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Socioeconomic differentials in performing urinalysis during prenatal care

ABSTRACT

OBJECTIVE: Urinalysis is an essential component of the prenatal routine, as urinary tract infections during pregnancy may lead to preterm delivery and neonatal morbidity. The objective of the study was to analyze factors associated to the solicitation of urinalysis during pregnancy.

METHODS: During 2004, 4,163 women living in the urban area of Pelotas (Southern Brazil) and who had received prenatal care were interviewed after delivery in the maternity hospitals of the city. Prevalence of the non-performance of urinalysis was analyzed in relation to socioeconomic and demographic variables, as well as to characteristics of prenatal care. After a bivariate analysis, logistic regression was conducted to identify factors associated with the outcome, controlling for possible confusion factors at a 5% level of significance.

RESULTS: The prevalence of not having had the test was 3%. The multivariate analysis showed that black skin color, poverty, low schooling, being unmarried and having fewer than six prenatal visits were associated with a higher probability of not carrying out the test. Women who were black, poor and with low schooling presented a 10% probability of not being examined, compared to 0.4% for mothers who were white, wealthy and highly educated.

CONCLUSIONS: Despite the fact that urinalysis is essential for preventing complications for the mother and newborn, 3% of the women were not screened. Screening coverage may serve as an indicator to assess the quality of prenatal care. Pregnant women who are black, poor, with low schooling and unmarried should be targeted in programs for improving the quality of care.

DESCRIPTORS: Pregnancy. Obstetric Labor, Premature. Prenatal Care. Urinalysis. Socioeconomic Factors. Cohort Studies.

INTRODUCTION

In pregnant women, urinary tract infection, even when asymptomatic, is an important cause of morbidity and is associated with abortion, premature delivery, low birth weight and neonatal morbidity. Anatomical and physiological modifications of the urinary tract during pregnancy predispose women to urinary infection. Incidence varies (2% to 10%) and depends, among other factors, on the socioeconomic level, parity and the presence of genital infections.[a]

Asymptomatic bacteriuria consists of persistent bacterial growth in the urinary tract without specific symptoms. It occurs in 5% to 10% of pregnancies and

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can contribute to preterm delivery (< 37 weeks), low birth weight, and even maternal pyelonephritis (30% of cases), which, untreated, harms the kidney.[14] Urinary infections during pregnancy, including asymptomatic bacteriuria, cystitis and pyelonephritis, may lead to a significant increase in maternal and neonatal morbidity and mortality.[15]

For this reason, urinalysis is a routine test in prenatal care. In the United States, urine culture is recommended in the first prenatal visit, ideally between six and eight weeks' gestational age.[8] Of the women who do not present positive urine culture in the initial examination, 1%-2% will develop bacteriuria later during pregnancy.[1] Randomized clinical trials, cohort studies and meta-analysis have shown that the treatment of asymptomatic bacteriuria can reduce the occurrence of complications such as preterm delivery and maternal pyelonephritis.[9,11] According to a recent review,[5] the treatment of asymptomatic bacteriuria was considered one of the key strategies to reduce neonatal mortality in developing countries.

The Ministry of Health of Brazil, in its "Technical Manual for Prenatal Care and Puerperium",[a] as well as in another publication concerning the "Program for the Humanization of Prenatal Care and Birth",[12] establishes that urinalysis must be requested as a routine exam in the first prenatal visit and repeated in the 30th week of gestation. Although the ideal frequency for subsequent urinalyses during prenatal care is not determined, the literature agrees that at least one test should be carried out.[8] Based on these recommendations, the present article aimed to describe the request for urinalyses during pregnancy and its association with maternal and healthcare characteristics.

METHODS

Pelotas is a city of 320,000 inhabitants located in the Southern Region of Brazil. During the year of 2004, all women who lived in the urban area of Pelotas and who gave birth in the municipality were invited to participate in the study.

The parturient women who were eligible for the research and who agreed to participate were interviewed right after delivery. The interview approached biological, demographic, reproductive, behavioral and socioeconomic characteristics, as well as information on the gestation.[2] The interviews were carried out by trained interviewers who visited the city's hospitals on a daily basis. In addition, the records of the Live Births Information System (SINASC) were tracked in order to identify and interview at home women who did not give birth at hospitals.[2]

The total number of interviewees was 4,244 puerperae, of whom 195 (4.5%) did not know whether they had been submitted to urinalysis or refused to participate in the study. Thus, the total of participants was 4,163.

Data referring to prenatal care were supplied by the parturient woman or extracted from her pregnancy card. Only women who had had at least one prenatal visit were included in the study (1.9% of the women had not received prenatal care and were excluded).

Data input was performed with the program EpiInfo 6.04 with automatic check on consistence and amplitude. The analysis was carried out with the program SPSS 10.0 and consisted of a description of the prevalence of the outcome of interest (the woman was not submitted to urinalysis during pregnancy) according to socioeconomic and demographic variables: maternal age (in years); quintiles of the National Economic Indicator (IEN), based on 12 assets and on the level of schooling of the head of the family[3] compared to the reference distribution of the municipality of Pelotas; maternal schooling; skin color of the parturient woman mentioned by the interviewer; marital status; planned pregnancy; prenatal care provided by *Sistema Único de Saúde* (SUS – Brazil's National Health System); the doctor who was responsible for the prenatal care; maternal work during gestation; and number of prenatal visits.

After a bivariate analysis, logistic regression was performed to identify factors associated with the outcome, controlling for possible confusion factors. For the adjusted analysis, the variables were included in the model when they reached a 20% level of significance and the association was considered significant for a value of $p<5\%$.

The project was approved by the Ethics in Research Committee of the Faculdade de Medicina of the Universidade Federal de Pelotas.

RESULTS

Among the 4,163 participants, the prevalence of not having been submitted to urinalysis during pregnancy was of 120 (3%); of 10% among women who were poor (lower quintile of the IEN), black and who had low schooling (0-4 years of studies), and of 0.4% in women who were white, wealthy (higher quintile of the IEN) and highly educated (9 or more years of schooling).

Table 1 describes the sociodemographic and health variables of the studied population. Half the parturient women were between 20 and 29 years of age; 1,836 (44.3%) of the women were classified in the two lower quintiles of the IEN, which represent the poorest population; 15.3% had up to four years of schooling; 73.2% were white; and the majority (83.9%) lived with

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Table 1. Demographic, socioeconomic and gestational characteristics of women who gave birth to live newborns. Pelotas, Southern Brazil, 2004. N=4,163

Variable	Frequency	%	N
Age (years)			4,161
<15	37	0.9	
15-19	745	17.9	
20-29	2,078	49.9	
30-39	1,162	27.9	
40 or more	139	3.3	
Indicador Econômico Nacional (National Economic Indicator) (quintiles)			4,143
1	984	23.7	
2	852	20.6	
3	911	22.0	
4	663	16.0	
5	733	17.7	
Schooling			4,122
0-4	632	15.3	
5-8	1,703	41.3	
9 or more	1,787	43.4	
Skin color			4,163
White	3,048	73.2	
Black	824	19.8	
Other	291	7.0	
Lives with husband/partner			4,163
No	670	16.1	
Yes	3,493	83.9	
Planned pregnancy			4,162
No	2,342	56.3	
Yes	1,820	43.7	
Prenatal care provided by SUS			4,158
No	796	19.1	
Yes	3,362	80.9	
Number of prenatal visits			3,984
One	31	0.8	
2-4	398	10.0	
5	285	7.2	
6	407	10.2	
7 or more	2,863	71.9	
Professional in prenatal visits			4,145
Same professional	2,892	69.8	
Different professionals	1,253	30.2	
Worked during pregnancy			4,162
No	2,487	59.8	
Yes	1,675	40.2	

SUS: National Health System

the husband/partner. In more than half (56.3%) of the cases, the pregnancy had not been planned; 80.9% of the pregnant women received prenatal care through SUS; 71.9% had seven prenatal visits or more; 30.2% received prenatal care from more than one professional and 40.2% worked during pregnancy.

Table 2 shows the results of the bivariate analysis. Neither maternal age (p=0.3) nor prenatal care provided by different professionals (p=0.8) were associated with the outcome. The socioeconomic situation evaluated by the IEN was strongly associated with the performance of urinalysis (p<0.001), with 6% of the women in the poorest group stating they were not submitted to the test. Prenatal care provided by SUS was also a risk factor to the outcome (OR=9.4; p<0.001). Maternal schooling showed reverse association with the outcome, as well as color, as 6.1% of black women were not submitted to the test, compared with 2.1% of white women (p<0.001). Not living with the husband/partner was also associated with the outcome (OR=2.2), as well as working during pregnancy. The number of prenatal visits was highly associated with the outcome: 35.5% of women with only one prenatal visit were not submitted to urinalysis, compared to 1.1% of those with seven or more visits.

In the multivariate analysis through logistic regression, a conceptual model of determination was used with three hierarchized levels: in the first level the variables skin color, schooling and IEN in quintiles were included; in the second level, marital status; and in the third level, the variables planned pregnancy, prenatal care through SUS, maternal work and number of prenatal visits. Table 3 shows the results of the multivariate analysis.

In the first level, even after mutual adjustment, the three variables remained significant: black color (OR=2.1; p=0.002), less than 4 years of schooling (OR=3.6; p<0.001) and first quintile of the IEN (OR=4.5; p=0.003). The interactions between the first level variables were tested and did not prove to be significant.

In the second level, the association with the fact that the woman did not live with the husband/partner remained significant after adjusting for the first level variables (OR=1.9; p=0.003).

In the third level of the analysis model, the only association that remained significant after adjusting for the previous levels was the reverse association with the number of prenatal visits (p<0.001). The association with unplanned pregnancy was no longer significant (p=0.08), but the variable was maintained in the model for the adjustment. The associations with prenatal care through SUS (p=0.3) and with the fact that the pregnant woman worked outside her home (p=0.3) lost significance and these variables were excluded from the model.

Table 2. Bivariate analysis between the non-performance of urinalysis and demographic, socioeconomic, behavioral and gestational variables. Pelotas, Southern Brazil, 2004.

Variable	Urinalysis was not performed (%)	OR	95% CI	p
Age (years)				0.3
<15	2.8	0.7	0.8;6.4	
15-19	3.7	1.0	0.4;2.6	
20-29	3.1	0.8	0.3;2.0	
30-39	2.1	0.5	0.2;1.5	
40 or more	3.8	1.0		
Indicador Econômico Nacional (National Economic Indicator) (quintiles)				<0.001
1	6.3	12.0	4.3;33.1	
2	2.8	5.1	1.7;14.7	
3	2.6	4.7	1.6;13.7	
4	1.4	2.5	0.8;8.2	
5	0.6	1.0		
Schooling				<0.001
0-4	6.0	6.9	3.8;12.5	
5-8	4.0	4.5	2.6;7.8	
9 or more	0.9	1.0		
Skin color				<0.001
White	2.1	1.0		
Black	6.1	3.0	2.1;4.4	
Other	3.1	1.5	0.7;3.1	
Lives with husband/partner				<0.001
No	5.4	2.2	1.5;3.3	
Yes	2.5	1.0		
Planned pregnancy				<0.001
No	4.0	2.6	1.7;4.0	
Yes	1.6	1.0		
Prenatal care provided by SUS				<0.001
No	0.4	1.0		
Yes	3.5	9.4	3.0;29.6	
Number of prenatal visits				<0.001
One	35.5	48.9	21.6;110.7	
2-4	13.6	13.9	8.8;22.0	
5	3.9	3.6	1.8;7.3	
6	2.3	2.1	1.0;4.3	
7 or more	1.1	1.0		
Professional in prenatal visits				0.8
Same professional	2.9	1.0		
Different professionals	2.8	0.9	0.6;1.4	
Worked during pregnancy				0.002
No	3.6	1.9	1.3;2.8	
Yes	2.0	1.0		

SUS: National Health System

Table 3. Multivariate analysis between the non-performance of urinalysis and demographic, socioeconomic, behavioral and gestational variables. Pelotas, Southern Brazil, 2004.

Variable	OR	95% CI	p
Skin color*			0.002
White	1.0		
Black	2.1	1.4;3.1	
Other	1.1	0.5;2.2	
Schooling*			<0.001
0-4	3.6	1.9;7.0	
5-8	2.8	1.6;5.1	
9 or more	1.0		
Indicador Econômico Nacional (National Economic Indicator) (quintiles)*			0.003
1	4.5	1.5;13.1	
2	2.3	0.8;7.0	
3	2.7	0.9;7.9	
4	1.8	0.6;6.1	
5	1.0		
Lives with husband/partner*			0.003
No	1.9	1.2;2.8	
Yes	1.0		
Number of prenatal visits**			<0.001
One	24.5	10.5;57.4	
2-4	7.4	4.5;12.1	
5	2.1	1.0;4.4	
6	1.4	0.7;3.1	
7 or more	1.0		
Planned pregnancy**			0.08
No	1.5	1.0;2.4	
Yes	1.0		

* Adjusted for color, schooling and National Economic Indicator in quintiles.
** Adjusted for color, schooling, National Economic Indicator in quintiles, marital status, number of prenatal visits and planned pregnancy.

DISCUSSION

The performance of urinalysis is an indicator of the quality of prenatal care. In the 4,163 analyzed pregnant women, the prevalence of non-performance of this test was 3%. The multivariate analysis showed that for women who were black, poor, single, with low schooling and who had less than six prenatal visits, the chance of not performing this test was increased.

These results need to be interpreted within the context of prenatal care provided in the city of Pelotas, where more than 98% of the parturient women of 2004 had at least one prenatal visit.[4] The average number of prenatal visits was 8.2; 6.8 in the lower quintile of the IEN and 7.3 in black women.

Although it is important, it was observed that 3% of the puerperae reported not having had urinalysis

during pregnancy. Despite being low, this prevalence is important in view of the increased occurrence of premature deliveries: from 8.5% in 1993 to 13.5% in 2004.[4] Furthermore, the issue of unequal care is verified in poor, black and uneducated pregnant women: the prevalence of the non-performance of urinalysis rises to 10%, compared to 0.4% in white, wealthy and highly educated pregnant women.

One of the factors associated with non-performance of the test is black skin color. This characteristic has been associated with other indicators of inadequate health care, such as the lower proportion of performance of the preventive examination for cervical uterine cancer.[10] The findings of the present study suggest that specific interventions should be targeted at this population, with the support of health professionals and civil organizations.

Women's low schooling was also associated with the non-performance of urinalysis, even after adjusting for color and socioeconomic level. A study conducted at municipal health centers of Pelotas in 1998 revealed that 91% of the pregnant women received inadequate prenatal care; there was no record of the performance of basic laboratory tests (hemoglobin, routine urinalysis and serology for syphilis– VDRL) in 14.4% of the pregnant women.[13]

Concerning the economic level, it was observed that the highest risk group was that of the poorest quintile of the IEN. This may be due to issues of less access and worse quality of care, and also to the women's lack of information on adequate prenatal care. With the increasing consolidation of the Family Health Program in the city, pregnant women in this risk group must be effectively tracked down and guided by health agents and professionals responsible for prenatal care.

Regarding marital status, women who do not live with their husbands/partners were submitted to urinalysis with lower frequency during pregnancy. Women with no fixed partners usually have worse prenatal care indicators,[6] which is not explained only by their socioeconomic situation, since the association remained significant after the adjustment.

The fact that unplanned pregnancy lost association with the outcome after adjusting for skin color, IEN and schooling may be explained by the fact that this event is more frequent in black women (68%) with less than four years of schooling (62%) and belonging to the lower quintile of the IEN (65%). It seems to be necessary to broaden the access to family planning for black women with low schooling and low socioeconomic level.

The association with maternal work also disappeared after the adjustment, probably because the pregnant women with IEN in the lower quintile worked less (25%) than the average, as well as those with black skin (37%) and with low schooling (25%). A study on the relationship between maternal work and children's weight gain also found a positive association of a significantly higher weight gain in children whose mothers had paid jobs.[7]

The strong association between receiving prenatal care through SUS and the non-performance of urinalysis disappeared after the adjustment, indicating that the place of assistance does not seem to be the most important factor in the type of prenatal care that is offered; rather, the patient's own characteristics play this role: skin color, level of schooling, socioeconomic level and marital status. The pregnant woman with lower socioeconomic level may also have greater difficulty regarding the physical access to the laboratories that have a partnership with SUS, due to transportation difficulties and, also, problems in scheduling tests through SUS for budget ceiling reasons. However, the pregnant women's greater difficulty in performing prenatal tests through SUS can, for example, be reduced if the woman can use other strategies, such as paying for the test. Black skin color may also be associated with receiving worse assistance: 91% of the black women received prenatal care through SUS, compared to 79% of white women and 81% of women of other races.

Despite the fact that the association with the number of prenatal visits was weaker, it remained significant after the adjustment, showing that this result cannot be totally explained by skin color, level of schooling, socioeconomic level and marital status. Again, the importance of attending the prenatal visits must be emphasized to the population.

One limitation of the present study is the fact that the information on urinalysis was based on the women's reports when their pregnancy card was not available or had been inadequately filled in. Pregnant women with low schooling may have difficulties in providing such information. This bias was reduced by the exclusion of the women who were not sure whether or not they had been submitted to the test. Another limitation is related to the variable skin color, which was based on the observation of the interviewers, and the majority of them were white. This variable was used instead of self-referred color because the latter included a higher percentage of ignored values. When the analyses above were repeated using the variable self-referred color, the results were virtually identical.

Epidemiological studies are important to evaluate the coverage of specific actions in public health. The utilization of the coverage of an important test such as urinalysis may serve as an indicator to assess the quality of prenatal care. From the point of view of SUS, the search for equity implies different assistance to those who need it most. In conclusion, the present study suggests that women who are black, poor, with low schooling and unmarried should be targeted by more specific actions so that they obtain adequate prenatal care.

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