


RESEARCH ARTICLE

# Investigation of usage of antenatal care services by Syrian immigrant pregnant women and the frequency of anaemia and hypertension during the pandemic

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## Abstract

During the pandemic period, the use of health services by disadvantaged groups such as immigrants has deteriorated. The study aims to evaluate the use of antenatal care services by Syrian pregnant women during the pandemic. It is a cross-sectional type of study. The population consisted of 495 pregnant women who applied to the Extended Migrant Health Center (EMHC) between August 2020 and December 2022. Demographic data and pregnancy-related health records were examined through the system records, without any contact with the pregnant women. The percentage of pregnant women who had timely follow-up for each antenatal visit were 11.5% ( $n = 56$ ), 17.2% ( $n = 80$ ), 20.0% ( $n = 88$ ), and 17.4% ( $n = 73$ ), respectively. Only 17.7% ( $n = 87$ ) of the pregnant women made the recommended number of visits during their pregnancy period. The recommended number of follow-ups was statistically significantly higher in women with high-risk pregnancies ( $p = 0.045$ ). Of the pregnant women, 27.4% had anaemia and 2.4% had hypertension. The use of antenatal care in immigrant pregnant women is very low. Interventions are needed in this regard. Increasing the utilization of antenatal care services by immigrant pregnant women is extremely important for both the health of the pregnant woman and the health of the baby.

**Keywords:** Antenatal care; immigrant women; pregnant women

## Introduction

Antenatal care services are comprehensive health services that monitor the pregnancy process for the health of the mother and baby. Adaptation of the mother to the pregnancy process, informing the pregnant woman about the pregnancy, and detecting and treating risky situations appropriately are also provided by antenatal care services (Desdicioğlu *et al.*, 2021). With the appropriate quality and number of antenatal follow-ups, it is possible to prevent complications that may occur during pregnancy and to organize appropriate medical care and guidance when necessary (WHO, 2002). Antenatal care services are among the most important and basic health services offered in hospitals and primary health care institutions. The World Health Organization (WHO) recommends a minimum of 8 follow-up visits during pregnancy in order to reduce perinatal mortality and increase maternal care (WHO, 2002). According to the ‘Antenatal Care Management Guide’ of the Ministry of Health in Turkey, a minimum of 4 times antenatal follow-up visits during pregnancy is recommended (T.C. Ministry of Health, 2018).

Migration is the movement of people from one place to another due to economic, social, political, and cultural reasons (Oral and Çetinkaya, 2017). Due to the war that started in Syria in 2011, many individuals had to migrate to Turkey. According to the latest data of the Directorate of Migration Management dated 02.02.2023; 3,500,964 registered Syrian individuals are living in Turkey (T.C. Ministry of Interior Presidency of Migration Management, 2023). The number of Syrian women in Turkey is 1,634,881 as of February 2023, and nearly half (812,400) are of childbearing age (15-49 years) (T.C. Ministry of Interior Presidency of Migration Management, 2023).

Immigrant individuals may experience some difficulties and inequalities in benefiting from health services in their new settlements (Gushulak *et al.*, 2009). These difficulties arise from; language problems, being economically inadequate, low education level, and poor nutritional and hygienic conditions (Gushulak *et al.*, 2009; Peltokorpi, 2010). Due to these reasons, immigrants, and especially immigrant women, who are among the most vulnerable groups, may face many health risks (Riza, 2020). Every woman should have the right to receive special care and assistance during pregnancy, childbirth, and the postpartum period (Arabacı *et al.*, 2016). Immigrant groups are vulnerable groups, and it is extremely important for them to access and benefit from the care services needed during pregnancy (May and Delston, 2017; Schoevers *et al.*, 2010). According to Turkey Demographic and Health Survey (TNSA) 2018 data, 93% of Syrian immigrant women received antenatal care from a health worker. In addition, 74% of them received antenatal care before their 4th month of pregnancy and 64% of them received at least 4 antenatal care services as recommended (Çavlin, 2018a). According to TNSA 2018 general population data, 96% of women received antenatal care from health personnel for their deliveries in the last five years. The percentage of pregnant women who received antenatal care service before the 3rd month of their pregnancy and at least 4 times is 90% for both conditions (Çavlin, 2018b). According to the data, the rate of use of pregnancy care services at the recommended level by Syrian pregnant women compared to the general population is quite low. In order to increase the access of Syrian immigrants to preventive and basic health services in Turkey, there are Migrant Health Centers (MHC) affiliated to primary health care institutions in places where these people live intensively. MHCs offer similar services to family health centers. In addition, Extended MHCs (EMHC) are available in places where the Syrian population is higher. In addition to primary health care services, EMHCs also provide internal medicine, pediatrics, gynecology and obstetrics, oral and dental health, and psychosocial support services.

The number of antenatal follow-up visits during the COVID-19 pandemic period decreased significantly compared to the pre-pandemic period (Nazik *et al.*, 2022). This situation has made obtaining health services more difficult for disadvantaged groups. Since it is known that immigrant populations experience difficulties in accessing healthcare services, the decrease in antenatal care during the pandemic may have had a more significant impact on immigrant groups. Therefore, evaluating the utilization of antenatal care services by immigrant pregnant women during the pandemic is important. In this regard, the research aims to evaluate the use of antenatal care services by Syrian pregnant women who received health service from the EMHC during the pandemic. It was aimed to compare the factors affecting women who received the recommended number of follow-up visits. In addition, it was aimed to determine the prevalence of anaemia and hypertension in pregnant women receiving antenatal care services. The results of the study will guide the implementation of appropriate interventions in the areas needed in terms of antenatal care for immigrant women.

## Methods

Istanbul is the largest city in Turkey and is divided into two sides by the Bosphorus. There are 8 EMHCs in total in Istanbul. One of these centers is on the Anatolian side and the others are on the

European side. Specialists and general practitioners, midwives and nurses, social workers, psychologists, and dentists work in these centers. The majority of the employees are Syrian health workers. This research was carried out on the data of pregnant Syrian women who applied to the EMHC on the Anatolian side of Istanbul.

### **Study design and participants**

The research is a cross-sectional type of study. The population consists of Syrian pregnant women who received health service from an EMHC in Istanbul between August 2020 and December 2022. In this study, there were 495 pregnant women over the age of 18 years who applied to the center between the research dates. Demographic data and pregnancy-related health records were examined only through system records retrospectively without any contact with pregnant women.

### **Measures**

In the system records, there was information about the age of the pregnant woman, the last status of pregnancy, the date of the last menstrual period, the number of pregnancies, the status of miscarriage, and the history of congenital anomaly. In addition, risk status, fasting blood sugar, presence of protein in the urine, haemoglobin level, and blood pressure were available for those who have at least one follow-up. The risk status of women was determined based on information documented in the system records. Apart from this, it was determined that 211 pregnant women gave birth during this period. The delivery methods (cesarean section, normal delivery) of these pregnant women are also included as data.

Presence of anaemia in pregnant women was defined as Hb value  $<11.0$  g/dL (WHO, 2023). The presence of hypertension is defined as a systolic blood pressure of 140 mmHg and above and a diastolic blood pressure of 90 mmHg or more (Luger and Kight, 2022). Gestational diabetes mellitus (GDM) is an increasingly common complication during pregnancy, defined as glucose intolerance that develops or is noticed for the first time (ACOG, 2005). The targeted fasting blood glucose value in pregnant women is  $\leq 95$  mg/dl (ACOG, 2005).

According to the 'Antenatal Care Management Guide' of the Ministry of Health in Turkey, the first follow-up in pregnant women is between 0 and 14 weeks, the second follow-up is between 18–24 weeks, and the third follow-up is 28–32. It is recommended to monitor a minimum of four times during pregnancy, with the last follow-up between the 36th and 38th weeks of pregnancy (T.C. Ministry of Health, 2018). The follow-up visits conducted within the recommended time frame were defined as timely antenatal care.

### **Statistical analyses**

SPSS (Statistical Package for Social Sciences) for Windows 25.0 program was used for statistical analysis and data recording. In the study, median, minimum, and maximum values, numbers (n), and percentages (%) were used for descriptive data. Conformity of continuous variables to normal distribution was examined by visual (histogram and probability graphs) and analytical methods (Kolmogorov–Smirnov/Shapiro–Wilk tests). The Mann–Whitney U test was used to compare the two groups (women who received the recommended number of follow-up visits [at least 4 visits] versus women without recommended number of antenatal care) in the data that did not fit the normal distribution. The factors associated with two delivery methods were also compared with the Mann–Whitney U test. The Fisher Exact test and Pearson chi-square tests were used to compare the categorical data. Statistical significance level was determined as  $p < 0.05$ .

**Table 1.** Age and Pregnancy-Related Characteristics of Pregnant Women

Features	
Age, median (min-max)	26.0 (18.0–47.0)
Number of pregnancies, median (min-max)	3.0 (1–10)
High-risk pregnancy, n (%)	48 (9.7)
History of miscarriage, n (%)	56 (11.3)
History of pregnancy with congenital anomalies, n (%)	4 (0.8)

### Ethics

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Medipol University, Istanbul, Turkey (protocol code 59 date of 26 January 2023).

### Results

The median age of 495 pregnant women evaluated within the scope of the study was 26.0 (min: 18.0; max: 47.0). The median number of pregnancies was 3.0 (min: 1.0; max: 10.0). Of the 9.7% ( $n = 48$ ) pregnant women, there was high-risk pregnancy in the current pregnancies. Of the pregnant women, 11.3% ( $n = 56$ ) had a history of miscarriage. Four (0.8%) pregnant women had a history of pregnancy with congenital anomalies (Table 1).

The percentage of pregnant women who had timely follow-up for 1, 2, 3, and 4 visits were 11.5% ( $n = 56$ ), 17.2% ( $n = 80$ ), 20.0% ( $n = 88$ ), and 17.4% ( $n = 73$ ), respectively. According to the compliance of the follow-ups with the appropriate date range, the percentages of timely follow-up of pregnant women are shown in Figure 1.

When the first follow-up data of the pregnant women were evaluated, there was proteinuria of 3.9% ( $n = 18$ ) of 463 pregnant women. The median haemoglobin (Hb) values of the pregnant women were 12.0 (min: 7.6; max: 14.8). The median values of systolic and diastolic blood pressure were 100 (min: 80; max: 140) and 70 (min: 50; max: 90), respectively. When the second follow-up data of the pregnant women were evaluated, there was proteinuria in 4.0% ( $n = 10$ ) of 249 pregnant women. The median haemoglobin values of the pregnant women were 11.8 (min: 7.6; max: 14.3). The median values of systolic and diastolic blood pressure were 100 (min: 81; max: 190) and 70 (min: 49; max: 96), respectively. When the third follow-up data of the pregnant were evaluated, 3.9% ( $n = 6$ ) of 155 pregnant women had proteinuria. The median haemoglobin values of the pregnant women were 11.7 (min: 8.7; max: 13.9). The median values of systolic and diastolic blood pressure were 100 (min: 80; max: 150) and 70 (min: 49; max: 100), respectively. When the fourth follow-up data of the pregnant were evaluated; none of the 84 pregnant women had proteinuria. The median haemoglobin values of the pregnant women were 11.6 (min: 8.6; max: 13.8). The median values of systolic and diastolic blood pressure were 100 (min: 81; max: 130) and 70 (min: 50; max: 90), respectively.

Anaemia was diagnosed in pregnant women with a haemoglobin value below  $<11.0$  g/dL, and the frequency of anaemia was found to be 20.1%, 20.1%, 25.2%, and 25.0% for each 4 follow-ups, respectively. Anaemia was observed during pregnancy follow-up in 127 (27.4%) of 463 pregnant women who were screened for anaemia in at least one follow-up. The percentages of pregnant women with hypertension were 0.6%, 2.0%, 1.3%, and 2.4% for each 4 follow-ups, respectively. Hypertension was observed in 11 (2.4%) of 463 pregnant women who were screened for

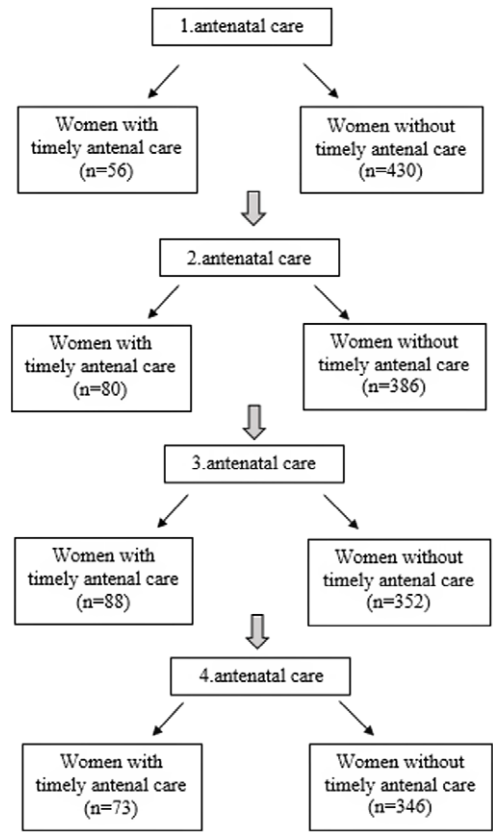


Figure 1. Number of Pregnant Women with Timely Follow-Up Visits.

hypertension in at least one follow-up (Table 2). Proteinuria was observed in 21 (4.5%) of 463 pregnant women whose proteinuria screening was performed in at least one follow-up. In other words, there was no pregnant woman diagnosed with preeclampsia in this study. When the fasting blood glucose (FBG) values of the pregnant women were evaluated, there were 301 pregnant women who had FBG data in the first measurement. Of these pregnant women, 8.6% ( $n = 26$ ) had FBG of 95 mg/dl and above. The rate of getting the recommended dose of tetanus vaccine according to the follow-up intervals of 463 pregnant women with at least one follow-up data was 47.9% ( $n = 222$ ) (Table 2).

During the follow-up visits, spontaneous abortion occurred in 12 (2.4%) pregnant women, and delivery occurred in 211 (42.6%) pregnant women. Of the pregnant women, 64 (30.3%) who gave birth were caesarean section (Table 2). Stillbirth occurred in 2 of 211 pregnant women who gave birth.

According to this study, there were 463 pregnant women (93.5%) who received antenatal care at least once among the 495 Syrian pregnant women registered at the EMHC. Four of the pregnant women were still in the first follow-up date range and had not been followed up yet. Only 17.7% ( $n = 87$ ) of the remaining 491 pregnant women had antenatal follow-up at the recommended number of times during their pregnancy. When the pregnant women's status of having all the recommended follow-ups and related factors are evaluated, in women with high-risk pregnancies, the recommended number of follow-ups was statistically significantly higher ( $p = 0.045$ ). While the recommended number of follow-ups was 29.8% ( $n = 14$ ) in those with high-risk pregnancies,

**Table 2.** Follow-Up Parameters, Delivery Data of Pregnant Women

Parameters	
Presence of anaemia (Hb<11.0 g/dL)	n (%)
Yes	127 (27.4)
No	336 (72.6)
Presence of proteinuria	n (%)
Yes	21 (4.5)
No	442 (95.5)
Presence of hypertension	n (%)
Yes	11 (2.4)
No	452 (97.6)
Fasting blood glucose measurement 95 mg/dl $\geq$	n (%)
Yes	26 (8.6)
No	275 (91.4)
Tetanus vaccine	n (%)
Yes	222 (47.9)
No	241 (52.1)
Data about abortion and delivery	n (%)
Spontaneous abortion	12 (2.4)
Delivery	211 (42.6)
Type of birth	
Caesarean section	64 (30.3)
Normal delivery	147 (69.7)

Hb: haemoglobin, BP: blood pressure.

Column percentages are presented on the table.

this percentage was 17.7% ( $n = 73$ ) in those who did not have a high-risk pregnancy ( $p = 0.045$ ). There was no statistically significant relationship between giving birth before, presence of anaemia, FBG 95 mg/dl and above, age and number of pregnancies with having all the recommended follow-up visits ( $p > 0.05$ ) (Table 3).

When the factors that may be related to the delivery methods of pregnant women are evaluated, the median age of the pregnant women who gave birth with caesarean section was found to be significantly higher than those who had normal delivery ( $p < 0.001$ ). Presence of high-risk pregnancy, giving birth before, presence of anaemia, status of having all follow-up visits, and high fasting blood glucose did not have a significant effect on delivery methods of pregnant women ( $p > 0.05$ ) (Table 4).

When the factors related to miscarriage/stillbirth of pregnant women were evaluated, no significant relationship was found between the presence of high-risk pregnancy, previous delivery, current delivery method, presence of anaemia, high blood glucose, the recommended number of follow-ups, and age ( $p > 0.05$ ) (Table 5).

**Table 3.** Receiving All the Recommended Follow-Up Visits and Related Factors

Parameters		Women who received recommended number of follow up visits (at least 4 visits)				P value
		No		Yes		
		n	%	n	%	
High-risk pregnancy	No	340	82.3	73	17.7	0.045
	Yes	33	70.2	14	29.8	
Previous delivery history	No	75	89.3	9	10.7	0.065
	Yes	329	80.8	78	19.2	
Presence of anemia	No	272	81.9	60	18.1	0.436
	Yes	100	78.7	27	21.3	
FBG 95 mg/dl≥	95 mg/dl <	207	76.1	65	23.9	0.326
	95 mg/dl ≥	22	84.6	4	15.4	
Age, median (min-max)		26.0 (18.0–46.0)		27.0 (18.0–47.0)		0.118
Pregnancy number, median (min- max)		3.0 (1–10)		3.0 (1–10)		0.665

FBG: fasting blood glucose.  
 Row percentages are presented on the table.

**Table 4.** Factors Associated with the Delivery Methods of Pregnant Women

Parameters		Delivery Methods				P value
		Caesarean section		Normal delivery		
		n	%	n	%	
High-risk pregnancy	No	55	29.6	131	70.4	0.099
	Yes	8	50.0	8	50.0	
Previous delivery history	No	12	35.3	22	64.7	0.492
	Yes	52	29.4	125	70.6	
Presence of anaemia	No	44	31.0	98	69.0	0.865
	Yes	19	32.2	40	67.8	
Receiving recommended number visits	No	44	28.0	113	72.0	0.214
	Yes	20	37.0	34	63.0	
FBG 95 mg/dl≥	95 mg/dl <	36	30.5	82	69.5	0.079
	95 mg/dl ≥	6	60.0	4	40.0	
Age, median (min-max)		29.0 (18.0–47.0)		25.0 (18.0–40.0)		<0.001

FBG: fasting blood glucose.

Row percentages are presented on the table.

**Table 5.** Healthy Delivery Status of Pregnant Women and Related Factors

Parameters		Healthy delivery (n = 209)		Miscarriage/stillbirth (n = 14)		P value
		n	%	n	%	
High-risk pregnancy	No	184	94.4	11	5.6	0.115
	Yes	16	84.2	3	15.8	
Previous delivery	No	36	100	0	0	0.134
	Yes	173	92.5	14	7.5	
Delivery methods	C/S	63	100.0	0	0	1.000
	ND	138	99.3	1	0.7	
Presence of anaemia	No	143	92.3	12	7.7	0.359
	Yes	57	96.6	2	3.4	
FBG 95 mg/dl $\geq$	95 mg/dl <	114	95.8	5	4.2	1.000
	95 mg/dl $\geq$	11	100.0	0	0	
Receiving recommended number of visits	No	51	96.2	2	3.8	0.389
	Yes	158	92.9	12	7.1	
Age, median (min-max)		25.0 (18.0–47.0)		29.0 (19.0–43.0)		0.075

C/S: caesarean section, ND: normal delivery, FBG: fasting blood glucose.

Row percentages are presented on the table.



## Discussion

Immigrant pregnant women who cannot receive antenatal care at recommended levels encounter many pregnancy and delivery-related complications such as gestational diabetes and preterm birth (Aydın *et al.*, 2017). Today, the number of Syrian immigrants is increasing, and it is extremely important to evaluate the frequency and quality of health services and antenatal care received by this population. In this way, appropriate interventions will be made in the areas that immigrants need, and the benefit of immigrants from antenatal care services will be increased.

In this study, in which it was aimed to evaluate the health services received by the Syrian pregnant women who received health service from the EMHC during the pandemic, there were 463 pregnant women (93.5%) who received antenatal care at least once among 495 Syrian pregnant women. Only 17.7% ( $n = 87$ ) of the pregnant women had all the follow-ups performed in the recommended number for the relevant pregnancy trimester. In a study conducted in 2019 among Syrian pregnant women in Turkey, the percentage of Syrian pregnant women who received regular antenatal care was reported as 28.1% (Mipatrini *et al.*, 2019). The lower percentage in this study may be due to the decrease in applying to a health institution due to COVID-19 pandemic conditions. In another study conducted in Turkey, it was found that Syrian pregnant women received antenatal care at a lower rate than others. It was reported that 41.3% of Syrian pregnant women and 7.7% of non-immigrant pregnant women did not have antenatal follow-up (Erenel *et al.*, 2017). According to another study conducted in Turkey, it was reported that 46.7% of immigrant pregnant women who were delivered to a tertiary state hospital never had antenatal follow-up (Cantürk *et al.*, 2019). In a study conducted in Lebanon, 63.8% of Syrian immigrant pregnant women received antenatal care at least once (Kabakian-Khasholian *et al.*, 2017). Similar studies in the literature show that the receiving of antenatal care by immigrant pregnant women is extremely low. Some factors such as language barriers, communication problems, social isolation, and cultural differences may be barriers to high levels of care services in immigrant groups (Chu *et al.*, 2017).

In a study conducted with Afghan immigrants in Iran, it has been reported that among immigrant pregnant women, older women, those with higher education and income, those who have resided for a long time, and those who have legal immigrant status receive more antenatal care (Dadras *et al.*, 2020). Similarly, a study conducted in Bangladesh found that immigrant pregnant women who had been residing in the host country for a long time were employed and had higher educational levels received more antenatal care (Islam and Gagnon, 2016). According to this study, the percentage of receiving all recommended follow-ups was found to be higher in women with high-risk pregnancies. Awareness of antenatal care services for those with high-risk pregnancies may be higher thanks to the recommendations of healthcare professionals. According to the results of both this study and the literature, the necessary awareness should be raised about the importance of continuity of antenatal care services. There is also a need for detailed qualitative studies examining the factors affecting the non-completion of the recommended antenatal care services of immigrant pregnant women. Besides, healthcare professionals can increase awareness about antenatal care among immigrants.

Timely access to perinatal health care is an effective method for improving pregnancy and childbirth processes and optimizing the health of the pregnant woman and her baby throughout life. Delayed access to maternity care may cause adverse perinatal outcomes (Heslehurst *et al.*, 2018). In this study, the percentage of follow-up of pregnant women within the recommended time interval (11.5–20.0%) was also quite low. In a large sample study conducted in Australia, immigrant pregnant women started to receive antenatal care services later than native pregnant women. More than half of the immigrant pregnant women performed their first antenatal care after the 14th gestational week (Mozooni *et al.*, 2020). In the same study, it was found that delayed antenatal care increased stillbirth rates (Mozooni *et al.*, 2020). For these reasons, it is important to pay attention to not only having the necessary number of antenatal care visits but also ensuring

that these visits are conducted with appropriate quality and within appropriate time intervals in immigrant pregnant women.

In order to prevent negative pregnancy outcomes, it is necessary to regulate blood glucose and blood pressure levels in pregnant women. When the fasting blood glucose values of the pregnant women in this study were evaluated, the FBG of 8.6% was 95 mg/dl and above. Many studies in the literature have shown that immigrant women are at high risk for the development of GDM (Gagnon *et al.*, 2011). In cases where (protein in the urine) proteinuria is observed in pregnant women, care should be taken in terms of the development of preeclampsia, which is a clinical picture accompanied by proteinuria and hypertension. Of the complications in pregnant women, 2–8% are caused by preeclampsia (ACOG, 2023). In order to prevent health risks caused by preeclampsia, blood pressure measurements of pregnant women and the presence of proteinuria are examined in antenatal care services. The percentage of isolated proteinuria in pregnant women can be up to 8.0% according to the literature (Bartal *et al.*, 2022). The prevalence of pregnancy-associated hypertension has been reported as 13.0% in the literature (Ford *et al.*, 2022). While none of the pregnant women in this study had preeclampsia, the rate of pregnant women with hypertension was 2.4% during follow-up. The rate of pregnant women with proteinuria is 4.5% during follow-up. According to the literature, the incidence of pregnancy-related hypertensive disease in immigrant pregnant women and in the resident community varies (Fasanya *et al.*, 2021; Sole *et al.*, 2018). In some studies, while the risk of pregnancy-related hypertensive disease is higher in immigrants, in others, pregnant women in the resident community have a higher risk of hypertensive disease. The variability in the results of studies conducted in different populations may be due to the genetic characteristics of different races that may predispose them to preeclampsia and gestational hypertension. Further studies are needed in this regard.

Iron deficiency anaemia in pregnant women can cause health problems such as low maternal weight gain, depression, preterm delivery, and an increase in complications during delivery (Haider *et al.*, 2013; Wassef *et al.*, 2019). Anaemia in pregnant women is an important public health problem, and its prevalence is over 20% in most of the countries (Garzon *et al.*, 2020). Anaemia that is not treated and diagnosed lately can cause maternal and perinatal morbidity and mortality (Smith *et al.*, 2019). For this reason, anaemia screening of pregnant women should be done in antenatal care services. In one of the studies, the risk of anaemia in immigrant pregnant women was found to be higher than the Canadian-born local population (Ménard *et al.*, 2020). Although the frequency of anaemia in immigrant pregnant women in this study varied between 20.1% and 25.2% during their follow-up; 27.4% of pregnant women who have undergone anaemia screening at least once have anaemia. In a study conducted in Turkey, the prevalence of anaemia in pregnant women was reported as 22.5% (Dabankara *et al.*, 2022). In another study conducted in Turkey, the frequency of anaemia in pregnant women was reported as 24.2% (Çıkım and Tok, 2020). According to the studies in the literature, the prevalence of anaemia in non-immigrant pregnant women in Turkey and the rates of immigrant pregnant women with anaemia according to the results of this study are similar. Unfortunately, the prevalence of anaemia is high both in immigrant pregnant women and in the resident community. It is necessary to improve the nutritional conditions that may cause anaemia in pregnant women. Populations with low economic status, such as immigrants, should be provided with essential nutrient support, especially during special care periods such as pregnancy. In addition, in some societies, controlled consumption of foods such as coffee and tea, which prevent iron absorption, should be ensured during pregnancy.

According to the results of this study, 12 women experienced miscarriage, and 211 immigrant pregnant women gave birth (2 were stillbirths). The remaining 272 women were still pregnant during study period. The rate of delivery by caesarean section is 30.3% of 211 pregnant women in this study. While 27.0% of all deliveries were made by caesarean section in the Syrian immigrant

pregnant sample of the Turkey Demographic and Health Survey (TNSA) 2018 study (Çavlin, 2018a), according to TNSA 2018 general population data, 52% of all deliveries were made by caesarean section (Çavlin, 2018b). According to the recommendation of the World Health Organization, caesarean delivery rates should be around 10–15% (Betrán *et al.*, 2016). According to studies in the literature, these rates are unfortunately higher than recommended. In some of the studies in which immigrant pregnant women were compared with the resident community, higher caesarean rates were observed in immigrants (Río *et al.*, 2010); in some, a higher rate of cesarean delivery occurs in the resident community (Vangen *et al.*, 2000). In some studies, there is no significant difference between the caesarean section rates of immigrant pregnant women and the resident community (David *et al.*, 2015). The differences between the results of the study may be due to the planned or interventional caesarean section of cesarean deliveries. Since caesarean deliveries with intervention may be caused by risks and complications in pregnancy, it is necessary to increase the utilization of antenatal care services in order to reduce caesarean delivery rates both in immigrants and in the general population.

### **Limitations and strengths of the study**

Even though this study provides extensive data in an important field, data are limited by the available records. Data that may affect the application to a health institution, such as the education level, income, and presence of chronic diseases of the pregnant women, could not be evaluated within the scope of this research. Another limitation is the inability to question the barriers of pregnant women who did not benefit from care services within the recommended date range and those who did not receive any care services. Conditions in COVID-19 pandemic are also among the factors that may affect the applications of pregnant women. Vulnerable groups such as pregnant and postpartum women experience difficulties in accessing preventive and therapeutic services, especially during an emergency such as a pandemic. A significant number of pregnant women have neglected their antenatal care during the pandemic period (Tadesse, 2020). The low rate of receiving antenatal care services among Syrian pregnant women in this study may have decreased even more due to the COVID-19 pandemic. There is a need for further qualitative and quantitative studies in which the barriers associated with the use of care services by immigrant pregnant women are questioned. This study presents a wide range of data regarding the antenatal follow-ups of pregnant women, their laboratory values, anaemia and hypertension prevalences, and socio-demographic characteristics. The fact that our sample size is higher than similar studies in the literature is one of the strengths of this study. In addition, cesarean delivery rates in pregnant women who gave birth were also examined in this study. The results of this study make an important contribution to the literature, as there is no existing study that presents all these data together for Syrian pregnant women.

### **Conclusions**

According to our results, the percentage of pregnant women who received antenatal care services at least once was 93.5%. Only 17.7% of the pregnant women had all the recommended antenatal care follow-up visits. The results of the study show that the rate of receiving adequate antenatal care in immigrant pregnant women is very low, with applications to care services occurring much later than the recommended date. Interventions are needed in this regard. Increasing the utilization of antenatal care services by immigrant pregnant women in accordance with the recommendations is extremely important for both the health of the pregnant woman and the health of the baby. The results of this study will contribute to filling the gap in the literature in this field, particularly highlighting the utilization of antenatal care services by Syrian immigrant pregnant women and the prevalence of anaemia and hypertension during the pandemic. This

study will provide insights for policy and health regulations to develop more focused and targeted interventions for immigrant populations.

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## References

- Arabacı Z, Hasgöl E and Serpen AS (2016) Migrant women and migration's effect on women's health in Turkey. *Sosyal Politika Çalışmaları Dergisi* **36**, 129–144.
- Aydın R, Körükcü Ö and Kabukçuoğlu K (2017) Bir göçmen olarak anneliğe geçiş: riskler ve engeller. *Current Approaches in Psychiatry* **9**, 250–262.
- Bartal MF, Lindheimer MD and Sibai BM (2022) Proteinuria During Pregnancy: Definition, Pathophysiology, Methodology, and Clinical Significance. *American Journal of Obstetrics and Gynecology* **226**, S819–S834.
- Betrán AP, Torloni MR, Zhang J-J, Gülmezoglu A, Aleem H, Althabe F and WHO Working Group on Caesarean Section (2016) WHO statement on caesarean section rates. *BJOG : An International Journal of Obstetrics and Gynaecology* **123**, 667–670.
- Cantürk FK, Dağlı SS and Cantürk M (2019) Analysis of perinatal outcomes of Syrian refugees in the province of Kırşehir. *Ahi Evran Medical Journal* **3**, 6–11.
- Çavlin A (2018a) Turkey Demographic and Health Survey Syrian Migrant Sample. Hacettepe University Institute of Population Studies Ankara, Turkey.
- Çavlin A (2018b) Turkey Demographic and Health Survey. Hacettepe University Institute of Population Studies Ankara, Turkey.
- Chu MS, Park M and Kim JA (2017) First childbirth experience of international marriage migrant women in South Korea. *Women Birth* **30**, e198–e206.
- Çıkım G and Tok A (2020) Evaluation of the frequency of iron deficiency anemia in healthy pregnant women according to trimesters. *F.Ü. Sağlık Bilimleri Tıp Dergisi* **34**, 249–253.
- Dabankara A, Kaplan İ and Atakul T (2022) The relationship between hemogram parameters observed in the second trimester and birth weight-retrospective case control study. *The Journal of Health Sciences and Life* **6**, 1–7.
- Dadras O, Dadras F, Taghizade Z, Seyedalinaghi S, Ono-Kihara M and Kihara M and Nakayama T (2020) Barriers and associated factors for adequate antenatal care among Afghan women in Iran; findings from a community-based survey. *BMC Pregnancy Childbirth* **20**, 1–11.
- David M, Borde T, Brenne S, Henrich W, Breckenkamp J and Razum O (2015) Caesarean section frequency among immigrants, second-and third-generation women, and non-immigrants: prospective study in Berlin/Germany. *PLoS One* **10**, e0127489.
- Desdicioğlu R, Coşkun A, Gediktaş, S, Keskin HL and Tekin ÖM (2021) The effect of COVID-19 pandemic on the antenatal care. *Turkish Journal of Health Research* **2**, 15–18.
- Erenel, H, Aydoğan Mathyk, B, Sal, V, Ayhan, I, Karatas, S and Koc Bebek, A (2017) Clinical characteristics and pregnancy outcomes of Syrian refugees: a case–control study in a tertiary care hospital in Istanbul, Turkey. *Archives of Gynecology and Obstetrics* **295**, 45–50.
- Fasanya HO, Hsiao CJ, Armstrong-Sylvester KR and Beal SG (2021) A critical review on the use of race in understanding racial disparities in Preeclampsia. *The Journal of Applied Laboratory Medicine* **6**, 247–256.
- Ford ND, Cox, S, Ko JY, Ouyang L, Romero L, Colarusso T, Ferre, CD, Kroelinger CD, Hayes DK and Barfield WD. (2022) Hypertensive disorders in pregnancy and mortality at delivery hospitalization—United States, 2017–2019. *Morbidity and Mortality Weekly Report* **71**, 585.
- Gagnon AJ, McDermott S, Rigol-Chachamovich J, Bandyopadhyay M, Stray-Pedersen B, Stewart D and ROAM Collaboration (2011) International migration and gestational diabetes mellitus: a systematic review of the literature and meta-analysis. *Paediatric and Perinatal Epidemiology* **25**, 575–592.

- Garzon S, Cacciato PM, Certelli C, Salvaggio C, Magliarditi M and Rizzo G** (2020) Iron deficiency anemia in pregnancy: novel approaches for an old problem. *Oman Medical Journal* **35**, e166.
- Gilder ME, Zin TW, Wai NS, Ner M, Say PS, Htoo M, Say S, Htay WW, Simpson JA, Pukrittayakamee S, Nosten F and McGready R** (2014) Gestational diabetes mellitus prevalence in Maela refugee camp on the Thai-Myanmar border: a clinical report. *Global Health Action* **7**, 23887.
- Gushulak BD, Weekers J and MacPherson DW** (2009) Migrants and emerging public health issues in a globalized world: threats, risks and challenges, an evidence-based framework. *Emerging Health Threats Journal* **2**, e10.
- Haider B, Olofin I, Ezzati M and Fawzi WW** (2013) Nutrition impact model study group (anaemia). Anaemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. *BMJ* **346**, f3443.
- Heslehurst N, Brown H, Pemu A, Coleman H and Rankin J** (2018) Perinatal health outcomes and care among Asylum seekers and refugees: a systematic review of systematic reviews. *BMC Medicine* **16**, 1–25.
- Islam MM and Gagnon AJ** (2016) Use of reproductive health care services among urban migrant women in Bangladesh. *BMC Womens Health* **16**, 1–7.
- Kabakian-Khasholian, T, Mourtada, R, Bashour, H, Kak, FE and Zurayk, H** (2017) Perspectives of displaced Syrian women and service providers on fertility behaviour and available services in West Bekaa, Lebanon. *Reproductive Health Matters* **25**, 75–86.
- Luger, RK and Kight BP** (2022) Hypertension In Pregnancy. [Updated 2022 Oct 3]. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing [Available from: <https://www.ncbi.nlm.nih.gov/books/NBK430839/>] (Accessed on 05 February 2023).
- May L and Delston JB** (2017) United Nations Universal Declaration of Human Rights. In *Applied Ethics* (pp. 54–57) Routledge.
- Ménard V, Sotunde OF and Weiler HA** (2020) Ethnicity and immigration status as risk factors for gestational diabetes mellitus, anemia and pregnancy outcomes among food insecure women attending the montreal diet dispensary program. *Canadian Journal of Diabetes* **44**, 139–145.
- Mipatrini D, Balcilar M, Dembech M, Ergüder T and Ursu P** (2019) *Survey on the Health Status, Services Utilization and Determinants of Health: Syrian Refugee Population in Turkey*. Copenhagen, Denmark: World Health Organization. Regional Office for Europe.
- Mozzoni M, Pennell CE and Preen DB** (2020) Healthcare factors associated with the risk of antepartum and intrapartum stillbirth in migrants in Western Australia (2005–2013): a retrospective cohort study. *PLoS Medicine* **17**, e1003061.
- Nazik F, Yükkseköl ÖD, Baltacı N and Uluçan M** (2022) Pregnant women receiving prenatal care and the impact of the COVID-19 pandemic. *Journal of TOGU Health Sciences* **2**, 111–122.
- Oral B and Çetinkaya F** (2017) Sosyolojik bir olgu olarak göç, tanımı, nedenleri ve göç kuramları. *Türkiye Klinikleri J Public Health* **3**, 1–8.
- Peltokorpi V** (2010) Intercultural communication in foreign subsidiaries: the influence of expatriates' language and cultural competencies. *Scandinavian Journal of Management* **26**, 176–188.
- Rio I, Castello A, Barona C, Jane M, Mas R, Rebagliato M, Bosch S, Martínez E and Bolívar F** (2010) Caesarean section rates in immigrant and native women in Spain: the importance of geographical origin and type of hospital for delivery. *European Journal of Public Health* **20**, 524–529.
- Riza E, Kalkman S, Coritsidis, A, Koubardas S, Vassiliu S, Lazarou D, Karnaki P, Zota D, Kantzanou M, Psaltopoulou T and Linos A** (2020) Community-based healthcare for migrants and refugees: a scoping literature review of best practices. *Healthcare* **8**, 115.
- Schoevers MA, van den Muijsenbergh ME and Lagro-Janssen AL** (2010) Illegal female immigrants in The Netherlands have unmet needs in sexual and reproductive health. *Journal of Psychosomatic Obstetrics and Gynaecology* **31**, 256–264.
- Smith C, Teng F, Branch E, Chu S and Joseph K** (2019) Maternal and perinatal morbidity and mortality associated with anemia in pregnancy. *Obstetrics and Gynecology* **134**, 1234.
- Sole KB, Staff AC and Laine K** (2018) The association of maternal country of birth and education with hypertensive disorders of pregnancy: a population-based study of 960 516 deliveries in Norway. *Acta Obstetrica et Gynecologica Scandinavica* **97**, 1237–1247.
- Tadesse E** (2020) Antenatal care service utilization of pregnant women attending antenatal care in public hospitals during the COVID-19 pandemic period. *International Journal of Women's Health* **12**, 1181–1188.
- T.C. Ministry of Health, General Directorate of Public Health, Department of Women's and Reproductive Health** (2018) Antenatal Care Management Guidelines (Publication No: 925). [Available from: [https://hsgm.saglik.gov.tr/depo/birimler/Kadin\\_ve\\_Ureme\\_Sagligi\\_Db/dokumanlar/rehberler/dogum\\_onesi\\_bakim\\_2020.pdf](https://hsgm.saglik.gov.tr/depo/birimler/Kadin_ve_Ureme_Sagligi_Db/dokumanlar/rehberler/dogum_onesi_bakim_2020.pdf)] (Accessed on 02 February 2023).
- T.C. Ministry of Interior Presidency of Migration Management** [Available from: <https://www.goc.gov.tr/gecici-koruma5638>] (Accessed on 16 February 2023).
- The American College of Obstetricians and Gynecologists (ACOG)** Preeclampsia and High Blood Pressure During Pregnancy. [Available from: [https://www.acog.org/womens-health/faqs/preeclampsia-and-high-blood-pressure-during-pregnancy?utm\\_source=redirect&utm\\_medium=web&utm\\_campaign=otn](https://www.acog.org/womens-health/faqs/preeclampsia-and-high-blood-pressure-during-pregnancy?utm_source=redirect&utm_medium=web&utm_campaign=otn)] (Accessed on 04 February 2023).

- The American College of Obstetricians and Gynecologists (ACOG)** (2005) Pregestational diabetes mellitus. ACOG practice bulletin. *Obstetrics and Gynecology* **105**, 675–685.
- Vangen S, Stoltenberg C, Skrandal A, Magnus P and Stray-Pedersen B** (2000) Cesarean section among immigrants in Norway. *Acta Obstetrica et Gynecologica Scandinavica* **79**, 553–558.
- Wassef A, Nguyen QD and St-André M** (2019) Anaemia and depletion of iron stores as risk factors for postpartum depression: a literature review. *Journal of Psychosomatic Obstetrics and Gynaecology* **40**, 19–28.
- World Health Organization (WHO)** (2002) Essential Antenatal, Perinatal and Postpartum Care [Available from: <https://apps.who.int/iris/bitstream/handle/10665/107482/E79235.pdf?sequence=1&isAllowed=y>] (Accessed on 01 February 2023).
- World Health Organization (WHO)**. Anemia. [Available from: <https://www.who.int/data/nutrition/nlis/info/anaemia>] (Accessed on 10 February 2023).