



Research Article

Ankara Med J, 2021;(1):1-11 // doi 10.5505/amj.2021.27879

KNOWLEDGE LEVEL OF THE FAMILY MEDICINE RESIDENTS AND SPECIALISTS ABOUT ASYMPTOMATIC BACTERIURIA DURING PREGNANCY AİLE HEKİMLİĞİ ASİSTANLARININ VE UZMANLARININ GEBELİKTE ASEPTOMATİK BAKTERİÜRİ HAKKINDAKİ BİLGİ DÜZEYLERİ

 Murat Çevik¹,  İzzet Göker Küçük²,  Utku Eser³,  Kurtuluş Öngel⁴

¹Güdül Family Health Center, Güdül, Ankara

²Kemalöz Family Health Center, Uşak

³Uşak University Faculty of Medicine, Department of Family Medicine, Uşak

⁴İzmir Katip Çelebi University Faculty of Medicine, Department of Family Medicine, İzmir

Yazışma Adresi / Correspondence:

İzzet Göker Küçük (e-mail: izzetgoker@gmail.com)

Geliş Tarihi (Submitted): 15.09.2020 // Kabul Tarihi (Accepted): 09.03.2021



Öz

Amaç: Çalışmamız gebelikte görülen asemptomatik bakteriüri hakkında aile hekimliği asistanları ve uzmanlarının yaklaşımlarını ve bilgi düzeylerini belirlemeyi amaçlamaktadır.

Materyal ve Metot: Bu çalışma, Haziran-Ağustos 2018 tarihleri arasında, kolay örneklem ile gerçekleştirilmiş, açılan web sitesi üzerinden maksimum hekim sayısına ulaşılarak yapılmış kesitsel bir çalışmadır. Türkiye genelinde, asistan ve uzman aile hekimlerine, gönüllü onam formu doldurulduktan sonra araştırmacılar tarafından oluşturulmuş 19 soru içeren bir anket uygulanmıştır. Tanımlayıcı istatistiksel analizler için SPSS 21 istatistik programı kullanılmıştır.

Bulgular: Çalışmaya 166'sı (%65,9) aile hekimliği asistanı (AHA), 86'sı (%34,1) aile hekimliği uzmanı (AHU) toplam 252 kişi katıldı. Gebe takibi esnasında 102 hekim (27 AHU ve 75 AHA) tam idrar tahlili (TİT) ve idrar kültürünü beraber istedi. İdrar kültüründe asemptomatik bakteriüri diyebilmek için bakteri sayısı 10^5 ve daha fazla olmalıdır sorusuna AHU'ların 55'i (%64,0) ve AHA'ların ise 91'si (%54,8) doğru cevap verdi. Gebelikte asemptomatik bakteriüri tedavisinde AHU ve AHA'ların en sık ampisilin tercih ettiği saptandı. Çalışmaya katılan katılımcıların çoğu tedavide kullanılan Trimetoprim-Sülfometaksazol (TMP-SMX)'ün komplikasyonlarından haberdardı.

Sonuç: Çalışmamıza göre; Aile hekimliği uzmanlarının ve asistanlarının, gebelikteki asemptomatik bakteriüri hakkındaki bilgi düzeylerinin yetersiz olduğunu saptadık. Bu nedenle literatürde bu konuyla ilgili yeni ve çok sayıda katılımcıyı içeren çalışmaların yapılması bu konudaki farkındalığı arttıracığı düşüncesindeyiz.

Anahtar Kelimeler: Asemptomatik bakteriüri, aile hekimliği, gebelik.

Abstract

Objectives: This study aims to determine the approaches and level of knowledge of family medicine residents and specialists about asymptomatic bacteriuria in pregnancy.

Materials and Methods: This is a cross-sectional study conducted between June and August 2018, with easy sampling, reaching the maximum number of physicians through the website we designed for this project. A questionnaire containing 19 questions created by the researchers was applied to family medicine residents and specialists in Turkey, after filling voluntary consent forms. SPSS 21 statistics program was used for descriptive statistical analyzes.

Results: A total of 252 people, 166 (65.9%) family medicine residents (FMRs), 86 (34.1%) family medicine specialists (FMSs) participated in the study. During the pregnancy follow-up, 102 physicians (27 FMSs and 75 FMRs) requested complete urinalysis (CUA) and urine culture together. In order to be able to diagnose asymptomatic bacteriuria in urine culture, 55 of FMSs (64.0%) and 91 of FMRs (54.8%) gave the correct answer to the question that the number of bacteria should be 10^5 or more. In the treatment of asymptomatic bacteriuria during pregnancy, it was determined that the FMSs and FMRs mostly preferred ampicillin. Most of the participants in the study were aware of the complications of Trimethoprim-Sulfamethoxazole (TMP-SMX) used in the treatment.

Conclusion: According to our study; We found that the knowledge level of family medicine specialists and residents about asymptomatic bacteriuria during pregnancy was insufficient. For this reason, we think that conducting new studies on this subject in the literature and involving a large number of participants will increase awareness of this issue.

Keywords: Asymptomatic bacteriuria, family medicine, pregnancy.

Introduction

Symptomatic and asymptomatic bacteriuria are common in pregnancies. Asymptomatic bacteriuria can develop in 2-10% of pregnancies.¹ Factors facilitating asymptomatic bacteriuria in pregnancy are as follows; poor socioeconomic status, recurrent urinary tract infections, diabetes, anatomical abnormalities in the urinary tract, sickle cell anemia, age, and number of births.²⁻⁴

Taking complete urinalysis (CUA) alone is not sufficient for the detection of asymptomatic bacteriuria. Urine culture should definitely be checked. The gold standard in the diagnosis of asymptomatic bacteriuria is urine culture.^{2,3,4,5} To be diagnosed as asymptomatic bacteriuria, $10^{5.5}$ or more bacteria should be produced in the urine culture without symptoms of urinary tract infection.⁶⁻⁸ In many countries around the world, urine culture is specified in various guidelines. The World Health Organization (WHO) does not routinely recommend urine culture during pregnancy follow-up.⁹

The most common cause of asymptomatic and symptomatic bacteriuria is E. Coli.²⁻⁴ The incidence in samples ranges from 70 to 80%. Apart from this, other pathogenic microorganisms include gram (-) bacteria; eg Klebsiella pneumonia and Proteus mirabilis, enterobacter species, Staphylococcus species, and enterococcus faecalis. Group B streptococci (Streptococcus agalactiae) and pseudomonas species are among the rare agents.¹⁰⁻¹³

Pyuria is; Leukocyturia in the urine as a result of the inflammatory response to bacterial invasion in the uroepithelium. For the diagnosis of pyuria, a microscopic examination should have ≥ 3 leukocytes / high magnification field or ≥ 10 leukocytes/ml. Pyuria may accompany 50% of patients with asymptomatic bacteriuria.¹⁴ However, pyuria is not a useful marker in the diagnosis of asymptomatic bacteriuria during pregnancy.¹⁵

Pyelonephritis is a bacterial infection of the kidney parenchyma. The clinical course of pyelonephritis includes high fever, chills, costovertebral angle tenderness, flank, waist, and abdominal pain, urinary burning, low blood pressure, and hematuria. Complications that may develop in the mother include sepsis, renal failure, preeclampsia, anemia, and respiratory failure. When asymptomatic bacteriuria developing during pregnancy is not treated, it may cause pyelonephritis development up to 30% in the future.^{1,8}

Treatment of asymptomatic bacteriuria may prevent symptomatic bacteriuria, preterm delivery, development of pyelonephritis, and also low birth weight infants, which may develop during pregnancy.^{9,10}

There is no consensus on the treatment of asymptomatic bacteriuria. However, many studies have found that treatment can prevent complications that may develop. There are many treatment options in the literature. Drug selection is individual-specific.^{2,3} In treatment, short-term (2-7 days) treatment regimens should be preferred instead of a single dose of medication.^{9,16} Ampicillin, one of the most commonly used drugs in treatment, is an antibiotic of the beta-lactam group and is not teratogenic.¹⁷

The use of fosfomycin in asymptomatic bacteriuria and urinary tract infections during pregnancy is effective and safe. In addition, drugs containing amoxicillin and amoxicillin-clavulanate can be administered orally for 3-7 days, with 500 mg twice daily.¹⁷ It has been claimed that cranberry juice may have a protective effect in non-pharmacological treatment.¹⁸

The purpose of this study was to examine the experiences of family medicine residents (FMRs) and family medicine specialists (FMSs) during pregnancy; asymptomatic bacteriuria, and the level of knowledge about preventive measures, complications, and treatment approaches that may be taken in relation to the presence of asymptomatic bacteriuria. This study aimed to increase the knowledge level and awareness of family physicians about the prevention of urinary tract infections and the treatment of asymptomatic bacteriuria, which are the most common causes of preterm labor and abortions.

Materials and Methods

This study organized in a prospective type; was planned as a single group and the control group was not included in the study. The questionnaire was prepared in consultation with the information obtained from sources about asymptomatic bacteriuria in pregnant women and expert scientists. The study was applied to family medicine residents and family medicine specialists who approved the voluntary consent form on the internet (Facebook™, Twitter™, Instagram™, and Web site) between June and August 2018. After a questionnaire form consisting of 19 questions investigating their knowledge level was filled. The first 5 questions were for socio-demographic data, and the remaining 14 questions were aimed at investigating the level of knowledge about pregnant women with asymptomatic bacteriuria. Those with known psychiatric diseases, those who have missing parts in the questionnaire, and those who were not volunteers were excluded from the study.

The data of the study were evaluated using the Statistical Program for Social Sciences (SPSS) 21 program. The answers are given as percentages. The dependence between variables was examined by Chi-Square analysis. The Kruskal-Wallis H test was used to compare the mean scores between the groups. The significance level was used at 0.05, and it was stated that there is a significant difference when $p < 0.05$, and that there is no significant difference if $p > 0.05$.

Results

Family medicine specialists and residents who are working in 40 different provinces throughout Turkey, participated in this study. In 18 different provinces, only one doctor participated in the study. The mean age of the physicians was 32.4 ± 7.1 (min: 24.0- max: 59.0 years).

The majority (n:143, 56.7%) consisted of young physicians within the first 5 years of their career. When the physicians participating in the study are examined according to their genders; 91 people (36.1%) were male and 161 (63.9%) were female. When the resident-specialist distribution is examined; 86 (34.1%) were FMSs and 166 (65.9%) were FMRs. The periods of Physician's work ranged from 1 to 30 years. "How many years have you been working as a family doctor?" There is a statistically significant difference between the answers given to the question ($p = 0.008$). It was observed that the total knowledge score of physicians working for 21 years or more was higher than the scores of the other groups.

Two hundred forty-four physicians (96.8%) responded "yes" to the question "Do you request a complete urine analysis (CUA) test for your pregnant patients?" 102 people answered "yes" (40.5%) and 150 people answered "no" (59.5%) in the question "Do you order urine culture from your patients during pregnancy?" During pregnancy follow-up, 102 physicians (40.6% of physicians) required both CUA and urine culture together.

While there is no statistically significant relationship between requesting a CUA according to the educational status (being a specialist-resident) ($p=0.451$); A statistically significant relationship was observed in terms of requesting urine culture ($p=0.035$). FMRs wanted statistically significantly more urine cultures than FMSs. 27 (31.4%) of 86 FMSs and 75 (45.2%) of 166 FMRs requested both complete urinalysis and urine culture.

Table 1. Urine culture demand rates according to education status

	Education Status						Chi-Square Analysis	
	FMSs		FMRs		Total		Chi-Square	p
	n	%	n	%	n	%		
No	59	68.6	91	54.8	150	59.5	4.4	0.035
Yes	27	31.4	75	45.2	102	40.5		
Total	86	100.0	166	100.0	252	100.0		

FMSs: Family medicine specialists, FMRs: Family medicine residents,

"Do you request a" Complete Urine Examination (CUA) from your patients who are followed up for pregnancy?" 244 physicians (96.8%) answered "yes" to the question, while 8 physicians answered "no" (3.2%).

For the question, "Do you request urine culture from your patients who come for pregnancy follow-up?" 102 physicians (40.5%) answered "yes" to the question, while 150 physicians answered "no" (59.5%). Out of 244 physicians who request CUA 102 (40.6%) also request urine culture.

73 of 86 family medicine specialists (84.9%) and 149 of 166 family medicine residents (89.8%) who participated in the study answered the most common cause of asymptomatic and symptomatic bacteriuria in pregnant women as "E.coli". No statistically significant difference was found between the two groups (p=0.353). The rate of correct answers is higher in FMRs.

Table 2. Rates of asymptomatic bacteriuria factors according to education level

		The most common factor in pregnant women					Total
		E.Coli	Enterococcus	Grup B s	Proteus	Staphylococcus	
Education Status	FMSs	73 (%84.9)	7 (%8.1)	4 (%4.7)	1 (%1.2)	1 (%1.2)	86
	FMRs	148(%89.7)	4 (%2.4)	11 (%6.7)	1 (%0.6)	1 (%0.6)	165
Total		221	10	15	1	2	251

FMSs: Family medicine specialists, FMRs: Family medicine residents, Grup B s: Group B streptococci

For the question: "What is the number of bacteria to be called asymptomatic bacteriuria in the urine culture?" 55 FMSs (64.0%) answered this question correctly; while on the other hand, 91 FMRs (54.8%) responded to this question correctly. No statistically significant difference was found between the two groups (p=0.164). Although it is not statistically significant, the rate of correct answers is higher in FMSs.

To the question "What % of pregnant women with asymptomatic bacteriuria accompany pyuria?", 12 people from FMSs (n: 14.0%) and 23 people from FMRs(n: 13.9%) answered 50%. No statistically significant difference was found between the two groups (p=1).

The criteria for true asymptomatic bacteriuria was able to recognized by 71 out of 86 FMSs (82.6%) and 119 out of 166 FMRs (71.7%). No statistically significant difference was found between the two groups ($p=0.081$). Although it is not statistically significant, the rate of correct answers is higher in FMSs.

The correct answer of "1. trimester", were given by 31 of the 86 FMSs (36.0%) and 42 of the 165 FMRs (25.5%) for the question: "In which trimester, having asymptomatic bacteria increases the incidence of pyelonephritis in the future?" There was no statistically significant difference between the answers given and the educational status of the participants (FMSs-FMRs) ($p=0.149$).

Factors that facilitate the development of asymptomatic bacteriuria in pregnancies were questioned; although not among risk factors; 66 (76.7%) of the 86 FMSs and 110 (66.3%) of the 166 FMRs considered hypertension as a risk factor. No statistically significant difference was observed between the two groups ($p=0.086$).

For the question "What does asymptomatic bacteriuria cause during pregnancy?", 69 of 86 FMSs (80.2%) and 106 of 165 FMRs (64.2%), considered pyelonephritis as the most common result of asymptomatic bacteriuria.

For the question "What does asymptomatic bacteriuria cause during pregnancy?" The correct answer is "all"(Pyelonephritis, low birth weight, preterm birth, urinary tract infections (eg acute cystitis)). A total of 117 physicians responded as "All" to this question, 47 (54.7%) FMSs, and 70 (42.2 %) FMRs. The rates of 3 and 4 correct answers are found to be significantly higher in FMSs ($P=0.036$).

For the question "Which of the following drugs do you prefer in the treatment of asymptomatic bacteriuria during pregnancy?" The correct answer to the question is "all" (Ampicillin, Cephalexin, Nitrofurantoin, Trimethoprim-Sulfamethoxazole (TMP-SMX)). In the treatment of asymptomatic bacteriuria in pregnancy, both FMSs and FMRs preferred ampicillin as a first choice mostly with ratios ($n:55, 64.0\%$); ($n:106, 64.2\%$) respectively. Only 2 FMSs (2.3%) and 2 FMRs (1.2%) answered "all" to this question. There is no significant difference between the two groups in terms of correct answer rates ($p=0.575$) The rates of 1 and 2 correct answers are higher in both groups. It should be discussed whether physicians who are expected to give correct answers to all of them give 1 or 2 correct answers.

For the question "Which one of the drugs used in the treatment of asymptomatic bacteriuria in pregnancy can cause NTD and other congenital injuries when used in the first trimester?" 60 of 86 FMSs (69.8%) and 119 out of 166 FMRs (71.7%), giving correct answer of " trimethoprim- Sulfamethoxazole (TMP-SMX)". There was no statistically significant difference between the groups ($p=0.863$).

Fifty-six (65.1%) out of 86 FMSs and 85 (51.2%) out of 166 FMRs, answered TMP-SMX for the question "Which drugs used in the treatment of asymptomatic bacteriuria in pregnancy can cause jaundice and kernicterus in

newborns when they are used after the 32nd week?". The correct response rate is found to be significantly higher in FMSs ($p=0.035$).

48.8% (n:42) of FMSs and 52.4% (n:87) of FMRs participating in the study, gave the answer "Ampicillin therapy alone is enough" in response to the question "Which of the following is not true about acute pyelonephritis that may develop in pregnancies with untreated asymptomatic bacteriuria?". There was no statistically significant difference between the groups ($p=0.591$).

None of FMSs nor the FMRs couldn't answer all the questions correctly.

Discussion

In our study, although it is stated in the pregnant follow-up guide of the Ministry of Health, only 40.6% of physicians want complete urinalysis (CUA) and urine culture together. On the other hand, it was observed that 96.8% of the doctors participating in the study in the patients who came for pregnancy follow-up requested CUA, only 8 (3.2%) stated that they did not. It was observed that FMRs requested statistically significantly more urine culture than FMSs.

In the study conducted by Wing D.A et al., the growth rate in urine culture of patients with acute pyelonephritis was found to be 62.5%. The bacteria detected in the urine culture are as follows; Escherichia coli (82.5%), Streptococcus species (21.4%), Klebsiella pneumonia (7.6%), Staphylococcus species (6.5%), enterococcal species (5.7%), and Proteus mirabilis (4.9%).¹⁰ Another bacteriuria that causes asymptomatic bacteriuria is beta-lactamase-producing enterobacteria. Previous urinary tract infection and antibiotic use are among the most important risk factors in their development.¹⁹ In our study, 84.9% of FMSs and 89.8% of FMRs, in accordance with the literature, gave the answer E.Coli as the most common cause of asymptomatic and symptomatic bacteriuria in pregnancy. There is no statistically significant difference between the two groups.

With a bacterial count of $>10^5$ in the culture of two consecutive clean urine samples for the diagnosis of asymptomatic bacteriuria in urine culture and the absence of signs of urinary tract infection, a 95% probability of true bacteriuria is made. In our study, 55 individuals (64.0%) of FMSs and 91 (54.8%) of FMRs gave the correct answer $>10^5$. The real asymptomatic bacteriuria diagnosis criteria were defined by 82.6% of FMSs and 71.7% of FMRs. Although it is not statistically significant, the rate of correct answers is higher in FMSs.

Complications that may develop in the mother include sepsis, renal failure, preeclampsia, anemia, and respiratory failure.^{1,13} In our study, according to the literature, those who gave the first-trimester answer in accordance with the literature were 36.0% among FMSs and 25.3% among FMRs.^{1,2,14,20}

Risk factors that facilitate the development of asymptomatic bacteriuria in pregnant women include recurrent urinary tract infections, polycystic kidney disease, congenital kidney anomalies, urinary tract stones, malformations, age, number of births, presence of bacteriuria, sickle cell anemia, and diabetes mellitus.^{1,2,8,10,12,21} In accordance with the literature, 76.7% of FMSs and 66.3% of FMRs were able to answer the risk factors for asymptomatic bacteriuria questions correctly. Although it is not statistically significant, the rate of correct answers is higher in FMSs.

Asymptomatic bacteriuria during pregnancy can cause many complications.^{10,21,22} In our study, the most frequently mentioned complication by the participants was pyelonephritis. The percentage of physicians who knew that it could cause all complications was 41.5% in FMSs and 58.5% in FMRs. It was found that the participants did not have enough information about the complications that asymptomatic bacteriuria can cause.

In our study, the most preferred antibiotic among both FMSs and FMRs as ampicillin. However, 64.0% of FMSs and 64.2% of FMRs who participated in the study stated that ampicillin alone would be insufficient in the treatment of acute pyelonephritis in pregnant women with asymptomatic bacteriuria, in accordance with the literature.¹⁷

In accordance with the literature, the majority of the participants in the study, 69.8% of FMSs and 71.7% of FMRs, respectively, stated that the use of TMP-SMX in the first trimester may cause congenital damage. Although it is not statistically significant, the rate of correct answers is lower in FMSs.

However, the number of correct responses to the other side effects, which are jaundice and kernicterus, were found to be lower in both FMSs (65.1%) and FMRs (51.2%). In contrast to the literature, in this study, a very low number of FMSs and FMRs answered that all of the above-mentioned drugs could be used.^{2,3,9,16,17}

The strengths of this study are as follows; It adequately represents FMSs actively working in the health system and FMRs who are trained in family medicine. Other positive aspects include the importance of CUA and urine culture in pregnancy follow-up, causes, diagnosis, complications, treatment options, and drug side effects of asymptomatic bacteriuria in pregnancy. The downsides are; The distribution of the participants could not be provided proportionally across the country. The majority of professional experience rates are young physicians. It was not determined how much of the FMSs participating in the study received gynecological rotation, we think that it may have an effect on the answers given. It is necessary to pay attention to the points specified in the planning of the next studies and to be done on larger groups.

As a result, family physicians should receive sufficient training to recognize asymptomatic bacteriuria in pregnancy, to know its complications, and to determine the specific treatment for the patient during and after family medicine education.

Ethical considerations

The study was conducted in accordance with the permission of the non-interventional clinical research ethics committee of Izmir Katip Çelebi University, dated 23.05.2018, decision number 190.

Conflict of interest

The authors declare no conflict of interest.

References

1. Smaill FM, Vazquez JC. Antibiotics for asymptomatic bacteriuria in pregnancy. *Cochrane Database Syst Rev* 2015;(8):CD000490.
2. Schnarr J, Smaill F. Asymptomatic bacteriuria and symptomatic urinary tract infections in pregnancy. *Eur J Clin Invest* 2008;38(S2):50-7.
3. Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM. Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults. *IDSA Guidelines for Asymptomatic Bacteriuria*. 2005;40:643-54.
4. Uncu Y, Uncu G, Esmer A, Bilgel N. Should asymptomatic bacteriuria be screened in pregnancy? *Clin Exp Obstet Gynecol* 2002;29(4):281-5.
5. Chang W, Yeh C, Wang P. Do pregnant women with asymptomatic bacteriuria need treatment? *Taiwanese Journal of Obstetrics & Gynecology* 2017;56:583-4.
6. Schneeberger C, Erwich JJHM, van den Heuvel ER, Mol BWJ, Ott A, Geerlings SE. Asymptomatic bacteriuria and urinary tract infection in pregnant women with and without diabetes: Cohort study. *Eur J Obstet Gynecol Reprod Biol* 2018;222:176-81.
7. Azak E, Gündeş SG. Asymptomatic bacteriuria. *Türkiye Klinikleri J Urology-Special Topics* 2010;3(3):27-33.
8. Etminan-Bakhsh M, Tadi S, Darabi R. Asymptomatic bacteriuria in pregnant women attending Boo-Ali Hospital Tehran Iran: Urine analysis vs. urine culture. *Electron Physician* 2017;9(11):5760-3.
9. Büyükbayrak EE. Gebelik izlemi: Dünyadaki uygulamalar; kılavuzlar ne öneriyor? *Türkiye Maternal Fetal Tıp ve Perinataloji Derneği X.Ulusal Kongresi*. 27-30 Ekim 2016.
10. Wing DA, Fassett MJ, Getahun D. Acute pyelonephritis in pregnancy: an 18-year retrospective analysis. *Am J Obstet Gynecol* 2014;210:219.e1-6.
11. Yaylı G. Asemptomatik bakteriüriye yaklaşım. *Klimik Dergisi*. 2000;13(3):83-5.
12. Izuchukwu KE, Oranu EO, Basse G, Orazulike NC. Maternofetal outcome of asymptomatic bacteriuria among pregnant women in a Nigerian Teaching Hospital. *Pan Afr Med J* 2017;27:69.
13. Kalinderi K, Delkos D, Kalinderis M, Athanasiadis A, Kalogiannidis I. Urinary tract infection during pregnancy: current concepts on a common multifaceted problem. *J Obstet Gynaecol* 2018;38(4):448-53.
14. Tünger Ö. Değişen CDC tanımları üriner kateterle ilişkili enfeksiyonlar. <http://www.klimik.org.tr/wp-content/uploads/2014/03/%C3%96ZLEM-T%C3%9CNGER.pdf>
15. de la Rosa M, Rojas A, García V, Herruzo A, Moreno I. Asymptomatic bacteriuria and pyuria during pregnancy. *Enferm Infecc Microbiol Clin* 1994;12(2):79-81.

16. Widmer M, Lopez I, Gülmezoglu AM, Mignini L, Roganti A. Duration of treatment for asymptomatic bacteriuria during pregnancy. *Cochrane Database Syst Rev* 2015;11:CD000491.
17. Tuğrul S, Arısoy R. Gebelikte Üriner Sistem Enfeksiyonları. <http://www.tjodistanbul.org/egitim/istanbul-kliniklerinden/obstetri/gebelikte-uriner-sistem-enfeksiyonlari>
18. Wing DA, Rumney PJ, Preslicka CW, Chung JH. Daily cranberry juice for the prevention of asymptomatic bacteriuria in pregnancy: a randomized, controlled pilot study. *J Urol* 2008;180(4):1367-72.
19. Yagel Y, Nativ H, Riesenberk K, Neshet L, Saidel-Odes L, Smolyakov R. Outcomes of UTI and bacteriuria caused by ESBL vs. non-ESBL Enterobacteriaceae isolates in pregnancy: a matched case-control study. *Epidemiol Infect* 2018;146(6):771-4.
20. Özsüt H. Üriner sistem enfeksiyonları. Akılcı antibiyotik kullanımı ve erişkinde toplumdan edinilmiş enfeksiyonlar sempozyum dizisi no:31. Kasım 2002;225-32.
21. Moore A, Doull M, Grad R, Groulx S, Pottie K, Tonelli M, et al. Recommendations on screening for asymptomatic bacteriuria in pregnancy. *CMAJ* 2018;190:E823-30.
22. Kazemier BM, Koningstein FN, Schneeberger C, Ott A, Bossuyt PM, Miranda ED, et al. Maternal and neonatal consequences of treated and untreated asymptomatic bacteriuria in pregnancy: a prospective cohort study with an embedded randomised controlled trial. 2015;15(11): 1324-33.