Assessment of urinary infection management during prenatal care in pregnant women attending public health care units in the city of Rio de Janeiro, Brazil

*Avaliação do manejo da infecção urinária no pré-natal em gestantes do Sistema Único de Saúde no município do Rio de Janeiro**

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Abstract

The aim of this study was to assess the sociodemographic risk factors for urinary tract infection and the inadequacy of antenatal care, according to the Kotelchuck index, in pregnant women in the city of Rio de Janeiro. A cross-sectional study was conducted with 1,091 pregnant women, 501 with urinary tract infection, in the public health antenatal care units in Rio de Janeiro, Brazil, in 2007-2008. Demographic and socioeconomic data, obstetric history and adequacy of antenatal care were collected by interviews and antenatal care card. Inadequacy management of urinary tract infection was evaluated by professional performance, health services and women dimensions. Chi-square and multivariate logistic regression were used to compare groups and to identify associated factors with management of urinary tract infection. Pregnant teenagers, anemic and diabetic pregnant women and quality of prenatal partially adequate or inadequate were those with higher odds of urinary tract infection. In the overall assessment, 72% had inadequate management of urinary tract infection. Inadequate management of urinary tract infection was associated with brown skin color compared to white skin color. In the assessment of health professional performance, inadequacy management of urinary tract infection was more common in pregnant women with low weight and overweight and obesity. According to pregnant women evaluation, primiparous women have lower odds of inadequacy management of urinary tract infection compared to those with one or more children.

Keywords: Urinary tract. Infection. Prenatal care. Pregnancy. Health evaluation. Public sector.

Resumo

O objetivo deste estudo foi avaliar o perfil sociodemográfico de risco para infecção do trato urinário e para inadequação do pré-natal, segundo índice de Kotelchuck, e avaliar o manejo da infecção do trato urinário durante o pré-natal segundo o profissional de saúde, o serviço de saúde e a mulher, em gestantes no município do Rio de Janeiro. Um estudo seccional foi realizado com 1.091 gestantes, 501 com infecção do trato urinário, na rede do SUS do Rio de Janeiro em 2007/2008. Informações demográficas, socioeconômicas, história obstétrica e adequação do pré-natal foram coletadas através de entrevistas e do cartão do pré-natal. O manejo inadequado da infecção do trato urinário foi avaliado pelas dimensões: profissional de saúde, serviços de saúde e mulher. Utilizou-se o teste χ^2 e regressão logística multivariada para comparação entre os grupos e identificação dos fatores associados ao manejo inadequado da infecção do trato urinário. As gestantes adolescentes, anêmicas, diabéticas e com qualidade do pré-natal parcialmente adequado ou inadequado apresentaram maior chance de infecção do trato urinário. Na avaliação global, 72% tiveram manejo inadequado da infecção do trato urinário. O manejo inadequado da infecção do trato urinário foi associado à cor parda em comparação com a cor branca. Na avaliação do profissional de saúde, o manejo inadequado para infecção do trato urinário foi menos comum nas gestantes com baixo peso e com sobrepeso e obesidade e, na avaliação da gestante, as primíparas tiveram menor chance de manejo inadequado para infecção do trato urinário em relação àquelas com um ou mais filhos.

Palavras-chave: Infecção. Trato urinário. Cuidado pré-natal. Gravidez. Avaliação em saúde. Setor público.

Introduction

The clinical forms of urinary tract infection (UTI) are asymptomatic bacteriuria, cystitis or pyelonephritis. Asymptomatic bacteriuria affects from 2 to 10% of pregnant women, of which between 25 and 35% develop pyelonephritis[1]. Jacociunas et al.[2] found an incidence of asymptomatic bacteriuria during pregnancy of 16% and Magalhães et al.[3] found an incidence of UTI in pregnant adolescents of 6.4%.

UTI during pregnancy occurs due to pelvic dilation and hydroureter, increase in renal size, increase in urine production, change in bladder position from the pelvis to the abdomen, reduction in vesicle muscle tone, and relaxation in the bladder and ureter smooth muscle tissues caused by impregnation with progesterone, glycosuria and aminoaciduria[1,4]. UTI affects pregnant women with similar characteristics, such as primiparous and anemic women and those with a previous history of UTI[5,6]. The main complication of UTI during pregnancy is preterm birth. UTI can also cause intrauterine growth restriction, low birth weight, cerebral palsy, mental retardation, infection, multiple organ failure and death. Additionally, UTI can cause severe maternal complications such as cellulite, perinephric abscess, urinary obstruction, premature labor, premature membrane rupture, anemia, chorioamnionitis, endometritis, septic shock, multiple organ failure and death[7-8].

The diagnosis of UTI must be performed with the laboratory test of urine culture, considered as the gold standard. There are other rapid tests to indicate urinary infection, such as the type 1 test and urine coloration with the Gram method. The type 1 test must be routinely requested in the first prenatal consultation and repeated close to the 30th gestational week. If this test detects bacteria, leukocytes or piocytes, urine culture must therefore be requested[1].

Adequate prenatal care interventions contribute to reduce the complications caused by UTI during pregnancy. Performing routine urine tests during prenatal care in

asymptomatic pregnant women to identify and treat those with asymptomatic bacteriuria benefits both these women and newborns. A systematic review showed that the treatment for asymptomatic bacteriuria reduced the risk of pyelonephritis and low birth weight, although it did not influence preterm birth rates[9].

In 2009, the proportion of newborns with low birth weight in the city of Rio de Janeiro was 10%. (http://tabnet.datasus.gov.br/cgi/tabcgi.exe?idb2010/g16.def). It is possible that many newborns have come from pregnant women with UTI inadequately treated during prenatal care.

The present study develops an in-depth and innovative approach towards the assessment of the adequacy of management of UTI during prenatal care. This approach is different as it verifies such management according to several joined dimensions which have not been observed in the literature, namely the assessment of health professionals, health services and pregnant women, according to the Ministry of Health recommendations[1]. The main hypothesis is that health professionals are those largely responsible for the difficulties in providing adequate prenatal care regarding urinary tract infections.

Methods

Study population

A cross-sectional study was conducted between October 2007 and May 2008. The participants were pregnant women who sought prenatal care at the Unified Health System (*Sistema Único de Saúde* – SUS) units in the city of Rio de Janeiro, RJ, Southeastern Brazil.

Sampling

A two-stage cluster sampling was performed to recruit the sample. In the first stage, SUS health care units providing low-risk prenatal care in the city of Rio de Janeiro were selected. In the second stage, pregnant women from these health care units were drawn. The sample was comprised of 1,313 women from primary health care units, 832 from hospitals or maternity hospitals and 73 from a maternity clinic, totaling thus 2,218 pregnant women. More details regarding the sampling procedures used in this study can be found in Vettore et al.[10].

Data collection

Data were collected through interviews using a standardized questionnaire and from information available in the prenatal care card. The selected pregnant women were interviewed by health professionals and undergraduate students, previously trained and under supervision in the health care unit itself.

All questionnaires and prenatal care cards were reviewed by physicians with experience in prenatal care for the identification of pregnant women with urinary tract infection (UTI), anemia, diabetes and history of preterm birth, stillbirth and/or neonatal mortality. The inclusion criteria were as follows: to have the prenatal care card, to bring the prenatal care card on the day of the interview, and to be categorized into with or without UTI. The exclusion criteria were as follows: lack of urine test, lack of records of urine tests in the prenatal care card or lack of treatment recorded in the prenatal care card and/or reported by the patient.

The present study was approved by the Research Ethics Committee of the Sergio Arouca National School of Public Health (ENSP/FIOCRUZ), protocol 142/06.

Study variables

The interviews included information about age; ethnicity; level of education; marital status; paid job; number of previous pregnancies; pre-pregnancy nutritional status; obstetric history; history of anemia and diabetes; gestational age in the beginning of prenatal care; explanation about the risk of UTI; request for urine test before and after treatment and performance of this test in

a SUS unit; and prescription, obtained in a SUS unit and use of medication for UTI treatment. Finally, the Kotelchuck index, which is used to assess the adequacy of prenatal care, was calculated[11]. In addition to the interview, prenatal care cards of all pregnant women included in the study were also copied manually or using copying services. Records of gestational age, weight, results of complementary tests of ATE (Abnormal Trace Elements), urine culture, blood glucose, hemoglobin, hematocrit, obstetric ultrasound and records of UTI treatment.

The following were considered as cases of UTI during pregnancy: pregnant women with positive urine culture recorded in the prenatal care card or those with altered ATE results (with 12 or more pyocites per field, piuria or uncountable pyocites, positive nitrite) recorded in the prenatal care card or record of UTI treatment in the prenatal care card or pregnant women's report of having had UTI and having been prescribed treatment during the current pregnancy[1].

The comparison group comprised pregnant women without UTI who were receiving prenatal care in the same health care units and for which the same diagnostic criteria were used.

All pregnant women classified as cases of UTI in the current pregnancy had the management of their condition independently assessed by two obstetricians. Any disagreements were resolved by consensus.

Considering the recommendations of the Prenatal and Postnatal Care Technical Manual[1], the management of UTI during pregnancy was classified as adequate or inadequate, according to the criteria presented in the table below.

Analysis

Initially, sample weights were estimated taking into account the type of health care unit. They were used to adjust for sampling complexity. The associations of characteristics of pregnant women at risk of UTI were tested using the chi-square test, considering a significance level of 5%. Independent variables that had a p-value below 0.20 were selected for multivariate logistic regression for the assessment of risk of UTI. Odds Ratio (OR) and respective 95% confidence intervals (95%CI) were estimated. Chi-square tests were performed to test the associations between characteristics of pregnant women with UTI and the results of prenatal care management. Variables that had a p-value below 0.20 were included in the multivariate logistic regression for the assessment of UTI management. Initially, separate analyses of health professionals, health services and pregnant women were performed, followed by an overall analysis.

The SPSS (Statistical Package for the

Assessment of UTI management during pregnancy:		
Management dimensions	Adequate management	Inadequate management
Health professionals	To explain about UTI and its risks to pregnant women To request urine test To prescribe medications for UTI treatment To request new urine test after treatment	Not to explain the risks of UTI during pregnancy Not to request urine test Not to prescribe medications for UTI treatment Not to request new urine test after treatment
Health services	To make available the urine test to those who sought to have it performed To provide medications to those who sought to obtain them	Not to make available the urine test to those who sought to have it performed Not to provide medications to those who sought to obtain them
Pregnant women	To have the urine test performed when requested To seek to obtain medications for treatment when prescribed To take the prescribed medications	Not to have the urine test performed when requested Not to seek to obtain medications for treatment when prescribed Not to take the prescribed medications
Overall assessment – Health professionals Health services Pregnant women	When all recommendations are followed	When at least one of the recommendations is not followed

Social Sciences) software, version 17.0, was used in all statistical analyses.

Results

Profile of pregnant women

A total of 2,188 pregnant women were selected: 92 (4.2%) refused to participate in the study and 1,005 (45.9%) were excluded as it was not possible to assess their risk of UTI. Thus, the final sample was 1,091 (46.8%) pregnant women, 501 (45.9%) classified as UTI cases and 590 (54.1%) without UTI.

The assessment of the profile of pregnant women revealed statistically significant differences between those with UTI and without UTI regarding age, marital status, anemia, diabetes and gestational age in the beginning of prenatal care (Table 1).

UTI was more frequent in younger pregnant women. Among those with UTI, the proportion of pregnant women younger than 19 years was 1.4 times higher than those without UTI (p = 0.01). Most of them

Table 1 - Sociodemographic characteristics of pregnant women attending prenatal care at SUS, according to the presence or absence of urinary infection. Rio de Janeiro city, Brazil, 2004-2008.
Tabela 1 – *Perfil sociodemográfico das gestantes no pré-natal do SUS, segundo a presença ou ausência de infecção urinária. Município do Rio de Janeiro, Brasil, 2007-2008.*

Characteristics of pregnant women, n (%)	Categories	Pregnant women with UTI n = 501	Pregnant women without UTI n=590	Total n = 1091	P-value
Age	≤ 19 years	142 (28.4)	117 (19.8)	259 (23.8)	0.01
	20 a 34 years	327 (65.4)	423 (71.7)	750 (68.8)	
	≥ 35 years	31 (6.2)	50 (8.5)	81 (7.4)	
	Total	500	590	1090	
Ethnicity	White	114 (23.2)	166 (29.2)	280 (26.4)	0.21
	Brown	274 (55.7)	291 (51.1)	565 (53.3)	
	Black	104 (21.1)	112 (19.7)	216 (20.3)	
	Total	492	569	1061 *	
Level of education	≤ 8 years	237 (47.3)	247 (41.8)	484 (44.4)	0.18
	> 8 years	264 (52.7)	343 (58.2)	607 (55.6)	
	Total	501	590	1091	
Marital status	Does not live with a partner	142 (28.3)	119 (20.2)	261 (23.9)	0.01
	Lives with a partner	359 (71.7)	471 (79.8)	830 (76.1)	
	Total	501	590	1091	
Paid job	Yes	183 (36.5)	224 (38)	407 (37.3)	0.57
	No	318 (63.5)	366 (62)	684 (62.7)	
	Total	501	590	1091	
Number of previous pregnancies	0	198 (39.5)	225 (38.1)	423 (38.8)	0.72
	1 or 2	215 (42.9)	270 (45.8)	485 (44.4)	
	≥ 3	88 (17.6)	95 (16.1)	183 (16.8)	
	Total	501	590	1091	
Pre-pregnancy nutritional status	Low weight	83 (22.1)	84 (18.3)	167 (20)	0.64
	Normal weight	153 (40.8)	194 (42.4)	347 (41.7)	
	Overweight	93 (24.8)	120 (26.2)	213 (25.6)	
	Obese	46 (12.3)	60 (13.1)	106 (12.7)	
	Total	375	458	833 **	
Anemia	Yes	144 (42.4)	93 (16.8)	237 (26.5)	<0.001
	No	196 (57.6)	460 (83.2)	656 (73.5)	
	Total	340	553	893 ***	
Diabetes	Yes	10 (4.2)	6 (1.2)	16 (2.2)	0.01
	No	226 (95.8)	489 (98.8)	715 (97.8)	
	Total	236	489	731 #	

Table 1 - Sociodemographic characteristics of pregnant women attending prenatal care at SUS, according to the presence or absence of urinary infection. Rio de Janeiro city, Brazil, 2004-2008. (cont.)
Tabela 1 – *Perfil sociodemográfico das gestantes no pré-natal do SUS, segundo a presença ou ausência de infecção urinária. Município do Rio de Janeiro, Brasil, 2007-2008. (cont.)*

Characteristics of pregnant women, n (%)	Categories	Pregnant women with UTI n = 501	Pregnant women without UTI n=590	Total n = 1091	P-value
History of prematurity	Yes	56 (20.7)	53 (16.3)	109 (18.3)	0.28
	No	214 (79.3)	273 (83.7)	487 (81.7)	
	Total	270	326	596 ##	
History of stillbirth / neonatal mortality	Yes	22 (8.2)	21 (6.4)	43 (7.2)	0.41
	No	247 (91.8)	306 (93.6)	553 (92.8)	
	Total	269	327	596 ##	
Gestational age in the beginning of prenatal care	1st trimester	275 (58.4)	391 (68.8)	666 (64.1)	0.01
	2nd trimester	185 (39.3)	167 (29.4)	352 (33.9)	
	3rd trimester	11 (2.3)	10 (1.8)	21 (2.0)	
	Total	471	568	1039 ###	
Kotelchuck index	More than adequate	43 (9.2)	76 (13.4)	119 (11.5) 757	0.01
	Adequate	316 (67.2)	441 (77.6)	(72.9)	
	Partially adequate	46 (9.8)	18 (3.2)	64 (6.2)	
	Inadequate	65 (13.8)	33 (5.8)	98 (9.4)	
	Total	470	568	1036 ####	

UTI: urinary tract infection. *ITU: infecção do trato urinário.*
** 28 excluded: Asian-descendants and indigenous people. * Excluídas 28: amarelas e indígenas.*
** 258 excluded: pre-pregnancy weight could not be assessed. *** Excluídas 258: não possível avaliar o peso pré-gestacional.*
*** 198 excluded: anemia could not be assessed. **** Excluídas 198: não foi possível avaliar anemia.*
# 360 excluded: diabetes could not be assessed. *# Excluídas360: não foi possível avaliar diabetes.*
495 excluded: 423 primiparous pregnant women and 72 had no available obstetric history. *## Excluídas 495: 423 primigestas e 72 não foi possível avaliar história obstétrica.*
52 excluded: beginning of prenatal care could not be assessed. *### Excluídas 52: não foi possível avaliar início do pré-natal.*
55 excluded: Kotelchuck índex could not be assessed. *#### Excluídas 55: não foi possível fazer avaliação de Kotelchuck.*
P-value refers to the chi-square test. *Valor de p refere-se ao teste Qui-quadrado.*

(76%) lived with a partner and these had less UTI than others who did not have a partner. In all, 26.5% of pregnant women had anemia and this was 2.5 times more frequent in those with UTI. Diabetes was also more frequent in the group of pregnant women with UTI (p = 0.01), although only 2% of the sample presented such condition. There was no available information concerning diabetes for 360 pregnant women. The beginning of prenatal care occurred in the first trimester for 64% of pregnant women; those with UTI began prenatal care at a later time.

The Kotelchuck index[11], which assess the adequacy of prenatal care, revealed that 84% of all pregnant women had adequate or more than adequate prenatal care. Pregnant women with UTI had a poorer performance, as 24% of them fell into the partially adequate and inadequate prenatal care categories, a significantly higher percentage than the 9% of those who did not have UTI.

Mixed ethnicity predominated in both groups and the majority of pregnant women had completed primary education and did not have a paid job. In all, pregnant women with one or two previous pregnancies, with a normal body mass index (BMI), and without history of prematurity, stillbirth and neonatal-mortality predominated. Obstetric history of prematurity, stillbirth and neonatal-mortality was assessed in only 55% of pregnant women as 39% were primiparous and no information could be obtained from the remaining 6.6%. There were no significant differences between groups with regard to ethnicity, level of education, paid job, number of previous pregnancies, pre-pregnancy nutritional status, and history of preterm birth, stillbirth and/or neonatal-mortality.

Results of the logistic regression analysis of the socio-demographic profile of pregnant women with UTI

In the multivariate regression analysis, the variables that showed statistical significance were gestational age, anemia, diabetes and the Kotelchuck index[11].

The odds of having UTI during prenatal care were 1.79 times higher among adolescents than those aged between 20 and 34 years (95%CI: 1.12 – 2.88, p = 0.02). Pregnant women with anemia had a higher odds of having UTI than those without anemia (OR = 1.83; 95%CI: 1.23 – 2.72, p = 0.01), as did women with diabetes when compared to those without diabetes (OR = 3.56; 95%CI: 1.25 – 10.19, p = 0.02). Pregnant women classified as having had partially adequate or inadequate prenatal care, according to the Kotelchuck index[9], were 1.6 times more likely to have UTI during prenatal care than those with adequate or more than adequate prenatal care (OR = 1.55; 95%CI: 1.03 – 2.33, p = 0.04).

Results of UTI management

Initially, an assessment was made of professionals' management dimension. In the group of pregnant women with UTI, 53% reported having received information about the risks of UTI during pregnancy. Requesting urine tests was reported by 75% of pregnant women and 96% said they had received medications for UTI treatment. A new urine test for control after UTI treatment was requested for 67% of pregnant women (Table 2).

Table 2 - Assessment of the urinary tract infection management in prenatal care in pregnant women in SUS. Rio de Janeiro city, Brazil, 2004-2008.
***Tabela 2** - Avaliação do manejo da infecção do trato urinário no pré-natal em gestantes do SUS. Município do Rio de Janeiro, Brasil, 2007-2008.*

Management dimensions, n (%)	Adequate management	Inadequate management	Total (n=496)	95% confidence interval of adequate management prevalence
Health professionals				
Explained the risks	257 (53.1)	227 (46.9)	484 #	48.7 – 57.5
Requested urine test	361 (74.6)	123 (25.4)	484 #	70.7 – 78.5
Provided medications	464 (95.7)	21 (4.3)	485 ##	93.9 – 97.5
Requested new urine test after treatment	264 (67.3)	128 (32.7)	392 ###	62.7 – 71.9
Health services				
Made available urine test to those who sought to have it performed	338 (98)	7 (2)	345*	96.5 – 99.5
Provided medications to those who sought to obtain them	270 (71.8)	106 (28.2)	376 **	67.3 – 76.3
Pregnant women				
Managed to have the urine test performed	338 (93.9)	22 (6.1)	360 ***	91.4 – 96.4
Sought to obtain medications for treatment when prescribed	376 (81)	88 (19)	464	77.6 – 84.4
Took the prescribed medications	393 (85.1)	69 (14.9)	462	81.9 – 88.3
Overall assessment	138 (27.8)	358 (72.2)	496	23.9 – 31.7
Health professionals	187 (37.7)	309 (62.3)	496	33.4 - 42
Health services	372 (77.2)	110 (22.8)	482	73.5 – 80.9
Pregnant women	452 (91.9)	40 (8.1)	492	89.5 – 94.3

12 could not provide this information. *# 12 não sabiam informar.*
13 could not provide this information. *## 13 não sabiam informar.*
104 could not provide this information. *### 104 não sabiam informar.*
* 123 professionals did not request urine tests, 15 did not seek to perform these tests and 13 could not provide this information. * *123 profissionais não pediram exame, 15 não tentaram fazer o exame e 13 não sabiam informar.*
** 21 professionals did not provide medications, 88 did not seek to obtain medications and 11 could not provide this information. ** *21 profissionais não passaram remédio, 88 não tentaram pegar medicação e 11 não sabiam informar.*
*** 123 professionals did not request urine tests, 7 could not perform urine tests due to difficulty in access to health services and 6 could not provide this information. *** *123 profissionais não pediram exame, 7 não conseguiram fazer exame de urina por dificuldade de acesso ao serviço de saúde e 6 não sabiam informar.*

As shown in Table 2, the assessment of health services reveals that the urine test was made available in the SUS for the great majority of pregnant women (98%) and medications for UTI treatment were made available for 72% of those who sought to obtain them.

With regards to the assessment of the pregnant women's dimension, among those who had been requested a urine test, 94% managed to have it performed. Of the 376 women who received medications for UTI treatment, 81% had sought to obtain the prescribed medications and 85% had taken these medications.

The overall assessment of UTI management during pregnancy could be made with 496 pregnant women and 358 (72%) of them had their management considered to be inadequate. The dimension of management of health professionals showed the highest proportion of inadequacy (390 pregnant women, 63%). The performance of the health care units could be observed among 482 pregnant women and 110 (23%) had an inadequate UTI management. Of all 492 women assessed for the pregnant women's dimension, 40 (8%) had an inadequate UTI management.

Results of the pregnant women's profile with regard to UTI management and logistic regression of the assessment of this management during prenatal care, in the SUS, in the city of Rio de Janeiro

Pregnant women with low weight had a lower proportion of inadequate follow-up of UTI during prenatal care, when compared to those with a normal weight (p = 0.05) (Table 3).

Table 3 - *Pregnant women characteristics regarding the urinary infection management at prenatal care in SUS. Rio de Janeiro city, Brazil, 2004-2008.*
Tabela 3 - *Perfil das gestantes em relação ao manejo da infecção urinária no pré-natal do SUS. Município do Rio de Janeiro, Brasil, 2007-2008.*

	Adequate UTI management	Inadequate UTI management	Total n=496	p-value
Gestational age in the beginning of prenatal care, n (%)				0.77
1st trimester	75 (58.5)	196 (41.5)	271 (58)	
2nd or 3rd trimester (only 11 pregnant women in the 3rd trimester)	57 (41.5)	139 (58.5)	196 (42)	
Total	132	335	467	
Age				0.07
≤ 19 years	48 (35)	92 (25.7)	140 (28.3)	
20 to 34 years	85 (62)	240 (67)	325 (65.6)	
≥ 35 years	4 (3)	26 (7.3)	30 (6.1)	
Total	137	358	495	
Ethnicity				0.11
White	37 (27.2)	76 (21.7)	113 (23.2)	
Brown	66 (48.5)	205 (58.4)	271 (55.6)	
Black	33 (24.3)	70 (19.9)	103 (21.2)	
Total	136	351	487	
Level of education				0.11
≤ 4 years	8 (5.8)	38 (10.6)	46 (9.3)	
> 4 years	130 (94.2)	320 (89.4)	450 (90.7)	
Total	138	358	496	
Marital status				0.76
Does not live with a partner	40 (29.2)	99 (27.7)	139 (28.1)	
Lives with a partner	97 (70.8)	259 (72.3)	356 (71.9)	
Total	137	358	495	

Table 3 - Pregnant women characteristics regarding the urinary infection management at prenatal care in SUS. Rio de Janeiro city, Brazil, 2004-2008. (cont.)

Tabela 3 - *Perfil das gestantes em relação ao manejo da infecção urinária no pré-natal do SUS. Município do Rio de Janeiro, Brasil, 2007-2008. (cont.)*

	Adequate UTI management	Inadequate UTI management	Total n=496	p-value
Paid job				0.57
Yes	47 (34.1)	135 (37.8)	182 (36.8)	
No	91 (65.9)	222 (62.2)	313 (63.2)	
Total	138	357	495	
Number of previous pregnancies				0.45
0	58 (42)	138 (38.5)	196 (39.5)	
≥ 1	80 (58)	220 (61.5)	300 (60.5)	
Total	138	358	496	
Pre-pregnancy nutritional status				0.05
Low weight	32 (31.4)	53 (19.8)	85 (23)	
Normal weight	35 (34.3)	112 (41.8)	147 (39.7)	
Overweight or obese	35 (34.3)	103 (38.4)	138 (37.3)	
Total	102	268	370	
History of prematurity			**n=305 ***	0.66
Yes	12 (18.5)	42 (20.9)	54 (20.3)	
No	53 (81.5)	159 (79.1)	212 (79.7)	
Total	65	201	266	
History of stillbirth or neonatal mortality			**n=305 ***	0.34
Yes	7 (10.6)	15 (7.5)	22 (8.2)	
No	59 (89.4)	186 (92.5)	245 (91.8)	
Total	66	201	267	
Diabetes				0.88
Yes	3 (4.2)	6 (3.7)	9 (3.9)	
No	69 (95.8)	154 (96.3)	223 (96.1)	
Total	72	160	232	
Anemia				0.57
Yes	39 (38.2)	101 (43.2)	140 (41.7)	
No	63 (61.8)	133 (56.8)	196 (58.3)	
Total	102	234	336	

* 196 primiparous pregnant women were excluded. * *excluídas as 196 primigestas.*

There was a trend towards inadequate UTI management during prenatal care for pregnant women who were older and of brown ethnicity, with a lower level of education, with a partner, with a paid job, with at least one previous pregnancy, with a history of prematurity, with anemia, without a history of stillbirth and/or neonatal mortality, and without diabetes. There was no available information about diabetes and anemia for 269 and 165 pregnant women, respectively.

As shown in Table 4, according to the health professionals' dimension, pregnant women with low weight and those with overweight and obesity had lower odds of inadequate UTI management (OR = 0.45; 95%CI: 0.25 – 0.81 p = 0.01; OR = 0.58; 95%CI: 0.33 – 0.99, p = 0.05, respectively) than those with a normal weight. The assessment of management of health services did not show statistically significant differences between the variables studied. With regard to the assessment of the dimension of pregnant women, the odds of inadequate UTI management were three times lower for primiparous pregnant women than

Table 4 - Results of logistic regression analysis of inadequate management of urinary infection according to health professional, health services and women dimensions of pregnant women at prenatal care in SUS. Rio de Janeiro city, Brazil, 2004-2008.

Tabela 4 – *Resultados da análise de regressão logística para o manejo inadequado da infecção urinária conforme as dimensões: profissional de saúde, serviço de saúde e mulher no pré-natal em gestantes do SUS. Município do Rio de Janeiro, Brasil, 2007-2008.*

	Reference category considered as risk factor for adequate UTI management	OR	95% confidence interval	P-value
HEALTH PROFESSIONALS				
Gestational age in the beginning of prenatal care	1st trimester	1	0.88 – 1.92	0.18
	2nd or 3rd trimesters	1.30		
Age	≤ 19 years	0.76	0.41 – 1.39	0.36
	20 to 34 years	1		
	≥ 35 years	0.74	0.26 – 2.99	0.99
Level of education	≤ 4 years	1.79	0.55 – 5.88	0.32
	> 4 years	1		
Pre-pregnancy nutritional status	Low weight	0.45	0.25 – 0.81	0.01
	Normal weight	1		
	Overweight/obese	0.58	0.33 – 0.99	0.05
HEALTH SERVICES				
Gestational age in the beginning of prenatal care	1st trimester	1	0.41 – 2.17	0.88
	2nd or 3rd trimesters	0.93		
Ethnicity	White	1		
	Brown	1.18	0.45 – 3.13	0.74
	Black	0.45	0.12 – 1.69	0.23
Pre-pregnancy nutritional status	Low weight	0.5	0.10 – 2.44	0.38
	Normal weight	1		
	Overweight/obese	1.37	0.62 – 3.03	0.43
Obstetric history of risk	Yes	1.85	0.62 – 5.56	0.26
	No	1		
PREGNANT WOMEN				
Age	≤ 19 years	2.13	0.91 – 4.76	0.07
	20 to 34 years	1		
	≥ 35 years	0.41	0.58 – 10.0	0.21
Ethnicity	White	1		
	Brown	1.20	0.57 – 2.50	0.62
	Black	0.43	0.12 – 1.61	0.21
Level of education	≤ 4 years	2.44	0.87 – 6.67	0.09
	> 4 years	1		
Number of previous pregnancies	0	0.31	0.12 – 0.76	0.01
	≥ 1	1		

those with one or more children (OR = 0.31; 95%CI: 0.12 – 0.76, p = 0.01).

In the overall assessment, ethnicity was the variable that had statistical significance (p = 0.01) (Table 5). The odds of experiencing inadequate UTI management during prenatal care were 2.5 times higher among mixed women than white ones (OR = 2.53; 95%CI: 1.31 – 4.87, p = 0.01).

Discussion

The proportion of pregnant women with urinary tract infection was 46%. Narchi et al.[12], through interviews and prenatal care card analysis, found a rate of UTI during

Table 5 - Results of logistic regression analysis for overall evaluation of inadequate management of urinary infection in prenatal care in pregnant women in SUS. Rio de Janeiro city, Brazil, 2004-2008.
Tabela 5 – *Resultados da análise de regressão logística para avaliação global do manejo inadequado da infecção urinária no pré-natal em gestantes do SUS. Município do Rio de Janeiro, Brasil, 2007-2008.*

	Reference category considered as risk factor for inadequate UTI management	OR	95% confidence interval	P-value
Age	≤ 19 years	1.34	0.46 – 3.93	0.58
	20 to 34 years	1		
	≥ 35 years	2.18	0.45 – 10.64	0.33
Ethnicity	White	1		
	Brown	2.53	1.31 – 4.87	0.01
	Black	1.52	0.61 – 3.80	0.36
Level of education	≤ 4 years	1.79	0.36 – 8.84	0.46
	> 4 years	1		
Pre-pregnancy nutritional status	Low weight	0.63	0.22 – 1.75	0.36
	Normal weight	1		
	Overweight/obese	0.74	0.34 – 1.60	0.42
History of stillbirth or neonatal mortality	Yes	1	0.82 – 12.30	0.09
	No	3.18		

pregnancy of 51%. However, Leal et al. reported a rate of 19.2% of UTI during pregnancy, with data collected from patients using public services[13]. In a study that included the prenatal care card as a source of information about UTI during pregnancy, the findings reported in the literature were similar to those from the present study, i.e. only the self-reported information underestimates the prevalence of UTI. Future studies should consider other sources of information, such as prenatal care cards.

Among the pregnant women who had UTI, 28% were adolescents and they were more affected by this condition than those aged more than 35 years. Cabral et al. found that UTI was more frequent among adolescent pregnant women[14]. Faria et al. observed a rate of 35.7% of UTI among adolescent pregnant women[5].

Anemia was more frequent in the UTI group. Duarte et al. found that 57% of pregnant women with pyelonephritis had anemia[14]. Diabetes was more frequently found in the UTI group. Alvarez et al. observed that the incidence of asymptomatic bacteriuria was 2.5 times higher in diabetic pregnant women than those without diabetes[15].

The worst assessment was that of health professionals, with 62% of inadequacy. What most contributed to this poor performance was the explanation about the risks of UTI during pregnancy. This assessment could have been influenced by the level of education of the pregnant women and difficulty of health professionals in establishing a dialogue and making themselves understood by pregnant women with poor schooling. Nonetheless, satisfaction with the health service did not differ between pregnant women with primary education level and those with more than eight years of education. The routine urine test performed during prenatal care, ATE or urine culture, was requested for 75% of pregnant women and 96% of those with UTI have received prescriptions for UTI treatment. Only half of pregnant women with UTI reported having received explanations about the risks of pregnancy. This result suggests that there is little communication between professionals and patients, perhaps due to the excessive number of appointments, where the medical practice is directed towards requesting tests and prescribing treatments. After the treatment, in 1/3 of the cases there was no

request for a new urine test to control the infection, as recommended by the Ministry of Health[1]. Pregnant women with low weight, overweight or obesity received better prenatal care from health professionals than those with a normal weight, thus revealing their concern with those pregnant women at risk.

There was a wide availability of urine tests in the public health services, totaling 98%. In 2006, 90.5% of pregnant women who had live newborns in Southeastern Brazil had a urine test performed during prenatal care. However, 28% of patients could not obtain medications for their treatment[16]. UTI treatment during pregnancy reduces the risk of complications. In addition to benefiting patients, outpatient treatment is less expensive than hospital treatment.

Compared to health professionals and services, pregnant women were those who had the best performance of adequacy of prenatal care for UTI. Primiparous pregnant women performed better than those who had at least one child. Additionally, they appear to show more concern and care for their pregnancy than those who already have children. The majority of pregnant women (81%) sought to obtain prescribed medications in the SUS and 85% reported they had taken their medications. This difference could have occurred because some of them obtained their medications from a different source or because of information bias in the responses given to the use of medications to treat UTI.

Pregnant women with anemia and diabetes had greater odds of having UTI during prenatal care. However, these conditions were not sufficient to provide them a better prenatal care. Ethnicity was the crucial characteristic for a better or worse management of UTI during prenatal care. Brown pregnant women had a poorer prenatal care follow-up than the white ones in the overall UTI assessment. Leal et al.[17] reported the persistent unfavorable condition of black and brown women regarding prenatal care when compared to white women, in the city of Rio de Janeiro. In the inadequate prenatal care category, according to the Kotelchuck index[9], values were significantly higher among black and brown pregnant women than the white ones. Silveira et al. observed that the prevalence of non-performance of urine tests was 10% among poor and black pregnant women with low schooling and 0.4% among rich and white women with high schooling[18].

Pregnant women without history of stillbirth and/or neonatal-mortality were more likely to receive worse follow-up of UTI management than those with this obstetric history. It seems that pregnant women with an obstetric history of risk are better cared because of the awareness of the consequences of not investigating and treating UTI during pregnancy. Mazor-Dray et al. found an independent association between UTI and Intrauterine Growth Restriction (IUGR), pre-eclampsia, Cesarean section and premature birth[19].

One limitation of this study was the fact that half of the sample was excluded due to the impossibility of the assessment of the risk of UTI, which may have caused a selection bias. The comparative analysis between the excluded and included groups in this study showed no differences regarding age, marital status, parity, nutritional status, history of prematurity, stillbirth and/or neonatal-mortality, and gestational age in the beginning of prenatal care. However, there were differences between groups in respect to ethnicity, level of education, paid job, anemia, diabetes and adequacy of prenatal care, according to the Kotelchuck index. The following characteristics were more frequently excluded: black pregnant women with a lower level of education, without a paid job, with anemia and diabetes, and with partially adequate or inadequate Kotelchuck indices. Even when excluding pregnant women with anemia, diabetes and partially adequate or inadequate Kotelchuck indices, these characteristics maintained their association with risk of UTI during prenatal care. With regard to the black ethnicity, if this difference had not occurred when patients were selected, this ethnicity could have been included with brown

pregnant women in the overall assessment of UTI management as a factor associated with inadequate management, and a different result could have been obtained in the assessments of UTI management of health care services and pregnant women. Level of education, which also showed different exclusions, was almost significant in the assessment of UTI management of pregnant women (p = 0.09). It is possible that, if such exclusions had not occurred in this way, this variable could have been statistically significant. With these exclusions, an underestimation of association measures may have occurred.

Based on these results, it is recommended that health care services should promote training for health professionals about a more humane care for pregnant women. Additionally, continuing education about the relevance of UTI during pregnancy should be provided to these professionals, with an emphasis on potential negative repercussions, aiming to promote the performance of urine tests during prenatal care. It is also suggested that the number of prenatal care services should be readjusted in the health care units, aiming to enable more time for explanations about the risks of UTI during pregnancy. Moreover, it is important to draw the attention of public health authorities towards the need for a regular supply of medications for UTI treatment during pregnancy.

The findings of the present study are only valid for women who were followed during prenatal care and, consequently, these results must be better than those obtained for the general population, which includes pregnant women without such follow-up.

Conclusions

The pregnant women who were more likely to have UTI during prenatal care were adolescents and those with anemia, diabetes and a partially adequate or inadequate quality of prenatal care, according to the Kotelchuck index[9].

The proportion of adequate UTI management during prenatal care was low. Health professionals were the factor that most contributed to inadequate UTI management. There was a deficiency in the supply of medications for UTI treatment during pregnancy in the public health care system in Brazil. In general, pregnant women with UTI adhered to the recommendations to have a good prenatal care follow-up.

With regard to UTI management, the prenatal care follow-up was worse among brown pregnant women than white ones in the overall assessment. Pregnant women with low weight, overweight and obesity were less likely to have inadequate UTI management during prenatal care than those with a normal weight in the assessment of health professionals. In the assessment of pregnant women, primiparous pregnant women had a lower risk of inadequate UTI management than those with one or more children.

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