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# Do Obstetricians' Knowledge and Approaches to HIV and Pregnancy Reflect the State-of-the-Art Literature in the Era of Contemporary ARTs, U=U, and PrEP?

Günümüz ART, U=U ve PrEP Döneminde Obstetrisyenlerin HIV ve Gebeliğe Yönelik Bilgi ve Yaklaşımları Güncel Literatürü Yansıtıyor mu?

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## Abstract

**Introduction:** Obstetricians are very important intermediaries for reaching and engaging with women living with Human Immunodeficiency Virus (HIV) or women at risk for acquiring HIV. Thus, they should acquire up-to-date HIV knowledge for them to make clinical decisions in prepregnancy counseling and follow-up of HIV-positive pregnant women.

**Materials and Methods:** This study assessed obstetricians' knowledge about HIV and pregnancy and their behaviors regarding the follow-up of HIVpositive pregnant women using a 54-item face-to-face and online questionnaire administered to physicians working in Türkiye between February and May 2023. This cross-sectional study questionnaire consists of four sections including following up of HIV+ pregnancies, knowledge of HIV, undetectable=untransmittable (U=U) pre-exposure prophylaxis (PrEP), and patient management or treatment approaches.

**Results:** A total of 133 obstetricians and gynecologists, comprising 15 (11.3%) academic members, 43 (32.3%) specialists, and 75 (56.4%) residents, participated in this study. A significant proportion of respondents felt that they knew nothing (2.2%) or little (34.6%) about HIV/Acquired Immunodeficiency Syndrome. A substantial proportion of respondents with <5 years of experience (40.5%, p=0.001) stated they had never attended a scientific meeting on HIV and had never read a guideline or article, whereas 34.6% had never followed up an HIV-positive pregnancy, and 43.6% reported having followed up only one to five HIV-positive pregnancies. Of the participants, 49.6% believed that HIV is an infection that will continue to progress and lead to death despite treatment, 74.4% reported they had never heard of the term U=U, and only 18.8% stated they had some knowledge on PrEP. Knowledge regarding the use of semen preparation techniques and indications for cesarean section and intravenous zidovudine in pregnant women with HIV was reportedly lacking.

**Conclusion:** The knowledge level on HIV, the disease course, the efficacy of antiretroviral drugs, and the use of these drugs in pregnancy among obstetricians participating in our study is insufficient. Considering that the incidence and prevalence of HIV will continue to increase significantly in the coming years and that a significant proportion of this increase will be young women of childbearing age, obstetricians and gynecologists must keep themselves up-to-date on HIV and pregnancy.

Keywords: HIV-positive pregnant woman, undetectable=untransmittable, U=U, preexposure prophylaxis, obstetricians' knowledge

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# Öz

Giriş: Kadın doğum uzmanları, İnsan Bağışıklık Yetmezliği Virüsü (HIV) ile yaşayan ya da HIV bulaşma riski taşıyan kadınlara ulaşma ve onlarla iletişim kurma konusunda çok önemli aracılardır. Kadın doğum uzmanlarının güncel HIV bilgisi, gebelik öncesi danışmanlık ve HIV pozitif gebe kadınların takibinde klinik kararlar alabilmeleri için de önemlidir.

Gereç ve Yöntem: Kadın doğum uzmanlarının HIV ve gebelik hakkındaki bilgilerini ve HIV pozitif gebelerin takibine ilişkin davranışlarını değerlendirmek amacıyla katılımcılara 54 soruluk yüz yüze ve çevrimiçi bir anket uygulanmıştır. Anketimiz demografik bilgiler, HIV, belirlenemeyen=bulaştırmayan (B=B), maruziyet öncesi profilaksi (PrEP), hasta yönetimi ve tedavi yaklaşımları ile ilgili soruları içeren beş bölümden oluşmaktadır.

**Bulgular:** Çalışmaya 15'i (%11,3) öğretim üyesi, 43'ü (%32,3) uzman ve 75'i (%56,4) asistan olmak üzere toplam 133 kadın hastalıkları ve doğum uzmanı katılmıştır. Katılımcıların önemli bir kısmı HIV/Edinilmiş Bağışıklık Yetmezliği Sendromu (AIDS) hakkında hiçbir şey bilmediğini (%2,2) veya çok az şey bildiğini (%34,6) düşünmektedir. Beş yıldan az deneyime sahip katılımcıların önemli bir kısmı (%40,5) HIV ile ilgili hiçbir bilimsel toplantıya katılmadıklarını ve hiçbir kılavuz ya da makale okumadıklarını belirtmiştir. Katılımcıların %34,6'sı hiç HIV pozitif gebelik takip etmemişken, %43,6'sı sadece bir ila beş HIV pozitif gebelik takip ettiğini bildirmiştir. Katılımcıların %49,6'sı HIV'in tedaviye rağmen ilerlemeye devam edecek ve ölüme yol açacak bir enfeksiyon olduğuna inanırken, %74,4'ü U=U terimini hiç duymadığını ve sadece %18,8'i PrEP hakkında biraz bilgi sahibi olduğunu söylemiştir. HIV'li gebe kadınlarda sperm hazırlama teknikleri, sezaryen endikasyonları ve intravenöz zidovudin kullanımı hakkında bilgi eksikliği vardı.

**Sonuç:** Türkiye'de kadın doğum uzmanları arasında HIV virüsü, hastalığın seyri, antiretroviral ilaçların etkinliği ve bu ilaçların gebelikte kullanımı konusunda bilgi düzeyi yeterli değildir. HIV insidansının ve prevalansının önümüzdeki yıllarda önemli ölçüde artmaya devam edeceği ve bu artışın önemli bir bölümünü doğurganlık çağındaki genç kadınların oluşturacağı düşünüldüğünde, kadın hastalıkları ve doğum uzmanlarının HIV ve gebelik konusunda kendilerini güncel tutmaları büyük önem taşımaktadır.

Anahtar Kelimeler: HIV pozitif gebe kadın, belirlenemeyen=bulaştırmayan, U=U, maruziyet öncesi profilaksi, kadın doğum uzmanlarının bilgisi

## Introduction

Recent advances in antiretroviral therapies (ART) for the Human Immunodeficiency Virus (HIV) have developed treatments that are resistant to the occurrence of resistance, are easy to use, and have a better short- and long-term side-effect profile. Consequently, global treatment coverage has increased, and the life expectancy of people living with HIV (PLWH) has improved. Virological suppression achieved with treatment has contributed to a reduction in HIV incidence at the community level, in addition to its positive contribution to health at the individual level<sup>[1]</sup>. Reducing new infections among adolescents and young women, as well as other key populations such as sex workers and men who have sex with men, and injecting drug users and transgender people, are key to eliminating HIV infection and achieving the Joint United Nations Programme on HIV/Acquired Immune Deficiency Syndrome (UNAIDS) 95-95-95 targets by 2030<sup>[2]</sup>.

As the life expectancy of PLWH approaches that of the general population, issues such as living without social exclusion, avoiding stigma and discrimination, and preventing comorbidities associated with aging, which were not priorities a few decades ago, can be addressed. Some authorities referred this as the fourth target, but not officially adopted by UNAIDS, to improve HIV health-related quality of life (HrQoL) by addressing comorbidities and other psychosocial challenges<sup>[3]</sup>. The desire to have children is one of the most important components of HrQoL.

The treatment concepts such as prevention based on ART (TasP) and pre-exposure prophylaxis (PrEP), which have emerged in the last decade, have resulted in very important innovations in pregnancy management about HIV and the approach to PLWH. TasP refers to the use of ART in decreasing transmission in PLWH. Undetectable=untransmittable (U=U) is defined as people with suppressed HIV viral loads who cannot transmit HIV sexually with effective treatment as a result of scientific evidence from TasP. Converely, PrEP involves the use of ART by HIV-uninfected individuals to reduce the risk of potential transmission through sexual intercourse. Accumulating evidence supports the key role of U=U and PrEP in decreasing HIV transmission and incidence<sup>[4]</sup>. Furthermore, provided the above conditions are met, HIV serodiscordant couples who want to have a child can have a safe sexual intercourse without using a condom in terms of the risk of HIV transmission<sup>[5]</sup>.

When HIV infection is considered in women and reproductive health, historical evidence suggests that the risk of HIV transmission from an ART-naive HIV-positive pregnant woman to her baby is 25-30%, which increases by 5-20% with breastfeeding. This risk can be reduced by increasing the frequency of HIV diagnostic testing, starting treatment as early as possible, planning cesarean sections, and preventing breastfeeding<sup>[6]</sup>. Screening all pregnant women for HIV infection, providing sexual health information to HIV-positive women, and raising their awareness are critical for achieving the goal of eliminating HIV<sup>[7]</sup>.

All this points to obstetricians as very important intermediaries for reaching and engaging with women. Therefore, they should acquire up-to-date HIV knowledge for them to make clinical decisions in pre-pregnancy counseling and follow-up of HIVpositive pregnant women. Furthermore, the fact that vertical transmission from mother to child is one of the most important routes of transmission following sexual intercourse, especially in developing countries, obstetricians are among the most critical physicians in ending the HIV epidemic. The low level of HIV knowledge among obstetricians negatively affects their management approach to pregnant women and HIV-positive pregnant women who want to become pregnant, and this contributes negatively to the stigma and discrimination faced by PLWH. In other words, obstetricians are one of the most important clinical specialties for HIV, following HIV specialists and infectious disease specialists, who are clinicians who provide primary HIV care, and thereby, the level of knowledge and awareness of these clinicians about HIV and HIV-positive pregnancy care should be increased.

This study aimed to determine the level of experience of obstetricians in Türkiye in following up HIV-positive pregnant women, their level of awareness of this issue, their level of knowledge, and their level of competence in the follow-up of HIV-positive pregnant women.

## Materials and Methods

The study population consisted of obstetricians and obstetric assistants caring for pregnant women in Türkiye. A 54-item questionnaire was designed to assess obstetricians' and gynecologists' knowledge of HIV and pregnancy and their behaviors about the care of HIV-positive pregnant women. The questionnaires were administered both face-to-face in the hospitals where the doctors worked and as an online questionnaire that the doctors forwarded to their colleagues. Sample selection was made with "snowball sampling." In the study, different groupings were considered to determine differences in knowledge level at each category, as well as differences in secondary and tertiary care hospitals. After obtaining informed consent, a total of 133 participants were included in the study. This is a multicentre study conducted in both secondary and tertiary hospitals. Our questionnaire is a cross-sectional study consisting of four sections: "Questions to assess obstetricians' general attitudes toward following up HIV+pregnancies," "Questions to assess obstetricians' general knowledge of HIV," "Questions to assess obstetricians' general knowledge of U=U and PrEP," and "Questions to assess how obstetricians manage and treat HIV-positive pregnancies."

The questionnaire was conducted face-to-face and online by medical students. After the survey, results were evaluated separately by two infectious diseases and clinical microbiology specialists. The evaluating experts were blinded on the information about the participants. Furthermore, peer assessment was obtained when formulating the questions. It was not aimed to obtain any total or average score from the questionnaire used in the study. Furthermore, the questionnaire items were evaluated separately. Considering these situations, no analysis related to the validity-reliability processes was needed, and the items were evaluated as questionnaire questions.

Our questions were divided into four different groups. Questions in the first group allow us to assess the obstetricians' perspectives on HIV and PLWH in general. We tried to understand whether they followed up with HIV-positive pregnant women. If not, was this because of fear of HIV transmission or lack of knowledge or experience? We also tried to measure whether obstetricians had attended a scientific meeting or read an article on pregnancy with HIV and their level of interest in HIV (Table 1).

Table 1. Questions to assess obstetricians	general attitudes toward	I following up HIV+pregnancies
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What is your leve regarding HIV/AID	l of knowledge S?	No	Little	Enough	Advanced	p-value
Total		3 (2.2%)	46 (34.6%)	67 (50.4%)	17 (12.8%)	
By hospital type	Secondary hospitals	3.1%	25.0%	46.9%	25.0%	0.099
	Tertiary hospitals	2.0%	37.6%	51.5%	8.9%	
By years of	0-5 years	4.0%	47.3%	41.9%	6.8%	0.004
experience	6-10 years	0.0%	38.9%	38.9%	22.2%	]
	11-20 years	0.0%	15.4%	65.4%	19.2%	
	>20 years	0.0%	0.0%	80.0%	20.0%	
By types of professional	Residents	4.0%	46.7%	41.3%	8.0%	0.008
	Specialists	0.0%	22.7%	56.8%	20.5%	
ucgree	Academics	0.0%	7.1%	78.6%	14.3%	

Table 1. Continue	ed						
What is your level regarding HIV/AID	of knowledge S?	No	Little	Enough	Advanced		p-value
How confident are follow-up care for pregnancies?	e you in providing r HIV-positive	Unconfident	Partially confident	Totally confident			p-value
Total		20 (15%)	81 (60.9%)	32 (24.1%)			
By hospital type	Secondary hospitals	9.3%	71.9%	18.8%			0.329
	Tertiary hospitals	16.9%	57.4%	25.7%			]
By years of	0-5 years	13.5%	55.4%	31.1%			0.545
experience	6-10 years	16.7%	72.2%	11.1%			]
	11-20 years	19.2%	65.4%	15.4%			
	>20 years	13.3%	<b>66.7</b> %	20.0%			
By types of	Residents	14.7%	53.3%	32.0%			0.065
professional	Specialists	11.4%	75.0%	13.6%			
	Academics	28.6%	57.1%	14.3%			
When did you last symposia, etc., ab pregnancy and he	t attend a talk, out HIV and ar from an expert?	Never	Within a year	Within 1-5 years	Within 6-10 years	>10 years	p-value
Total		33 (24.8%)	17 (12.8%)	45 (33.9%)	24 (18%)	14 (10.5%)	
By hospital type	Secondary hospitals	15.6%	3.1%	31.3%	34.4%	15.6%	0.021
	Tertiary hospitals	27.7%	15.8%	34.7%	12.9%	8.9%	1
By years of	0-5 years	40.5%	14.9%	36.5%	6.8%	1.3%	0.001
experience	6-10 years	0.0%	16.7%	38.9%	38.9%	5.5%	
	11-20 years	7.7%	11.5%	26.9%	34.7%	19.2%	
	>20 years	6.6%	0.0%	26.7%	20.0%	46.7%	
By types of	Residents	40.0%	16.0%	33.4%	9.3%	1.3%	0.001
professional degree	Specialists	6.8%	4.6%	31.8%	31.8%	25.0%	
	Academics	0.0%	21.4%	42.9%	21.4%	14.3%	
When did you last guideline about H	t read an article or IV and pregnancy?	Never	Within a year	Within 1-5 years	Within 6-10 years	>10 years	p-value
Total		34 (25.6%)	42 (31.6%)	37 (27.8%)	10 (7.5%)	10 (7.5%)	
By hospital type	Secondary hospitals	12.5%	25.0%	37.5%	6.2%	18.8%	0.019
	Tertiary hospitals	29.7%	33.7%	24.7%	7.9%	4.0%	
By years of	0-5 years	41.9%	28.4%	23.0%	6.7%	0.0%	0.001
experience	6-10 years	5.6%	33.3%	50.0%	11.1%	0.0%	
	11-20 years	7.7%	38.5%	19.2%	7.7%	26.9%	
	>20 years	0.0%	33.3%	40.0%	6.7%	20.0%	
By types of	Residents	42.7%	28.0%	21.3%	8.0%	0.0%	0.001
protessional degree	Specialists	4.5%	25.0%	40.9%	9.1%	20.5%	
	Academics	0.0%	71.5%	21.4%	0.0%	7.1%	
Under what condi provide follow-up positive pregnant	tions do you care for HIV- women?	l do not	With a multidisciplinary team of experts in my hospital	Consultation with specialists from other hospitals if required	I do not have consult, I do it	experts to myself	p-value
Total		33 (24.8%)	79 (59.4%)	13 (9.8%)	8 (6.0%)		

Table 1. Continue	ed				r	
What is your level regarding HIV/AID	of knowledge S?	No	Little	Enough	Advanced	p-value
By hospital type	Secondary hospitals	37.5%	28.1%	21.9%	12.5%	0.001
	Tertiary hospitals	20.8%	69.3%	5.9%	4.0%	
By years of	0-5 years	29.7%	63.5%	4.1%	2.7%	0.13
experience	6-10 years	16.7%	44.4%	16.7%	22.2%	
	11-20 years	26.9%	50.0%	15.4%	7.7%	
	>20 years	6.7%	73.3%	20.0%	0.0%	
By types of	Residents	28.0%	64.0%	4.0%	4.0%	0.013
professional	Specialists	27.3%	45.4%	15.9%	11.4%	
ucgree	Academics	0.0%	78.6%	21.4%	0.0%	
In comparison to normal pregnancies, what would be your approach to the follow-up of HIV-positive pregnant women?		I follow-up with HIV-positive pregnant women as I would with HIV-negative pregnancies	I would definitely involve other specialties like infectious diseases and internal medicine and follow patients with a multidisciplinary team	If additional interventions such as assisted reproductive techniques are not available, I would refer the pregnant woman to a more advanced center	I would refer the patient to a more advanced hospital; I do not follow up with HIV-positive pregnant women	p-value
Total		14 (10.5%)	108 (81.2%)	6 (4.5%)	5 (3.8%)	
By hospital type	Secondary hospitals	12.4%	75.0%	6.3%	6.3%	0.594
	Tertiary hospitals	9.9%	83.2%	4.0%	3.0%	
By years of	0-5 years	14.9%	79.7%	4.0%	1.4%	0.107
experience	6-10 years	5.6%	94.4%	0.0%	0.0%	
	11-20 years	3.8%	73.1%	11.6%	11.5%	
	>20 years	6.7%	<b>86.7</b> %	0.0%	6.6%	
By types of	Residents	14.7%	81.3%	2.7%	1.3%	0.076
professional degree	Specialists	4.6%	81.8%	4.5%	9.1%	
	Academics	7.1%	78.6%	14.3%	0.0%	
How many HIV-po women have you s	sitive pregnant seen to date?	None	1-5	6-10	>10	p-value
Total		46 (34.6%)	58 (43.6%)	21 (15.8%)	8 (6.0%)	
By hospital type	Secondary hospitals	34.4%	46.9%	15.6%	3.1%	0.876
	Tertiary hospitals	34.7%	42.6%	15.8%	6.9%	
By years of	0-5 years	44.6%	35.1%	16.2%	4.1%	0.059
experience	6-10 years	27.8%	55.5%	11.1%	5.6%	
	11-20 years	15.4%	65.4%	15.4%	3.8%	
	>20 years	26.7%	33.3%	20.0%	20.0%	
By types of	Residents	45.4%	33.3%	16.0%	5.3%	0.004
protessional degree	Specialists	27.3%	54.5%	15.9%	2.3%	
	Academics	0.0%	64.3%	14.3%	21.4%	

Table 1. Continue	ed					
What is your level regarding HIV/AID	l of knowledge )S?	No	Little	Enough	Advanced	p-value
How does caring f pregnant women doctor?	for HIV-positive make you feel as a	I have no idea because I do not follow them up	I feel very comfortable, just like an HIV-negative pregnant woman	I feel worried that I might lack the skills to manage the patient	l feel worried about myself, whether I will get HIV	p-value
Total		40 (30.1%)	46 (34.6%)	34 (25.5%)	13 (9.8%)	
By hospital type	Secondary hospitals	21.9%	46.9%	18.7%	12.5%	0.276
	Tertiary hospitals	32.7%	30.7%	27.7%	8.9%	
By years of	0-5 years	40.5%	18.9%	33.8%	6.8%	0.001
experience	6-10 years	22.2%	44.4%	22.2%	11.2%	
	11-20 years	15.4%	50.0%	15.4%	19.2%	
	>20 years	13.3%	73.3%	6.7%	6.7%	
By types of	Residents	42.7%	18.7%	32.0%	6.6%	0.001
professional degree	Specialists	18.2%	45.5%	20.4%	15.9%	
	Academics	0.0%	85.7%	7.2%	7.1%	
How many HIV-po have you had to d	ositive deliveries late?	None	1-5	6-10	>10	p-value
Total		55 (41.4%)	59 (44.4%)	14 (10.4%)	5 (3.8%)	
By hospital type	Secondary hospitals	25.0%	59.4%	15.6%	0.0%	0.061
	Tertiary hospitals	46.5%	39.6%	8.9%	5.0%	
By years of	0-5 years	62.2%	27.0%	8.1%	2.7%	0.001
experience	6-10 years	5.6%	77.8%	11.1%	5.5%	
	11-20 years	19.2%	69.2%	11.6%	0.0%	
	>20 years	20.0%	46.7%	20.0%	13.3%	
By types of	Residents	61.3%	26.7%	8.0%	4.0%	0.001
protessional degree	Specialists	15.9%	68.2%	13.6%	2.3%	
	Academics	14.3%	64.3%	14.3%	7.1%	
What kind of prol experience during HIV-positive pregu delivery?	blems do you the follow-up of nancies and the	I have no idea because I do not follow them up	l do not experience any problems	ce any I am experiencing both medical and administrative difficulties		p-value
Total		41 (30.8%)	67 (50.4%)	25 (18.8%)		
By hospital type	Secondary hospitals	28.1%	40.6%	31.3%		0.112
	Tertiary hospitals	31.6%	53.5%	14.9%		
By years of	0-5 years	41.9%	43.2%	14.9%		0.004
experience	6-10 years	22.2%	50.0%	27.8%		
	11-20 years	11.5%	53.8%	34.7%		
	>20 years	20.0%	80.0%	0.0%		
By types of	Residents	42.7%	42.7%	14.6%		0.002
protessional degree	Specialists	20.4%	52.3%	27.3%		
	Academics	0.0%	85.7%	14.3%		

HIV/AIDS: Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome

The second set of questions consisted of general information about HIV. It aimed to measure the general knowledge level regarding screening, diagnosis, clinic, transmission, and treatment of HIV infection (Table 2). The third set of questions aimed to measure the level of knowledge about U=U and PrEP, whereas the fourth set of questions consisted of questions about approaching HIV-positive pregnant women and HIV-positive pregnancy management (Tables 3 and 4). Ethics committee approval was graded by University of Health Sciences Türkiye, Hamidiye Scientific Research Ethics Committee (approval number: 27/33, dated: 30.12.2022). The consent form was filled out by all participants.

HIV testing should be routinely included in antenatal screening		Agree	Disagree
Total		129 (97.0%)	4 (3.0%)
	Secondary hospital	96.9%	3.1%
By nospital type	Tertiary hospital	97.0%	3.0%
	0-5 years	95.9%	4.1%
	6-10 years	94.4%	5.6%
By years of experience	11-20 years	100.0%	0.0%
	>20 years	100.0%	0.0%
	Residents	96.0%	4.0%
By types of professional degree	Specialists	97.7%	2.3%
	Academics	100.0%	0.0%
I perform an HIV test at my first antena later in pregnancy	atal visit; there is no need for a repeat test	Agree	Disagree
Total		44 (33.1%)	89 (66.9%)
By hospital type	Secondary hospital	37.5%	62.5%
	Tertiary hospital	31.7%	68.3%
	0-5 years	32.4%	67.6%
	6-10 years	27.8%	72.2%
By years of experience	11-20 years	50.0%	50.0%
	>20 years	13.3%	86.7%
	Residents	33.3%	66.7%
By types of professional degree	Specialists	27.3%	72.7%
	Academics	50.0%	50.0%
I perform an anti-HIV test at the first p trimester	regnancy visit and repeat it in the last	Agree	Disagree
Total		100 (75.2%)	33 (24.8%)
Du la conital tura	Secondary hospital	81.2%	18.8%
By hospital type	Tertiary hospital	73.3%	26.7%
	0-5 years	73.0%	27.0%
Du voors of our original	6-10 years	77.8%	22.2%
By years of experience	11-20 years	65.4%	34.6%
	>20 years	100.0%	0.0%
	Residents	74.7%	25.3%
By types of professional degree	Specialists	79.5%	20.5%
	Academics	64.3%	35.7%
HIV is a sexually transmitted viral infect	tion	Agree	Disagree
Total		125 (94.0)	8 (6.0%)
Pu hospital tupo	Secondary hospital	87.5%	12.5%
by nospital type	Tertiary hospital	96.0%	4.0%

<b>T</b> I I A	<b>o</b> <i>i</i> :					C 1 1 1 1
Table 2.	Questions	to assess	obstetricians	general	knowledge	of HIV

Table 2. Continued			
HIV testing should be routinely included in antena	ital screening	Agree	Disagree
	0-5 years	97.3%	2.7%
By years of experience	6-10 years	94.4%	5.6%
	11-20 years	88.5%	11.5%
	>20 years	86.7%	13.3%
	Residents	97.3%	2.7%
By types of professional degree	Specialists	88.6%	11.4%
	Academics	92.9%	7.1%
HIV causes opportunistic infections within weeks t destroys the immune system	to months because it rapidly	Agree	Disagree
Total		69 (51.9%)	64 (48.1%)
	Secondary hospital	56.2%	43.8%
By hospital type	Tertiary hospital	50.5%	49.5%
	0-5 years	58.1%	41.9%
	6-10 years	50.0%	50.0%
By years of experience	11-20 years	34.6%	65.4%
	>20 years	53.3%	46.7%
	Residents	58.7%	41.3%
By types of professional degree	Specialists	47.7%	52.3%
	Academics	28.6%	71.4%
HIV can be asymptomatic for many years after inf	ection	Agree	Disagree
Total		128 (96.2%)	5 (3.8%)
Du boonital turo	Secondary hospital	100.0%	0.0%
By nospital type	Tertiary hospital	95.0%	5.0%
	0-5 years	93.2%	6.8%
Buygers of experience	6-10 years	100.0%	0.0%
by years of experience	11-20 years	100.0%	0.0%
	>20 years	100.0%	0.0%
	Residents	93.3%	6.7%
By types of professional degree	Specialists	100.0%	0.0%
	Academics	100.0%	0.0%
HIV can be transmitted from an HIV-positive moth pregnancy and childbirth	er to her baby during	Agree	Disagree
Total		128 (96.2%)	5 (3.8%)
	Secondary hospital	96.9%	3.1%
by nospital type	Tertiary hospital	96.0%	4.0%
	0-5 years	94.6%	5.4%
Put years of experience	6-10 years	100.0%	0.0%
by years of experience	11-20 years	96.2%	3.8%
	>20 years	100.0%	0.0%
	Residents	96.0%	4.0%
By types of professional degree	Specialists	95.5%	4.5%
	Academics	100.0%	0.0%

Table 2. Continued			
HIV testing should be routinely included in ante	natal screening	Agree	Disagree
Hugging, eating in the same place, and using a stransmit HIV	Agree	Disagree	
Total		11 (8.3%)	122 (91.7%)
	Secondary hospital	9.4%	90.6%
By hospital type	Tertiary hospital	7.9%	92.1%
	0-5 years	10.8%	89.2%
	6-10 years	0.0%	100.0%
By years of experience	11-20 years	11.5%	88.5%
	>20 years	0.0%	100.0%
	Residents	10.7%	89.3%
By types of professional degree	Specialists	4.5%	95.5%
	Academics	7.1%	92.9%
HIV is an infection that keeps progressing despit death	te treatment and can lead to	Agree	Disagree
Total		66 (49.6%)	67 (50.4%)
	Secondary hospital	46.9%	53.1%
By hospital type	Tertiary hospital	50.5%	49.5%
By years of experience	0-5 years	60.8%	39.2%
	6-10 years	38.9%	61.1%
	11-20 years	42.3%	57.7%
	>20 years	20.0%	80.0%
	Residents	61.3%	38.7%
By types of professional degree	Specialists	43.2%	56.8%
	Academics	7.1%	92.9%
Although there is no cure for HIV, treatment car	n stop its progression	Agree	Disagree
Total		128 (96.2%)	5 (3.8%)
	Secondary hospital	96.9%	3.1%
By nospital type	Tertiary hospital	96.0%	4.0%
	0-5 years	93.2%	6.8%
Duran of an eliment	6-10 years	100.0%	0.0%
By years of experience	11-20 years	100.0%	0.0%
	>20 years	100.0%	0.0%
	Residents	93.3%	6.7%
By types of professional degree	Specialists	100.0%	0.0%
	Academics	100.0%	0.0%
With effective treatment, people with HIV have as the general population	almost the same life expectancy	Agree	Disagree
Total		112 (84.2%)	21 (15.8%)
By bosnital type	Secondary hospital	81.3%	18.8%
by nospital type	Tertiary hospital	85.1%	14.9%
	0-5 years	85.1%	14.9%
During of our griance	6-10 years	77.8%	22.2%
by years of experience	11-20 years	80.8%	19.2%
	>20 years	93.3%	6.7%

Table 2. Continued			
HIV testing should be routinely included in ant	enatal screening	Agree	Disagree
	Residents	84.0%	16.0%
By types of professional degree	Specialists	84.1%	15.9%
	Academics	85.7%	14.3%
HIV/AIDS is a disease that can be cured with m	edicines that are available today	Agree	Disagree
Total		19 (14.3%)	114 (85.7%)
	Secondary hospital	18.8%	81.3%
By hospital type	Tertiary hospital	12.9%	87.1%
	0-5 years	8.1%	91.9%
	6-10 years	16.7%	83.3%
By years of experience	11-20 years	15.4%	84.6%
	>20 years	40.0%	60.0%
	Residents	8.0%	92.0%
By types of professional degree	Specialists	27.3%	72.7%
	Academics	7.1%	92.9%
HIV medicines should never be used during pre teratogenic to the baby	Agree	Disagree	
Total		25 (18.8%)	108 (81.2%)
By hospital type	Secondary hospital	12.5%	87.5%
	Tertiary hospital	20.8%	79.2%
	0-5 years	28.4%	71.6%
	6-10 years	0.0%	100.0%
By years of experience	11-20 years	3.8%	96.2%
	>20 years	20.0%	80.0%
	Residents	26.7%	73.3%
By types of professional degree	Specialists	11.4%	88.6%
	Academics	0.0%	100.0%
HIV can be transmitted to the baby through br	eastfeeding	Agree	Disagree
Total		109 (82.0%)	24 (18.0%)
	Secondary hospital	78.1%	21.9%
By hospital type	Tertiary hospital	83.2%	16.8%
	0-5 years	83.8%	16.2%
	6-10 years	77.8%	22.2%
By years of experience	11-20 years	76.9%	23.1%
	>20 years	86.7%	13.3%
	Residents	84.0%	16.0%
By types of professional degree	Specialists	79.5%	20.5%
	Academics	78.6%	21.4%

HIV: Human İmmunodeficiency Virus

#### **Statistical Analysis**

Data were analysed using IBM SPSS 25 (IBM Corp. 2017 IBM SPSS Statistics for Windows, version 25.0. Armonk, NY: IBM Corp.) software package programme. The frequency and percentage values were presented for qualitative variables. The chi-square test was used for comparisons between the two qualitative variables. The type I error rate was taken as 0.05 in the study.

The number of observations to be included in the sample was calculated using the formula:  $n = \frac{e_{a}^{2}P.Q}{d^{2}}$ . Based on the result of the calculations, 97 observations should be included in the sample (p = 0.5; q = 0.5; d = 0.10;  $\alpha = 0.05$ )<sup>[8]</sup>.

Have you ever heard of U=U or B=B (in Turkish)?		No	Yes, but I have no idea	Yes, and I have some knowledge
Total		99 (74.4%)	29 (21.8%)	5 (3.8)
By bospital type	Secondary hospitals	65.6%	31.3%	3.1%
By nospital type	Tertiary hospitals	77.2%	18.8%	4.0%
	0-5 years	83.8%	12.2%	4.1%
During of our original	6-10 years	61.1%	33.3%	5.6%
By years of experience	11-20 years	69.2%	30.8%	0.0%
	>20 years	53.3%	40.0%	6.7%
	Residents	82.7%	13.3%	4.0%
By types of professional degree	Specialists	70.5%	25.0%	4.5%
	Academics	42.9%	57.1%	0.0%
If people living with HIV take their t and achieve viral suppression (effect unprotected sex will not lead to HIV	reatment regularly ive treatment), even transmission	Agree	Disagree	No idea
Total		33 (24.8)	46 (34.6%)	54 (40.6)
	Secondary hospitals	21.9%	37.5%	40.6%
By hospital type	Tertiary hospitals	25.7%	33.7%	40.6%
	0-5 years	20.3%	40.5%	39.2%
	6-10 years	38.9%	16.7%	44.4%
By years of experience	11-20 years	30.8%	30.8%	38.5%
	>20 years	20.0%	33.3%	46.7%
	Residents	22.7%	37.3%	40.0%
By types of professional degree	Specialists	22.7%	29.5%	47.8%
	Academics	42.9%	35.7%	21.4%
If one of the partners who wants to have children is HIV- positive, unprotected sex may be allowed without further counseling if the partner is on effective HIV treatment		Agree	Disagree	No idea
Total		24 (18%)	66 (49.6%)	43 (32.3%)
Py hospital type	Secondary hospitals	21.9%	46.9%	31.2%
By nospital type	Tertiary hospitals	16.8%	50.5%	32.7%
	0-5 years	18.9%	52.7%	28.4%
During of our original	6-10 years	16.7%	38.9%	44.4%
By years of experience	11-20 years	15.4%	50.0%	34.6%
	>20 years	20.0%	46.7%	33.3%
	Residents	20.0%	50.7%	29.3%
By types of professional degree	Specialists	13.6%	45.5%	40.9%
	Academics	21.4%	57.2%	21.4%
Even if it is accepted that people live treatment do not transmit HIV, this other assisted reproductive techniqu and intrauterine insemination, need	ing with HIV on effective does not convince me that es, such as sperm washing not be used	Agree	Disagree	No idea
Total		54 (40.6%)	36 (27.1%)	43 (32.3%)
	Secondary hospitals	59.3%	18.8%	21.9%
By nospital type	Tertiary hospitals	34.7%	29.7%	35.6%
	0-5 years	36.5%	27.0%	36.5%
	6-10 years	38.9%	22.2%	38.9%
By years of experience	11-20 years	50.0%	26.9%	23.1%
	>20 years	46.7%	33.3%	20.0%
		-		

## Table 3. Questions to assess obstetricians' general knowledge of U=U and PrEP

## Table 3. Continued

Have you ever heard of U=U or B=B (in Turkish)?		No	Yes, but I have no idea	Yes, and I have some knowledge
	Residents	38.7%	26.7%	34.7%
By types of professional degree	Specialists	38.6%	25.0%	36.4%
	Academics	57.1%	35.7%	7.1%
Have you heard of PrEP?		No	Yes, but I have no idea	Yes, and I have some knowledge
Total		25 (18.8%)	83 (62.4%)	25 (18.8%)
Py hospital type	Secondary hospitals	9.4%	81.2%	9.4%
by nospital type	Tertiary hospitals	21.8%	<b>56.4</b> %	21.8%
	0-5 years	18.9%	<b>64.9</b> %	16.2%
By years of experience	6-10 years	22.2%	61.1%	16.7%
by years of experience	11-20 years	15.4%	61.5%	23.1%
	>20 years	20.0%	53.3%	26.7%
Du tumos of puotossional	Residents	21.3%	<b>62.7</b> %	16.0%
degree	Specialists	18.2%	<b>65.9</b> %	15.9%
ucyree	Academics	7.1%	50.0%	42.9%
PrEP is the use of certain HIV medicines to prevent the spread of HIV in high-risk groups, such as people who have an HIV-positive sex partner, people who have multiple sex partners, or people who inject drugs		Agree	Disagree	No idea
Total		85 (63.9%)	6 (4.5%)	42 (31.6%)
Pu bosnital tuno	Secondary hospitals	78.1%	6.3%	15.6%
By hospital type	Tertiary hospitals	<b>59.4</b> %	4.0%	36.6%
	0-5 years	<b>59.5</b> %	1.4%	39.1%
Puweers of experience	6-10 years	72.2%	0.0%	27.8%
by years of experience	11-20 years	65.4%	11.5%	23.1%
	>20 years	73.3%	13.3%	13.4%
Du tumos of puotossional	Residents	58.7%	1.3%	40.0%
degree	Specialists	63.6%	11.4%	25.0%
ucyree	Academics	92.9%	0.0%	7.1%
The idea that drugs that are u healthy people for prevention absurd	sed to treat HIV can be used by seems to me to be unnecessary/	Agree	Disagree	No idea
Total		25 (18.8%)	80 (60.2%)	28 (21.0%)
	Secondary hospitals	15.6%	62.5%	21.9%
By nospital type	Tertiary hospitals	19.8%	<b>59.4</b> %	20.8%
	0-5 years	20.3%	<b>58.1</b> %	21.6%
D	6-10 years	22.2%	72.2%	5.6%
By years of experience	11-20 years	11.5%	65.4%	23.1%
	>20 years	20.0%	<b>46.7</b> %	33.3%
	Residents	21.3%	<b>58.7</b> %	20.0%
By types of professional	Specialists	18.2%	<b>59.1</b> %	22.7%
ucyrcc	Academics	7.1%	71.5%	21.4%
PrEP use should also be recomrisk of HIV transmission	mended for pregnant women at	Agree	Disagree	No idea
Total		61 (45.9%)	18 (13.5%)	54 (40.6%)
Py bosnital type	Secondary hospitals	37.5%	21.9%	40.6%
By hospital type	Tertiary hospitals	48.5%	10.9%	40.6%

Table 5. continued				
Have you ever heard of U=	U or B=B (in Turkish)?	No	Yes, but I have no idea	Yes, and I have some knowledge
	0-5 years	39.2%	14.9%	<b>45.9</b> %
During of automiction	6-10 years	61.1%	11.1%	27.8%
By years of experience	11-20 years	46.2%	7.6%	46.2%
	>20 years	60.0%	20.0%	20.0%
	Residents	42.7%	14.6%	42.7%
By types of professional	Specialists	47.7%	15.9%	36.4%
ucyrcc	Academics	57.1%	0.0%	42.9%
The use of PrEP medicines mother and baby	during pregnancy is risky for the	Agree	Disagree	No idea
Total		12 (9.0%)	40 (30.1)	81 (60.9%)
Durles and test to ma	Secondary hospitals	15.6%	34.4%	50.0%
By hospital type	Tertiary hospitals	6.9%	28.7%	64.4%
	0-5 years	9.5%	21.6%	<b>68.9</b> %
	6-10 years	5.6%	33.3%	61.1%
By years of experience	11-20 years	7.7%	42.3%	50.0%
	>20 years	13.3%	46.7%	40.0%
	Residents	9.3%	21.3%	<b>69.4</b> %
By types of professional	Specialists	11.4%	34.1%	54.5%
degree	Academics	0.0%	64.3%	35.7%
recommendation" does not In this case, PrEP seems to additional protective measu	is seem sufficient and safe to me. be an appropriate method as an ure for my patients	Agree	Disagree	No idea
Total		59 (44.4%)	20 (15.0%)	54 (40.6%)
By hospital type	Secondary hospitals	50.0%	21.9%	28.1%
by nospital type	Tertiary hospitals	42.6%	12.9%	44.5%
	0-5 years	36.5%	13.5%	<b>50.0</b> %
By years of experience	6-10 years	61.1%	11.1%	27.8%
by years of experience	11-20 years	<b>53.8</b> %	15.4%	30.8%
	>20 years	46.6%	26.7%	26.7%
	Residents	40.0%	13.3%	<b>46.7</b> %
By types of professional	Specialists	43.2%	20.4%	36.4%
ucyrcc	Academics	71.5%	7.1%	21.4%
If one of the partners is HIV-positive but on effective ART and the healthy partner is on PrEP, these partners can conceive through normal sexual intercourse without taking any additional protection		Agree	Disagree	No idea
Total		49 (36.8%)	41 (30.8%)	43 (32.4%)
Py hospital type	Secondary hospitals	40.6%	28.1%	31.3%
by nospital type	Tertiary hospitals	35.6%	31.7%	32.7%
	0-5 years	33.8%	32.4%	33.8%
During of automiction	6-10 years	38.9%	38.9%	22.2%
by years of experience	11-20 years	42.3%	19.2%	38.5%
	>20 years	40.0%	33.3%	26.7%
	Residents	33.3%	36.0%	30.7%
By types of professional degree	Specialists	34.1%	25.0%	<b>40.9</b> %
ucyrcc	Academics	64.3%	21.4%	14.3%

### Table 3. Continued

U=U: Undetectable=untransmittable, B=B: Being safe=being sure, HIV: Human Immunodeficiency Virus, ART: Antiretroviral therapy, PrEP: Pre-exposure prophylaxis

## Table 4. Questions to assess how obstetricians manage and treat HIV-positive pregnancies

If the female partner is HIV-positive and the male partner is negative, and provided she is on ART, the use of assisted reproductive techniques with semen from the male partner during the periovulatory period is a good option that I can recommend to my patients		Agree	Disagree	No idea
Total	1	83 (62.4%)	5 (3.8%)	45 (33.8%)
By hospital type	Secondary hospital	78.1%	3.1%	18.8%
by hospital type	Tertiary hospital	57.4%	4.0%	38.6%
	0-5 years	50.0%	4.1%	45.9%
By years of experience	6-10 years	83.3%	5.6%	11.1%
by years of experience	11-20 years	73.1%	0.0%	26.9%
	>20 years	80.0%	6.7%	13.3%
	Residents	<b>50.7</b> %	4.0%	45.3%
By types of professional degree	Specialists	<b>72.8</b> %	4.5%	22.7%
	Academics	<b>92.9</b> %	0.0%	7.1%
Even if the HIV-positive female partn partner is on PrEP, I would definitely reproductive techniques	er is already on active ART and the male refer this couple to a clinic that offers assisted	Agree	Disagree	No idea
Total		64 (48.1%)	23 (17.3%)	46 (34.6%)
By bosnital type	Secondary hospital	<b>56.2</b> %	18.8%	25.0%
By nospital type	Tertiary hospital	45.5%	16.9%	37.6%
	0-5 years	36.5%	16.2%	47.3%
By years of experience	6-10 years	77.8%	16.6%	5.6%
by years of experience	11-20 years	57.7%	15.4%	26.9%
	>20 years	53.3%	26.7%	20.0%
	Residents	40.0%	16.0%	44.0%
By types of professional degree	Specialists	52.3%	20.4%	27.3%
	Academics	<b>78.6</b> %	14.3%	7.1%
The use of sperm preparation techniq the sample for HIV-RNA, intrauterine injection) is no longer routinely recor- but on active ART and the woman ha	ues (sperm washing followed by testing of insemination, in vitro intracytoplasmic sperm nmended when the male partner is HIV-positive s the opportunity to use PrEP	Agree	Disagree	No idea
Total		21 (15.8%)	31 (23.3%)	81 (60.9%)
Deck and the later a	Secondary hospitals	18.7%	25.0%	56.3%
By nospital type	Tertiary hospitals	14.8%	22.8%	62.4%
	0-5 years	12.2%	16.2%	71.6%
	6-10 years	27.8%	27.8%	44.4%
By years of experience	11-20 years	3.8%	46.2%	50.0%
	>20 years	40.0%	13.3%	46.7%
	Residents	12.0%	17.3%	70.7%
By types of professional degree	Specialists	22.7%	20.5%	56.8%
	Academics	14.3%	64.3%	21.4%
Under no circumstances will I allow an HIV-positive pregnant woman for normal vaginal delivery		Agree	Disagree	No idea
Total	43 (32.3%)	68 (51.1%)	22 (16.6%)	
By hospital type	Secondary hospitals	28.1%	<b>46.9</b> %	25.0%
by nospital type	Tertiary hospitals	33.7%	<b>52.4</b> %	13.9%
	0-5 years	33.8%	45.9%	20.3%
By years of experience	6-10 years	27.8%	<b>66.7</b> %	5.5%
	11-20 years	34.6%	50.0%	15.4%
	>20 years	26.7%	60.0%	13.3%
	Residents	34.7%	48.0%	17.3%
By types of professional degree	Specialists	34.1%	50.0%	15.9%
	Academics	14.3%	71.4%	14.3%

Table 4. Continued						
A pregnant woman who is newly diagnosed with HIV close to delivery should definitely be advised for a cesarean section			Agree	Disagree	No idea	
Total				78 (58.6%)	36 (27.1%)	19 (14.3%)
By hospital type		Second	lary hospitals	65.6%	18.8%	15.6%
by nospital type		Tertiar	y hospitals	56.4%	29.7%	13.9%
		0-5 ye	ars	51.4%	28.4%	20.2%
By years of experience		6-10 y	ears	72.2%	16.7%	11.1%
		11-20	years	61.5%	30.8%	7.7%
		>20 ye	ars	73.3%	26.7%	0.0%
By types of professional degree		Reside	nts	<b>50.7</b> %	29.3%	20.0%
		Specia	lists	72.7%	18.2%	9.1%
		Acader	nics	57.1%	42.9%	0.0%
There is no medical ind woman on active ART	lication for ces	arean d	elivery of an HIV-positive pregnant	Agree	Disagree	No idea
Total				51 (38.3%)	51 (38.3%)	31 (23.4%)
By bosnital type		Second	lary hospitals	37.5%	40.6%	21.9%
by nospital type		Tertiary hospitals		38.6%	37.6%	23.8%
		0-5 ye	ars	31.1%	37.8%	31.1%
Puy years of experience		6-10 years		38.9%	44.4%	16.7%
by years of experience		11-20	years	46.2%	38.5%	15.4%
		>20 years		60.0%	33.3%	6.7%
		Reside	nts	32.0%	37.3%	30.7%
By types of professional	degree	Specialists		45.5%	36.4%	18.1%
		Acader	nics	50.0%	50.0%	0.0%
My main reason not to admit an HIV- positive pregnant woman to normal delivery even if she is on ART is.		To prevent HIV transmission to the baby	The higher risk of HIV transmission to health personnel who deliver the baby	Both	No idea	
Total			42 (31.6%)	19 (14.3%)	58 (43.6%)	14 (10.5%)
	Secondary hos	pitals	21.9%	21.9%	53.1%	3.1%
By nospital type	Tertiary hospit	als	34.6%	11.9%	40.6%	12.9%
	0-5 years		25.7%	12.1%	47.3%	14.9%
	6-10 years		44.4%	5.6%	50.0%	0.0%
By years of experience	11-20 years		30.8%	26.9%	34.6%	7.7%
	>20 years		46.7%	13.3%	33.3%	6.7%
	Residents		26.7%	10.6%	48.0%	14.7%
By types of	Specialists		36.4%	18.2%	40.9%	4.5%
professional degree	Academics		42.9%	21.4%	28.6%	7.1%
Zidovudine is a drug used to treat HIV and is used as a prophylaxis to prevent HIV transmission to the baby during labor		Agree	Disagree	No idea		
Total			97 (72.9%)	7 (5.3%)	29 (21.8%)	
Deckson its Lterns		Second	lary hospitals	71.9%	12.5%	15.6%
By nospital type		Tertiar	y hospitals	73.2%	3.0%	23.8%
		0-5 ye	ars	67.6%	4.0%	28.4%
		6-10 years		94.4%	5.6%	0.0%
ву years of experience		11-20 years		65.4%	11.5%	23.1%
		>20 ye	ars	86.7%	0.0%	13.3%
		Reside	nts	68.0%	4.0%	28.0%
By types of professional degree		Specialists		75.0%	9.1%	15.9%
		Acader	nics	92.9%	0.0%	7.1%

#### Table 4. Continued

Zidovudine prophylaxis should be administered to an HIV-positive pregnant woman during labor under all circumstances		Agree	Disagree	No idea
Total	82 (61.7%)	18 (13.5%)	33 (24.8%)	
Deckson its lateral	Secondary hospitals	59.4%	25.0%	15.6%
By nospital type	Tertiary hospitals	62.4%	9.9%	27.7%
	0-5 years	60.8%	6.8%	32.4%
	6-10 years	72.2%	16.7%	11.1%
By years of experience	11-20 years	57.7%	26.9%	15.4%
	>20 years	60.0%	20.0%	20.0%
	Residents	61.3%	6.7%	32.0%
By types of professional degree	Specialists	59.1%	20.5%	20.4%
	Academics	71.4%	28.6%	0.0%
There is no medical indication for IV zidovudine during labor in an HIV-positive pregnant woman who is on active ART		Agree	Disagree	No idea
Total		20 (15.0%)	60 (45.1%)	53 (39.9%)
By bosnital type	Secondary hospitals	15.6%	50.0%	34.4%
By nospital type	Tertiary hospitals	14.8%	43.6%	41.6%
	0-5 years	10.8%	43.2%	46.0%
	6-10 years	22.2%	61.1%	16.7%
By years of experience	11-20 years	15.4%	53.8%	30.8%
	>20 years	26.7%	20.0%	53.3%
	Residents	12.0%	44.0%	44.0%
By types of professional degree	Specialists	18.2%	40.9%	40.9%
	Academics	21.4%	64.3%	14.3%
In case of suspected HIV infection during labor or breastfeeding, breastfeeding should be stopped immediately and should not be resumed if the infection is confirmed				
In case of suspected HIV infection du be stopped immediately and should n	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed	Agree	Disagree	No idea
In case of suspected HIV infection du be stopped immediately and should n Total	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed	Agree 92 (69.2%)	<b>Disagree</b> 21 (15.8%)	<b>No idea</b> 20 (15.0%)
In case of suspected HIV infection du be stopped immediately and should n Total	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals	Agree 92 (69.2%) 65.6%	<b>Disagree</b> 21 (15.8%) 18.8%	<b>No idea</b> 20 (15.0%) 15.6%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals	Agree 92 (69.2%) 65.6% 70.2%	<b>Disagree</b> 21 (15.8%) 18.8% 14.9%	<b>No idea</b> 20 (15.0%) 15.6% 14.9%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years	Agree 92 (69.2%) 65.6% 70.2% 73.0%	<b>Disagree</b> 21 (15.8%) 18.8% 14.9% 12.2%	No idea 20 (15.0%) 15.6% 14.9% 14.8%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years	Agree 92 (69.2%) 65.6% 70.2% 73.0% 77.8%	<b>Disagree</b> 21 (15.8%) 18.8% 14.9% 12.2% 22.2%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years	Agree 92 (69.2%) 65.6% 70.2% 73.0% 73.0% 73.8% 53.8%	<b>Disagree</b> 21 (15.8%) 18.8% 14.9% 12.2% 22.2% 19.2%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0% 27.0%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years	Agree 92 (69.2%) 65.6% 70.2% 73.0% 77.8% 53.8% 66.7%	Disagree           21 (15.8%)           18.8%           14.9%           12.2%           22.2%           19.2%           20.0%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0% 27.0% 13.3%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents	Agree 92 (69.2%) 65.6% 70.2% 73.0% 77.8% 53.8% 66.7% 73.3%	Disagree           21 (15.8%)           18.8%           14.9%           12.2%           22.2%           19.2%           20.0%           12.0%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0% 27.0% 13.3% 14.7%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists	Agree 92 (69.2%) 65.6% 70.2% 73.0% 77.8% 53.8% 66.7% 73.3% 63.6%	Disagree           21 (15.8%)           18.8%           14.9%           12.2%           22.2%           19.2%           20.0%           12.0%           20.5%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0% 27.0% 13.3% 14.7% 15.9%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists Academics	Agree 92 (69.2%) 65.6% 70.2% 73.0% 73.0% 53.8% 66.7% 73.3% 63.6% 64.3%	Disagree           21 (15.8%)           18.8%           14.9%           12.2%           22.2%           19.2%           20.0%           12.0%           20.5%           21.4%	No idea 20 (15.0%) 15.6% 14.9% 14.8% 0.0% 27.0% 13.3% 14.7% 15.9% 14.3%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their	Agree         92 (69.2%)         65.6%         70.2%         73.0%         73.8%         66.7%         73.3%         63.6%         64.3%         Agree	Disagree           21 (15.8%)           18.8%           14.9%           12.2%           22.2%           19.2%           20.0%           12.0%           20.5%           21.4%           Disagree	No idea           20 (15.0%)           15.6%           14.9%           14.8%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery Total	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their	Agree         92 (69.2%)         65.6%         70.2%         73.0%         77.8%         53.8%         66.7%         73.3%         63.6%         64.3%         Agree         35 (26.3%)	Disagree         21 (15.8%)         18.8%         14.9%         12.2%         22.2%         19.2%         20.0%         12.0%         20.5%         21.4%         Disagree         64 (48.1%)	No idea           20 (15.0%)           15.6%           14.9%           14.8%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%           No idea           34 (25.6%)
In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery Total	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their Secondary hospitals	Agree         92 (69.2%)         65.6%         70.2%         73.0%         77.8%         53.8%         66.7%         73.3%         63.6%         64.3%         Agree         35 (26.3%)         34.4%	Disagree         21 (15.8%)         18.8%         14.9%         12.2%         22.2%         19.2%         20.0%         12.0%         20.5%         21.4%         Disagree         64 (48.1%)         37.5%	No idea           20 (15.0%)           15.6%           14.9%           14.8%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%           No idea           34 (25.6%)           28.1%
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In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery Total By hospital type	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their Secondary hospitals Tertiary hospitals 0-5 years	Agree         92 (69.2%)         65.6%         70.2%         73.0%         73.8%         66.7%         73.3%         63.6%         64.3%         Agree         35 (26.3%)         34.4%         23.8%         17.6%	Disagree         21 (15.8%)         18.8%         14.9%         12.2%         22.2%         19.2%         20.0%         12.0%         20.5%         21.4%         Disagree         64 (48.1%)         37.5%         51.5%         54.1%	No idea           20 (15.0%)           15.6%           14.9%           14.8%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%           Xo idea           34 (25.6%)           28.1%           24.7%           28.3%
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In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery Total By hospital type By years of experience	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years	Agree         92 (69.2%)         65.6%         70.2%         73.0%         77.8%         53.8%         66.7%         73.3%         63.6%         64.3%         Agree         35 (26.3%)         34.4%         23.8%         17.6%         38.9%         34.6%	Disagree         21 (15.8%)         18.8%         14.9%         12.2%         22.2%         19.2%         20.0%         12.0%         20.5%         21.4%         Disagree         64 (48.1%)         37.5%         51.5%         54.1%         34.6%	No idea           20 (15.0%)           15.6%           14.9%           14.8%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%           0.0           24.7%           28.3%           16.7%           30.8%
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In case of suspected HIV infection du be stopped immediately and should n Total By hospital type By years of experience By types of professional degree Pregnant women with HIV-positive w baby after delivery Total By hospital type By years of experience By types of professional degree	ring labor or breastfeeding, breastfeeding should ot be resumed if the infection is confirmed Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists Academics ho are on active ART should not breastfeed their Secondary hospitals Tertiary hospitals 0-5 years 6-10 years 11-20 years >20 years Residents Specialists	Agree         92 (69.2%)         65.6%         70.2%         73.0%         73.8%         66.7%         73.3%         63.6%         64.3%         Agree         35 (26.3%)         34.4%         23.8%         17.6%         38.9%         34.6%         40.0%         18.7%         29.6%	Disagree         21 (15.8%)         18.8%         14.9%         12.2%         22.2%         19.2%         20.0%         12.0%         20.5%         21.4%         Disagree         64 (48.1%)         37.5%         51.5%         54.1%         34.6%         46.7%         52.0%	No idea           20 (15.0%)           15.6%           14.9%           14.9%           14.3%           0.0%           27.0%           13.3%           14.7%           15.9%           14.3%           0.4.7%           28.1%           24.7%           28.3%           16.7%           30.8%           13.3%           29.3%           22.7%

HIV: Human Immunodeficiency Virus, ART: Antiretroviral therapy, PrEP: Pre-exposure prophylaxis, IV: Intravenous

The p-value was presented in comparisons made in the research. It is not understood which variable or variables belong to the confidence intervals to be presented. The study did not aim to determine a risk coefficient or investigate factors affecting the level of information. In addition, the presentation of the effect size as a result of the chi-square test was not needed for these reasons.

## Results

A total of 133 obstetricians and obstetric residents, comprising 90 (67%) females and 101 (75.9%) who worked in a tertiary care hospital, responded to our questionnaire. The respondents included 15 (11.3%) academic members, 43 (32.3%) specialists, and 75 (56.4%) residents.

Obstetricians reported that their level of knowledge about HIV and competence in HIV care was low or average that they had not recently been involved in scientific activities associated with HIV, and that they did not have a good command of the up-todate literature. The survey results also reveal that obstetricians either do not follow up HIV-positive pregnancies at all or have limited experience of doing so (Table 1).

A significant proportion of those surveyed felt that they did not know (2.2%) or knew little (34.6%) about HIV/AIDS. Participants in their first 5 years (47.3%) and 6 to 10 years (38.9%) of practice and/or residency (46.7%) described their level of knowledge as lower, whereas those with more years of experience reported having more adequate knowledge (p=0.004). The proportion of those who felt competent to follow up with HIV-positive pregnant women was low (24.1%), and this did not differ by years of experience or other subgroups.

A significant proportion of obstetricians with <5 years of experience (40.5%, p=0.001) and/or residents (40%, p=0.001) reported they had never attended a scientific meeting on HIV and had never read a guideline or article, whereas 71.5% (p=0.001) of academic members stated they had read an article or guideline within a year.

A third to a quarter of the residents, specialist obstetricians, and those working in secondary care hospitals stated that they had never followed up an HIV-positive pregnant woman. The vast majority of obstetricians responded to the question "Compared to normal pregnancies, how would you approach the management of HIV-positive pregnant women?" with "I would definitely involve other specialties such as infectious diseases, internal medicine, and manage patients with a multidisciplinary team."

Although 34.6% of respondents had never followed up an HIVpositive pregnancy, 43.6% reported having followed up one to five HIV-positive pregnancies. All academic staff had followed up at least one HIV-positive pregnancy, 21.4% of whom had followed up >10 HIV-positive pregnancies.

Of the participants, 34.6% reported they felt very comfortable, as they do in HIV-negative pregnancies, whereas the rest stated they felt worried about contracting HIV or managing the pregnancy, and 30.1% of participants had no idea because they did not follow HIV-positive pregnant. Of those surveyed, 50.4% reported that they did not experience any problems with HIV-positive pregnancies, whereas 18.8% reported having experienced both medical and administrative difficulties.

Although 41.4% of the survey participants had never helped an HIV-positive woman give birth before, this rate was highest among residents at 61.3% (p=0.001), and 44.4% of participants reported having delivered only 1-5 deliveries (Table 1).

Although obstetricians' general knowledge on HIV is at an adequate level, it has been shown that they have incomplete or conflicting knowledge about HIV screening during pregnancy, the disease course, and how it is transmitted (Table 2).

Of the obstetricians surveyed, 97% agreed that HIV testing should be routinely included in antenatal screening. Among them, 33.1% agreed that an HIV test should be performed at the first antenatal visit and that the test need not be repeated later in the pregnancy. However, 75.2% reported performing an HIV test at the first antenatal visit and repeating it in the last trimester of the pregnancy. The proportion of participants who believed that HIV testing was unnecessary in the third trimester of pregnancy was highest among academics, and in parallel, the proportion of participants who reported that they performed HIV testing in the third trimester was lowest among academics.

The vast majority of respondents (94%) demonstrated a comprehensive understanding of the fact that HIV is a sexually transmitted infection. According to 96.2% of the participants, HIV can be asymptomatic for many years postinfection.

Of the participants, 96.2% agreed that HIV can be transmitted from an HIV-positive mother to her baby during pregnancy and childbirth, whereas 91.7% disagreed that HIV can be transmitted by hugging, eating in the same place, or sharing a swimming pool or a toilet. Of these, 82% agreed that HIV could be transmitted to a baby through breastfeeding.

The majority of respondents (96.2%) recognized that HIV treatment can stop the disease progression, although there is no cure for HIV. A substantial proportion of respondents expressed scepticism regarding the efficacy of the current treatment regimens in achieving a cure for HIV, with 85.7% of respondents believing that such a cure would not be attainable through the utilization of existing therapeutic interventions. Furthermore, a mere 51.9% of respondents attributed the phenomenon of opportunistic infections occurring within a timeframe of weeks

to months to the rapid destruction of the immune system by HIV. Of the participants, 84.2% agreed that with effective treatment, PLWH have almost the same life expectancy as the general population; conversely, 49.6% believed that HIV is an infection that will continue to progress and lead to death despite treatment.

Of the participants, 18.8% reported that HIV drugs should never be used during pregnancy as they can be toxic/teratogenic to the baby, and this rate was highest (26.7%) among residents (Table 2).

Obstetricians have low levels of knowledge on U=U and PrEP and low levels of knowledge on up-to-date antenatal counseling for couples planning to have a child in the U=U and PrEP era (Table 3).

Of the obstetricians, 74.4% reported they had never heard of the term U=U, and only 3.8% said they had an opinion about U=U. In PLWH who achieved viral suppression with effective ART, the rate of obstetricians who believed that HIV could not be transmitted even through unprotected sexual intercourse was 24.8%. If one of the partners planning to have a child is HIV-positive, 18% of respondents believe that unprotected sex can be allowed without the need for assisted reproductive technologies if the partner is on active HIV treatment. Of the respondents, 40.6% disagreed with the argument that further assisted reproduction techniques are not required, even if it is accepted that PLWH on effective treatment do not transmit HIV. In addition, 32.3% have no opinion on this argument. The proportion increases with professional experience and is highest among academics at 57.1%. In addition, 32.3% of respondents have no opinion on this argument.

Of those surveyed, only 18.8% said they had some knowledge of PrEP. Moreover, 63.9% agreed with the argument that PrEP is the use of certain HIV drugs to prevent the spread of HIV in high-risk groups, such as people who have an HIV-positive sex partner, who have multiple sex partners, or who inject drugs, whereas 18.8% agreed with the argument that it seems unnecessary/absurd that drugs used to treat HIV could be used by healthy people for prevention. About 45.9% of the respondents thought that PrEP could be used in pregnant women who are at risk of HIV transmission. Of the participants, 9% believed that using HIV drugs for PrEP in pregnant women would be risky for the mother or baby, and 60.9% had no opinion. Among respondents, 44.4% thought that PrEP could be an appropriate method of additional protection for people whose partner is HIV-positive but on effective ART, and this proportion was highest among academics at 71.5%. If one of the partners was HIV-positive but on effective ART and the healthy partner was on PrEP, 36.8% of participants thought that these partners could conceive through normal sexual intercourse without

taking any additional protection; again, the highest rate was among academics at 64.3%. However, 30.8% disagreed and 32.4% had no opinion on this argument (Table 3).

Obstetricians have low levels of confidence in the protection of U=U and PrEP against HIV during pregnancy and childbirth (Table 4).

Of the obstetricians surveyed, 62.4% agreed with the statement: "If the female partner is HIV-positive and the male partner is negative, and provided she is on ART, the use of assisted reproductive techniques with sperm from the male partner during the periovulatory period is a good option that I can recommend to my patients"; the proportion was highest among academics at 92.9%. "Even if the HIV-positive female partner is already on active ART and the male partner is on PrEP, I would definitely refer this couple to a clinic offering assisted reproductive techniques." A mere 17.3% of the respondents expressed disagreement with the statement, whereas a significant majority of 48.1% agreed.

The proportion of respondents who agreed with the statement "The use of semen preparation techniques (semen washing followed by testing of the sample for HIV-RNA, intrauterine insemination, in vitro intracytoplasmic sperm injection) is no longer routinely recommended when the male partner is HIV-positive but on active ART and the woman has the option of using PrEP" was very low at 15.8%.

Approximately 32.3% of obstetricians said they would never allow an HIV-positive pregnant woman to have a normal delivery. Of the respondents, 58.6% agreed that a pregnant woman newly diagnosed with HIV close to delivery should definitely be referred for a cesarean section. The proportion of agreement and disagreement with the statement "There is no medical indication for cesarean section in an HIV-positive pregnant woman on effective ART" was equal at 38.3%. The proportion of main reasons for not allowing an HIV-positive pregnant woman to have a normal delivery, even if she is on ART, was to prevent HIV transmission to the baby for 31.6%, to prevent transmission to health professionals for 14.3%, and both for 43.6%. Of the participants, 72.9% knew that zidovudine (ZDV) is a drug used to treat HIV and is used as a prophylaxis to prevent HIV transmission to the baby during labor; this was highest among academics (92.9%) and those with 6-10 years of experience (94.4%). Of these, 61.7% agreed that ZDV prophylaxis should be administered to an HIV-positive pregnant woman during labor under all circumstances. If HIV infection was suspected during labor or breastfeeding, 69.2% of respondents agreed that breastfeeding should be stopped immediately. Furthermore, only 26.3% agreed that pregnant women with HIV who are on effective ART should not breastfeed their babies postdelivery, and this proportion was highest among academics (57.1%).

The results of the study indicated that 69.2% of participants advocated that if HIV infection was suspected during labor or breastfeeding, breastfeeding should be stopped immediately and should not continue if infection was confirmed (Table 4).

#### Discussion

In recent years, the advent of novel ART has transformed HIV from a fatal condition into a manageable chronic disease. This shift coincided with a remarkable increase in the life expectancy of PLWH, which now closely resembles that of the general population. Consequently, a discourse surrounding the desire of these individuals to conceive children has been emerging. The U=U paradigm, which has gained widespread acceptance, has further facilitated the discussion by emphasizing the safety of HIV serodiscordant couples in terms of the risk of HIV transmission through unprotected sexual intercourse.

The results of our study revealed that the vast majority of obstetricians have never heard of U=U, and almost all of them have no idea about it. Furthermore, the majority of obstetricians reported that even if they accepted the efficacy of U=U, they would not rely on it in their daily practice and would recommend advanced assisted reproductive techniques to HIV-serodiscordant couples.

PrEP is another prevention strategy that has been promoted in the last decade to fight the HIV epidemic. It is a new medical form of HIV prevention in which antiretroviral drugs are taken by people at high risk of acquiring HIV, and it is safe and effective in men who have sex with men (MSM) and serodiscordant couples to prevent HIV acquisition<sup>[9]</sup>. In 2014, the World Health Organization recommended that PrEP be made available to MSM, and in 2015, it extended the recommendation to anyone at substantial risk of HIV infection<sup>[10,11]</sup>.

In HIV-serodiscordant couples, if the partner with HIV has not achieved viral suppression or the viral suppression status is unknown, PrEP is recommended for the partner without HIV to reduce the risk of sexual transmission. This recommendation also applies to HIV-serodiscordant couples who are trying to conceive through unprotected sex without using assisted reproductive techniques<sup>[5]</sup>. Only a few obstetricians who responded to our survey reported they had any idea about PrEP, and a significant number did not have enough knowledge regarding its indications, use in pregnancy, and risks. However, a significant proportion of participants stated they could recommend PrEP to their patients as an additional protection to U=U. This shows that adequate knowledge of PrEP among obstetricians can make a significant contribution to increasing the number of people who access PrEP within the indication.

When seeking pregnancy in serodiscordant couples where the male partner is HIV-positive, the use of sperm preparation

techniques (e.g., "sperm washing" followed by HIV-RNA testing of the sample) and in vitro fertilization are no longer routinely recommended if the HIV-positive individual is adherent to ART and the HIV viral load is undetectable. These recognized indications for semen preparation techniques were largely developed in trials before the demonstration of the effectiveness of ART and PrEP in reducing the risk of HIV transmission<sup>[5]</sup>. However, few obstetricians surveyed believed these partners could conceive through normal intercourse without additional protection, and most reported they would still recommend sperm preparation techniques.

Although data on the use of PrEP in pregnant and postpartum women are less robust than in non-pregnant women, PrEP is highly effective in women, and the large amount of data from pregnant women using tenofovir disoproxil and emtricitabine for HIV and hepatitis B infection treatment indicates that these agents are safe for pregnant and breastfeeding women<sup>[5]</sup>. However, obstetricians are unaware of the potential effects of PrEP use in pregnant women and the fetus.

HIV infection should be diagnosed before or as early as possible during pregnancy. Early diagnosis offers the best chance of improving the health of the pregnant woman, the outcome of the pregnancy, and preventing HIV transmission to the baby. People who are at high risk of acquiring HIV, who have acute signs and symptoms of HIV, or who live in areas with high HIV incidence are advised to have a repeat HIV test in the third trimester before 36 weeks of pregnancy, even if the first HIV test during pregnancy was negative<sup>[5]</sup>. Analyzing the results of our survey, obstetricians in Türkiye agreed on HIV testing at the beginning of pregnancy; however, there was doubt or disagreement about the need for retesting in the later stages of pregnancy.

Planned cesarean section at 38 weeks of gestation is recommended to prevent perinatal HIV transmission in people with HIV-RNA levels of >50 copies/ml at the time of delivery and in those with unknown HIV-RNA levels<sup>[5,12]</sup>. No evidence planned cesarean section for the sole purpose of preventing perinatal HIV transmission in pregnant HIV-positive persons on active ART with an HIV-RNA level of  $\leq$  1000 copies/ml at the time of delivery provides any benefit and is not routinely recommended in these cases. Thus, there were no additional HIV-specific indications in addition to the normal obstetric indications<sup>[5]</sup>. Obstetricians are aware of the need to refer pregnant women who are not virologically suppressed or who are diagnosed with HIV close to term for cesarean section. However, only a few respondents had accurate information regarding the medical indication for cesarean section in an HIV-positive pregnant woman on active ART. When asked why they prescribed an HIV-positive pregnant woman with a cesarean section rather than a normal delivery, even if she is on ART, obstetricians say they do so to prevent

HIV transmission to the baby and the health workers during the delivery.

Intrapartum ZDV provides antiretroviral prophylaxis when infants are at increased risk of exposure to maternal blood and body fluids. The decision to use intrapartum ZDV is now based on maternal adherence to ART and HIV-RNA levels<sup>[5]</sup>. Regardless of ART use in HIV-positive pregnant women, IV ZDV is recommended if the HIV-RNA level is >1000 copies/ml in the 4 weeks before delivery; however, it was not required if the HIV-RNA level is  $\leq$ 50 copies/ml in ART-adherent pregnant women<sup>[5]</sup>. In our study, obstetricians were aware that administering ZDV to the mother reduces HIV transmission to the baby, but they did not know under what conditions ZDV should be used and thought that ZDV could be given to any HIV-positive mother.

The majority of obstetricians who responded to our survey believe that breastfeeding should be stopped as soon as HIV positivity is detected; however, they are not sufficiently informed whether breastfeeding is permissible in HIV-positive pregnant women on ART. The available evidence cannot sufficient confirm whether breast milk is U=U in the context of vertical transmission<sup>[12]</sup>. With an undetectable viral load in the mother's blood, the risk of HIV transmission during breastfeeding is very low, but not zero; therefore, breastfeeding should be discouraged if a substitute for breast milk is available. The longer breastfeeding continues, the greater the risk of transmission; therefore, if breastfeeding is continued out of necessity, mothers should be encouraged to stop as soon as possible<sup>[12]</sup>.

Globally, an estimated 1.3 million women and adolescents living with HIV become pregnant each year. Without proper intervention, the HIV transmission rate from a mother living with HIV to her child during pregnancy, childbirth, postpartum, or breastfeeding ranges from 15% to 45%<sup>[13]</sup>. Young and pregnant women are one of the most strategic groups in achieving global HIV elimination targets; therefore, obstetricians' knowledge and approach to women living with or at risk of acquiring HIV in line with antenatal counseling and during pregnancy in the era of modern HIV medicines, U=U, and PrEP is critical.

A review of the HIV/AIDS statistics in Türkiye reveals that between 1985 and November 7, 2024, a total of 45,835 individuals were reported to be HIV-positive. According to the most recent data, between January 1, 2024, and November 7, 2024, 1567 HIVpositive persons were identified. These cases occurred most frequently in the 25-29 age group and following heterosexual sexual contact. The number of HIV infections in Turkey is expected to increase by 27% annually until 2040, according to a modeling study, reaching 376,889 new HIV cases and 2,414,965 cases of HIV prevalence by 2040. Assuming that these new diagnoses are in young heterosexual people, gynecologists and obstetricians will encounter HIV-positive pregnant women much more frequently in the coming years<sup>[14,15]</sup>.

Our study indicates a substantial knowledge deficit among obstetricians and gynecologists concerning general awareness of HIV, the concept of U=U, PrEP, and the clinical management of HIV-positive pregnancies, and the study addresses a significant public health issue, with a sample that includes different levels of expertise (residents, specialists, and academics), thus allowing for comparative analysis. To our knowledge, this is the first study to determine the level of HIV knowledge of obstetricians and gynecologists. We believe that this is the most important feature that makes our study valuable. A general consideration of the results of this study reveals that obstetricians and gynecologists do not feel the need to read guideline articles on this subject because of the low frequency with which they meet HIV-positive pregnant women. They also do not spend time attending meetings or symposia on this subject. Consequently, there are deficiencies in the general attitudes of obstetricians toward the follow-up of HIV-positive pregnancies, their general knowledge about HIV, their level of knowledge about U=U and PrEP, and their knowledge about the management of HIVpositive pregnancies.

#### **Study limitations**

The study's primary limitation is the relatively small sample size, which may not fully represent broader trends. A population of physicians may have refused to participate in the survey at the stage when the surveyors offered the physicians to participate. However, we think that this is due to time constraints and workload of the physicians rather than a situation that creates a volunteer bias. The fact that the population with a low level of knowledge is much more dominant in our survey results supports this view.

### Conclusion

Considering the expected increase in the number of HIV-positive pregnant women in Türkiye in the future, this study found that the level of HIV knowledge, the disease course, the efficacy of antiretroviral drugs, and the use of these drugs in pregnancy among obstetricians are insufficient. Furthermore, their experience in managing HIV-positive pregnancies and deliveries is low, and young doctors particularly do not feel adequate and comfortable in managing HIV-positive pregnancies. The fact that obstetricians, especially residents, have not attended any meetings or read any literature on HIV in recent years suggests that HIV should be more integrated into the educational and training activities of obstetricians. Therefore, further research should be performed to draw general conclusions on this issue.

#### Ethics

**Ethics Committee Approval:** Ethics committee approval was graded by University of Health Sciences Türkiye, Hamidiye Scientific Research Ethics Committee (approval number: 27/33, dated: 30.12.2022).

**Informed Consent:** The consent form was filled out by all participants.

#### Footnotes

#### **Authorship Contributions**

Surgical and Medical Practices: S.Ç.E., E.Y., Concept: S.Ç.E., E.Y., T.Y., A.Ş., A.K., B.D., Design: S.Ç.E., E.Y., A.K., Data Collection or Processing: S.Ç.E., E.Y., T.Y., B.D., Analysis or Interpretation: S.Ç.E., E.Y., A.Ş., A.K., B.D., H.K., Literature Search: S.Ç.E., E.Y., T.Y., A.Ş., A.K., H.K., Writing: S.Ç.E., E.Y., T.Y., A.Ş., H.K.

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## References

- Elliott T, Sanders E J, Doherty M, Ndung'u T, Cohen M, Patel P, Cairns G, Rutstein S E, Ananworanich J, Brown C, Fidler S. Challenges of HIV diagnosis and management in the context of pre-exposure prophylaxis (PrEP), postexposure prophylaxis (PEP), test and start and acute HIV infection: a scoping review. J Int AIDS Soc. 2019;22:e25419.
- Murewanhema G, Musuka G, Moyo P, Moyo E, Dzinamarira T. HIV and adolescent girls and young women in sub-Saharan Africa: a call for expedited action to reduce new infections. IJID Reg. 2022;5:30-2.
- 3. Mvilongo P T N, Vanhamel J, Siegel M, Nöstlinger C. The "4th 90" target as a strategy to improve health-related quality of life of people living with HIV in sub-Saharan Africa. Trop Med Int Health. 2022;27:1026-43.
- Lau LH, Lee MP, Wong BC, Kwong TS, Hui WM, Chan JM, Lee SS. HIV-related public stigma in the era of "Undetectable=Untransmittable": a populationbased study in Hong Kong. BMC Public Health. 2024;24:1517.
- 5. Centers for Disease Control and Prevention, HIV Medicine Association of the Infectious Diseases Society of America, Pediatric Infectious Diseases

Society, HHS Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission-A Working Group of the Office of AIDS Research Advisory Council (OARAC). Recommendations for the use of antiretroviral drugs during pregnancy and interventions to reduce perinatal HIV transmission in the United States. [Updated 2024 Dec 19]. In: ClinicalInfo. HIV.gov [Internet]. Rockville (MD): US Department of Health and Human Services; 2002. Last accessed date: 2025 Mar 6. Available from: https:// www.ncbi.nlm.nih.gov/sites/books/NBK586310/

- Gökengin D, Kurtaran B, Korten V, Tabak F, Ünal S. HIV/AIDS Tanı, İzlem ve Tedavi El Kitabı, 2. baskı. Aralık 2021. Last accessed date: 2025 Mar 6. Available from: https://www.klimik.org.tr/wp-content/uploads/2022/03/ HIV\_AIDS-El-Kitabi\_-Sürüm-2.pdf
- Republic of Türkiye Ministry of Health, General Directorate of Public Health. Türkiye HIV/AIDS Control Program. Ankara; 2019. Last accessed date: 2025 Mar 6. Available from: https://hsgm.saglik.gov.tr/depo/Yayinlarimiz/ Programlar/HIV\_AIDS\_Kontrol\_Programi.pdf
- 8. Dişçi R. Temel ve Klinik Biyoistatistik. İstanbul: İstanbul Tıp Kitabevi; 2015.
- O Murchu E, Marshall L, Teljeur C, Harrington P, Hayes C, Moran P, Ryan M. Oral pre-exposure prophylaxis (PrEP) to prevent HIV: a systematic review and meta-analysis of clinical effectiveness, safety, adherence and risk compensation in all populations. BMJ Open. 2022;12:e048478.
- 10. World Health Organization. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations. Geneva: World Health Organization; 2014.
- World Health Organization. WHO expands recommendation on oral pre-exposure prophylaxis of HIV infection (PrEP). 2015. Last accessed date: 2025 Mar 6. Available from: https://apps.who.int/iris/bitstream/ handle/10665/197906/WHO\_HIV\_2015.48\_eng.pdf?sequence=1
- European AIDS Clinical Society. EACS Guidelines 2024, version 12.1, November 2024. Last accessed date: 2025 Mar 6. Available from: https:// eacs.sanfordguide.com/
- 13. World Health Organization, Global HIV Programme. Mother-to-child transmission of HIV. Last accessed date: 2025 Mar 6. Available from: https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/hiv/ prevention/mother-to-child-transmission-of-hiv
- Turkish Ministry of Health, General Directorate of Public Health. HIV/ AIDS Statistics. Last accessed date: 2025 Mar 6. Available from: https:// hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/ Dokumanlar/Istatistikler/Ek\_HIV-AIDS\_Istatistikleri.pdf
- Yaylali E, Erdogan Z M, Calisir F, Gokengin D, Korten V, Tabak F, Tasova Y, Unal S, Ozelgun B, Ozcagli T G, Sahin T. Modeling the future of HIV in Türkiye: cost-effectiveness analysis of improving testing and diagnosis. PLoS One. 2023;18:e0286254.