to healthcare services[6]. Infections such as toxoplasmosis, CMV, and Rubella are particularly concerning in these communities. Studies have indicated that toxoplasmosis seroprevalence ranges from 30% to 60%, whereas Rubella seroprevalence remains high among unvaccinated individuals[7-9]. CMV infection is also prevalent among migrant populations, with transmission risks heightened in environments with inadequate hygiene. Early diagnosis and treatment of these infections are crucial because they can lead to severe complications during pregnancy.

In Turkey, similar patterns are observed among migrant communities. Turkey hosts a large refugee population, particularly from Syria, and the prevalence of infectious diseases within these communities is notably high. Studies among refugee women in Turkey reported hepatitis B carriage rates of approximately 4-7%[10]. Although HIV infection is relatively rare among the migrant population in Turkey, it remains a concern in high-risk groups. Infections such as Rubella and CMV can lead to severe complications during pregnancy, affecting both the mother and the fetus. Challenges in accessing healthcare further exacerbate the spread of these infections among refugee populations in Turkey.

Refugee women face economic and social hardships that hinder access to healthcare, increasing the risk of developing infectious diseases. Exposure to infections during pregnancy can result in significant adverse outcomes for both maternal and fetal health[11]. Screening for infections during pregnancy is crucial to safeguard maternal health and ensure the birth of a healthy child. Specifically, infections such as toxoplasmosis, hepatitis, Rubella, HIV, and CMV can lead to complications during pregnancy and pose risks to the infant's health postpartum[12]. Preventive measures against these infections are essential to minimize potential health risks[13].

Regular serological testing of pregnant women presenting to University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital is crucial for assessing the prevalence of infection in this group. This study aimed to analyze the annual distribution of serological test results for specific infectious agents among pregnant refugee women admitted to University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital between March 2018 and

March 2020. The study examined anti-Toxoplasma IgM, anti-Toxoplasma IgG, anti-HCV, HBsAg, anti-HIV, anti-HBs, anti-Rubella IgM, anti-Rubella IgG, anti-CMV IgM, and anti-CMV IgG tests.

Materials and Methods

This study evaluated the annual distribution of serological test results among pregnant women who presented to University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital between March 1, 2018 and March 1, 2020. The study aims to determine immunity or infection status against certain infectious agents in pregnant women, including anti-Toxoplasma IgM, anti-Toxoplasma IgG, anti-HCV, HBsAg, anti-HIV, anti-HBs, anti-Rubella IgM, anti-Rubella IgG, anti-CMV IgM, and anti-CMV IgG serological tests. Annual positivity, negativity, and untested (not examined) rates for each serological test were analyzed.

Statistical Analysis

In data analysis, the distribution percentages of positive, negative, and untested results for each serological test were calculated by years. The positivity, negativity, and untested rates for each serological test were compared, and the chi-square test was applied to detect differences between years when the validity conditions were met. For test groups with cell frequencies below 5, only percentage summaries were provided because of the invalidation of the test under these conditions. The percentage distribution of positivity and negativity rates in the serological tests was presented using descriptive statistics, and seroprevalence was calculated.

The study was approved by the University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital Ethics Committee on March 06, 2024, with approval number 2024/02-07.

Results

The mean age of the study population was 25.6±3.9 years (range: 18-39). Of the pregnant women, 94.7% (n=1,042) were of Syrian nationality, while the remaining 5.3% (n=58) were of Afghan nationality. Serological testing was conducted for 552 women (50.2%) in 2018, 225 women (20.5%) in 2019, and 323 women (29.4%) up to March 1, 2020.

The seroprevalence of anti-Toxoplasma IgM and anti-Toxoplasma IgG was 2.81% and 51.28% (Table 1). For anti-HCV, the seroprevalence was 0.37%; for HBsAg, 1.85%; and for anti-HBs, 22.29% (Table 2). Anti-Rubella IgM and anti-Rubella IgG seroprevalence was 0.64% and 85.30% (Table 3). The seroprevalence of anti-CMV IgM was 3.49%, and for anti-CMV IgG was 3.49% and 57.55% (Table 4).

No significant changes were observed in the distribution of serological test results across years within the study group. Although anti-Toxoplasma IgM and IgG positivity rates were higher in 2018, they remained stable in 2019 and 2020 ($p>0.05$). Due to the low positivity in anti-HCV, HBsAg, and anti-Rubella IgM tests, chi-square analysis was limited by the expected cell counts below 5 for certain categories. Additionally, no significant changes were found across years in anti-HIV, anti-HB, and anti-Rubella IgG levels, with p-values exceeding 0.05. The positivity rates for anti-

Table 1. Distribution of toxoplasma serology results of the study group

Anti Toxoplasma IgM	
Positive (%)	22 (2%)
Negative (%)	761 (69.2%)
Not tested (%)	317 (28.8%)
Anti Toxoplazma IgG	
Positive (%)	402 (36.6%)
Negative (%)	380 (34.5%)
Not tested (%)	318 (28.9%)
Ig: Immunoglobulin	

Table 2. Distribution of hepatitis and HIV serology results of the study group

Anti HCV	
Positive (%)	4 (0.4%)
Negative (%)	1081 (98.3%)
Not tested (%)	15 (1.3%)
HBsAg	
Positive (%)	20 (1.8%)
Negative (%)	1063 (96.6%)
Not tested (%)	17 (1.6%)
Anti HBs	
Positive (%)	173 (15.7%)
Negative (%)	603 (54.8%)
Not tested (%)	324 (29.5%)
Anti HIV	
Positive (%)	0 (0.0%)
Negative (%)	1065 (96.8%)
Not tested (%)	35 (3.2%)
HIV: Human immunodeficiency virus, HCV: Hepatitis C virus, HBsAg: Hepatitis B surface antigen	

CMV IgM and IgG were similarly distributed across years, with annual differences not reaching statistical significance (p>0.05). Overall, no notable annual increase or decrease was observed in serological test results; statistical analyses were limited to certain tests due to low cell counts. These findings indicated no significant year-over-year changes in the serological test results of the study group (Table 5).

Discussion

This study revealed the seroprevalence of various infectious agents among pregnant refugee women in Turkey, highlighting infectious disease risks as a significant public health concern in migrant populations. The high prevalence of infections, including toxoplasmosis, Rubella, hepatitis B, HCV, and CMV, in this group is associated with challenges in accessing healthcare and insufficient hygiene conditions. A global review by Saseetharran et al.[14] noted that viral hepatitis infections such as hepatitis B and C are widespread among migrant populations, and barriers to accessing healthcare complicate the treatment and monitoring of these diseases. This finding aligns with our study results, underscoring the importance of expanding viral hepatitis screening among pregnant refugee women[14].

Table 3. Distribution of Rubella serology results of the study group

Anti Rubella IgM	
Positive (%)	5 (0.5%)
Negative (%)	779 (70.8%)
Not tested (%)	316 (28.7%)
Anti Rubella IgG	
Positive (%)	570 (36.7%)
Negative (%)	118 (10.7%)
Not tested (%)	315 (28.6%)

Ig: Immunoglobulin

Table 4. Distribution of cytomegalovirus serology results of the study group

Anti CMV IgM	
Positive (%)	22 (2%)
Negative (%)	610 (55.5%)
Not tested (%)	468 (42.5%)
Anti CMV IgG	
Positive (%)	633 (57.6%)
Negative (%)	0 (0%)
Not tested (%)	467 (42.4%)

Ig: Immunoglobulin, CMV: Cytomegalovirus

In our study, the Rubella IgG seropositivity was 85.3%. Similarly, a study by Gürses et al.[15] on Syrian refugees in Şanlıurfa found a high Rubella seropositivity rate (99.5%). This high seropositivity may be attributed to widespread Rubella vaccination or natural immunity among refugees. However, a study by Fahme et al.[16] on sexually transmitted infections in pregnant Syrian refugees in Lebanon indicated that this population does not receive adequate screening services during the antenatal period. This finding highlights the need to expand screening programs for detecting infections during pregnancy.

The prevalence of hepatitis B and C infections among refugee women is also noteworthy. In a study by Hansu and Cikim[17], anti-HCV positivity was found to be higher in Syrian migrant pregnant women in Turkey compared to Turkish pregnant women, which may be linked to poor hygiene and inadequate healthcare services. In our study, anti-HCV seroprevalence was found to be 0.37%, which is lower than in other studies; however, expanding health screenings among refugee populations remains essential to reduce potential transmission risks.

CMV infection can cause serious complications during pregnancy and is more common in communities with poor hygiene. A study by Köse et al.[18] on Syrian refugee children in İzmir reported high CMV seroprevalence, which was linked to the hygiene conditions among refugees. Similarly, our study found a CMV IgG positivity rate of 57.6%, which is consistent with other findings in the literature. CMV screening during pregnancy is critical to reduce the risk of prenatal infection.

Toxoplasma infection is more prevalent in developing countries and poses serious risks to fetal health during the prenatal period. A study conducted in Kahramanmaraş found high toxoplasma seropositivity among Syrian refugee women[19]. Similar findings were observed in a study by Hansu et al.[20], which reported high toxoplasma seroprevalence among refugee women, associating it with increased hygiene issues due to displacement. Consistent with these studies, our study found a toxoplasma IgG positivity rate of 51.3%, indicating the impact of poor hygiene conditions and limited access to healthy nutrition.

Study Limitations

This study has several limitations. First, it employed a retrospective design and included only pregnant refugee women presenting to University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital. Therefore, the findings cannot be generalized to the entire refugee population

Table 5. Evaluation of the distribution of serologic test results of the study group according to years				
Serological test	**Year of serological testing**			**Chi-square test statistic**
	2018 n (%)	**2019 n (%)**	**2020 n (%)**	**p-value**
Anti-Toxoplazma IgM				
Positive	7 (31.8%)	9 (40.9%)	6 (27.3%)	0.091
Negative	377 (49.5%)	151 (19.8%)	233 (30.6%)	
Not tested	168 (53%)	65 (20.5%)	84 (26.5%)	
Anti-Toxoplasma IgG				
Positive	191 (47.5%)	78 (19.4%)	133 (33.1%)	0.339
Negative	193 (50.8%)	81 (21.3%)	106 (27.9%)	
Not tested	168 (52.8%)	66 (20.8%)	84 (26.4%)	
Anti-HCV				
Positive	2 (50.0%)	0 (0.0%)	2 (50.0%)	***
Negative	539 (49.9%)	224 (20.7%)	318 (29.4%)	
Not tested	11 (73.3%)	1 (6.7%)	3 (20.0%)	
HBsAg				
Positive	10 (50.0%)	4 (20.0%)	6 (30.0%)	***
Negative	531 (50.0%)	218 (20.5%)	314 (29.5%)	
Not tested	11 (64.7%)	3 (17.6%)	3 (17.6%)	
Anti-HIV				
Negative	529 (49.7%)	220 (20.7%)	316 (29.7%)	0.175
Not tested	23 (65.7%)	5 (14.3%)	7 (20.0%)	
Anti-HBs				
Positive	83 (48.0%)	31 (17.9%)	59 (34.1%)	0.491
Negative	298 (49.4%)	128 (21.2%)	177 (29.4%)	
Not tested	171 (52.8%)	66 (20.4%)	87 (26.9%)	
Anti-Rubella IgM				
Positive	2 (40.0%)	1 (20.0%)	2 (40.0%)	***
Negative	382 (49.0%)	160 (20.5%)	237 (30.4%)	
Not tested	168 (53.2%)	64 (20.3%)	84 (26.6%)	
Anti-Rubella IgG				
Positive	59 (50.0%)	20 (16.9%)	39 (33.1%)	0.556
Negative	326 (48.9%)	141 (21.1%)	200 (30.0%)	
Not tested	167 (53.0%)	64 (20.3%)	84 (26.7%)	
Anti-CMV IgM				
Positive	10 (45.5%)	4 (18.2%)	8 (36.4%)	0.604
Negative	304 (49.8%)	118 (19.3%)	188 (30.8%)	
Not tested	238 (50.9%)	103 (22.0%)	127 (27.1%)	
Anti-CMV IgG				
Positive	315 (49.8%)	122 (19.3%)	196 (31.0%)	0.306
Not tested	237 (50.7%)	103 (22.1%)	127 (27.2%)	
Total	552 (50.2%)	225 (20.5%)	323 (29.4%)	

***The validity conditions for the chi-square test were not met; in some cells the expected value is less than 5, Ig: Immunoglobulin, HCV: Hepatitis C virus, HBsAg: Hepatitis B surface antigen, CMV: Cytomegalovirus

in Turkey. Additionally, the seroprevalence data cover only a limited time period (2018-2020), which limits the ability to assess long-term trends. Second, the low positivity rates of some serological tests reduced the statistical power of chi-square analysis because of low cell frequencies. This limitation especially affected the analysis of rare infections (e.g., anti-HCV positivity), making it challenging to derive statistically significant results. Furthermore, due to limited access to healthcare services among the refugee population, some individuals may not have been able to receive regular healthcare, limiting the representativeness of serological test results. Future studies should consider the effects of these variables on infection prevalence by incorporating them into the analysis.

Conclusion

Infectious diseases are prevalent among pregnant women in Turkey. This situation is associated with challenges to healthcare access and inadequate hygiene conditions in the migrant population. Expanding screening and vaccination programs is essential to reduce the spread of these infections and to protect the health of refugee women. In addition, improving living conditions and ensuring regular health screenings for refugees play critical roles in preventing infectious diseases.

Ethics

Ethics Committee Approval: The study was approved by University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital Ethics Committee on March 06, 2024, with approval number 2024/02-07.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: İ.A., Concept: İ.A., Z.S.V., Design: İ.A., Data Collection or Processing: İ.A., Z.S.V., Analysis or Interpretation: İ.A., Z.S.V., Literature Search: İ.A., Z.S.V., Writing: İ.A., Z.S.V.

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