Non-performance of urinalysis among pregnant women in Brazil

Abstract

Purpose

To measure the prevalence, evaluate the trend and identify factors associated with the non-performance of qualitative urine test (QUT) among pregnant women living in the extreme south of Brazil between 2007 and 2016.

Design/methodology/approach

All births occurred in the local maternity wards from 01/01 to 12/31 of 2007, 2010, 2013 and 2016. Mothers were interviewed within 48 hours after delivery. The outcome was the non-performance of QUT during pregnancy. Chi-square test was used to compare proportions and Poisson regression with robust variance adjustment for the multivariate analysis. The effect measure used was prevalence ratio.

Findings

Of the 10,331 new mothers identified, 10,004 (96.8%) performed at least one prenatal visit. The prevalence of non-performance of QUT was 3.3% (95%CI 2.9% -3.7%), ranging from 1.5% in 2007 to 5.3% in 2016 ($p<0.001$). The analysis showed that not living with a companion, having under four years of schooling, living with seven or more people in the household, having five or more children, having had one to three prenatal visits and not having been supplemented with ferrous sulfate during pregnancy showed a significantly higher prevalence rate to non-performance of QUT.

Originality/value

The rate of non-performance of this test among pregnant women has clearly increased. Mothers at higher risk of unfavorable outcomes in pregnancy were the ones with the highest probability of not performing QUT. Increasing the number of prenatal visits is a high-impact measure towards the performance of this test.

Key-words: prenatal; pregnancy; associated factors; urinalysis; preterm birth.

Paper type: Research paper

Introduction

Urinary tract infection (UTI) is the most frequent clinical complication in pregnancy, and may reach up to 20% of women in this period (Brazil and Departamento de Atenção Básica, 2012; Chalmers et al., 2001). UTI is associated with several unfavorable outcomes, including cystitis and acute pyelonephritis, premature rupture of membranes, chorioamnionitis, preterm labor, low birth weight and miscarriage (Brazil and Departamento de Atenção Básica, 2012; Chalmers et al., 2001; Duncan et al., 2004).

Due to UTI high frequency and, above all, its negative repercussions on mother and child health, the Brazilian Ministry of Health recommends two qualitative urine tests, one of them being in the first prenatal visit, provided that it occurs in the first quarter, and the other, in the 30th week of pregnancy (Brazil and Departamento de Atenção Básica, 2012). While this may vary across countries, there is a consensus that at least one prenatal test should be performed (Akkerman et al., 2012). The purpose of this provision is to identify early UTI, to promote appropriate management and, in the case of child health, to avoid low birth weight and prematurity, which are important determinants of infant mortality (Duncan et al., 2004; Goldenberg et al., 2008; Kramer, 1987).

A single population-based study on non-performance of qualitative urine test (QUT) was found in the literature. This study from the 2004 birth cohort of Pelotas, RS, Brazil found a non-performance prevalence of 3.0%, ranging from 0.4% among white pregnant women with higher schooling and family income, to 10.0% among black pregnant women with worse socioeconomic level (Silveira et al., 2008). The outcome of the remaining few studies that address this issue is the performance of two urine tests.

In 2007, 2010, 2013 and 2016, Rio Grande, a municipality located in the extreme south of Brazil, close to the border with Uruguay, was the object of a study that included all the urban and rural births of this municipality to evaluate the quality of care received during pregnancy and delivery. These studies showed that, in this period, most of the indicators studied improved, while some remained unchanged and a few worsened, among them the performance of QUT.

This study aims to measure prevalence, evaluate trends and identify factors associated with the non-performance of qualitative urine tests in pregnant women living in a municipality located in the South of Brazil between 2007 and 2016.

Materials and methods

The municipality of Rio Grande has about 210,000 inhabitants and is located in the extreme south of the state of Rio Grande do Sul, some 300 km from State capital Porto Alegre and 250 km from the border with Uruguay. Data shown here stem from four cross-sectional surveys, the Rio Grande Perinatal Studies, carried out from 01/01 to 31/12 of 2007, 2010, 2013 and 2016 in the two maternity wards of this municipality. All pregnant women living in urban or rural areas of this municipality whose newborn weight was equal to or greater than 500 grams or with at least 20 weeks gestational age were included in the study. The analysis shown here is restricted to pregnant women who performed at least one prenatal visit, that is, they had the opportunity to perform at least one QUT.

All the information was obtained through an interview with new mothers within 48 hours after delivery. A single, standardized and pre-coded questionnaire was used in each year of the study, which sought information on demographic and socioeconomic characteristics, housing conditions, maternal reproductive history, morbidity pattern and care received during pregnancy and delivery. All information on the Pregnant Woman Card was copied into the final part of this questionnaire. The outcome of this study was the non-performance of a qualitative (or common) urine test during pregnancy.

Each survey had at least three interviewers selected after training, which included reading the questionnaire and the instruction manual, and a pilot study. These interviewers searched daily for mothers-to-be based on information contained in pregnant women medical records, followed by their identification at the maternity ward and visits to the infirmaries. The questionnaire was applied only after new mothers' consent and signature in two copies of the informed consent form (ICF), of which new mothers retained one copy.

Printed questionnaires were used until 2013. These questionnaires were coded by interviewers themselves and delivered to the project headquarters, where they were reviewed, double entered by different professionals, compared and corrected. This was done using the free software Epidata 3.1 (Lauritsen, 2000). In the 2016 study, a tablet-based electronic questionnaire was used for data collection. In this digital version, questionnaires were sent daily through the REDCap (Research Electronic Data Capture) Web Platform to the Federal University of Rio Grande (FURG) server (Harris et al., 2009). The data collection supervisor reviewed daily the

questionnaires applied. Possible completion errors, inconsistencies and lack of answers were immediately corrected. If necessary, a new contact with the respondent was performed. These data were then accumulated in a bank for the establishment of derivative variables from Stata statistical package version 13 (StataCorp, 2013).

The descriptive analysis consisted of obtaining measures of prevalence of both the exposure variables and the outcome. The effect measure used was the prevalence ratio, obtained through Poisson regression with robust variance adjustment (Barros and Hirakata, 2003). Regarding ordinal categorical variables, the linear trend test p-value was reported, while Wald's test for heterogeneity was used for other variables (Kirkwood et al., 2003).

The adjusted analysis followed a previously established hierarchical model with the objective of controlling eventual confounding factors (Victora et al., 1997). This model had four levels, In the first one were the demographic and socioeconomic variables (age, skin color, marital status, monthly household income, schooling in full years of study and paid work during pregnancy); in the second level were the environment's characteristics (number of household's residents); in the third level were variables related to reproductive life (parity, stillbirth and pregnancy planning); and in the fourth level were variables related to pregnancy care (month of onset of prenatal consultations, number of consultations performed, type of service – public or private – where most of these consultations took place and ferrous sulfate supplementation). In the regression model used, variables were controlled for those of the same level or previous levels, and a p-value of up to 0.20 was established for its maintenance in the adjustment equation. The level of significance adopted was 95% for two-tailed tests (Kirkwood et al., 2003).

Quality control consisted of the partial replication of key questions for at least 7% of the questionnaires. This was mostly done over the phone, and on very few occasions, through household visits, especially in 2007 and 2010. These questionnaires were systematically chosen for each 100 block. The Kappa agreement index ranged from 0.63 to 0.89. This step aimed to check the realization of the interview and the application of the question and to compare the answers obtained on these two occasions.

Each research protocol was submitted and approved by the Research Ethics in Health Committee (CEPAS) of the Federal University of Rio Grande in the

respective years of 2007 (process 05369/2006), 2010 (process 06258/2009), 2013 (process 02623/2012) and 2016 (process 0030-2015).

Women's answers confidentiality was assured, as well as voluntary participation and the possibility of leaving the study at any time, without any justification or prejudice to the care that they were receiving.

Results

According to data from the Live Births Information System (SINASC), in 2007, 2010, 2013 and 2016, there were 10,552 births whose mothers resided in this municipality. From this total, it was possible to obtain information on 10,331 of them, representing a respondent rate of 97.9%, or a loss of 2.1%.

Table 1 shows the distribution of these new mothers according to the performance (or not) of a qualitative urine test. In general, mothers who did not remember having performed QUT were similar for several variables studied to those who had confirmed this test, and were regrouped as such. Mothers who did not perform prenatal care (n=327) were excluded from the adjusted analysis because they had much worse characteristics than those of the other groups. Thus, the denominator of this study consisted of 10,004 new mothers (96.8% of the total), of which 9,669 were classified as having performed QUT and 161 (1.6%) who had prenatal care but did not have a QUT.

The prevalence of non-performance of QUT between 2007 and 2010 was 3.3% (2.9%-3.7%), from 1.5% (1.1%-2.0%) in 2007 to 2.3% (1.7%-2.9%) in 2010, 3.9% (3.2%-4.6%) in 2013 and 5.3% (4.5%-6.2%) in 2016, A 3.5-fold increase.

Table 2 shows that the prevalence of non-performance of QUT ranged from 0.9% for those who attended 12 or more visits to 14.9% among those who had one to three visits. In the adjusted analysis, it is possible to verify that women without a companion had PR=1.50 (1.14-1.96) of not performing QUT in relation to the others, and that PR for those with under four years of schooling was 1.76 (1.22-2.56) when compared to new mothers with nine or more years of schooling. Living in the same household with seven or more people gave a PR=1.54 (1.08-2.18) of not performing QUT in relation to those living with two or three people. Having had five or more children gave a significantly higher risk of not performing QUT (PR=1.79:1.24-2.58) when compared to those with one or two children.

The number of consultations was the variable most strongly associated with non-performance of QUT. Mothers who did between one and three visits showed PR=10.23 (5.18-20.18) in relation to mothers who completed 12 or more visits. Finally, the PR for the performance of QUT in pregnant women not supplemented with ferrous sulfate was 1.77 (1.41-2.21) in relation to the others.

Discussion

The prevalence of non-performance of QUT among these pregnant women was 3.3%, with a marked worsening between 2007 and 2016. During this period, this rate increased 3.5-fold, from 1.5% to 5.3%. Pregnant women who are more likely to suffer unfavorable outcomes showed a significantly higher risk of not performing QUT, which are those who live without a companion, with lower schooling, greater household crowding, with a higher parity, who performed fewer prenatal visits and were not supplemented with ferrous sulfate.

The rate of non-performance of QUT (3.3%) in this study was very similar to the 3.0% observed in 2004 in Pelotas, a neighboring municipality. While with a similar rate, it must be remembered that they refer to different stages of investigation. In any case, the prevalence of non-performance of QUT, at least in this region of the extreme south of Brazil, where the municipalities are very similar, excepting the number of inhabitants, may not have been very different from this value. This data can be useful to health professionals and local public managers.

In this study, single new mothers had PR=1.50 (1.14-1.96) of not having QUT in relation to the others. Except for the Pelotas study, no other study published in the most important databases available investigated factors associated with non-performance of QUT. In Pelotas, not living with a companion returned an OR=1.9 (1.2-2.8) of pregnant women not performing QUT (Silveira et al., 2008). The presence of a companion, besides the possibility of helping in domestic chores, thus resulting in free time for the mother to address her other many commitments, may also encourage the mother to perform prenatal consultations (Gama et al., 2004; Shah et al., 2011).

In Rio Grande, PR to non-performance QUT among pregnant women under four years of schooling was 1.76 (1.22-2.56) in relation to those with nine years or more of schooling. In another study, for these same comparison groups, the odds ratio reached 3.6 (1.9-7.0) (Silveira et al., 2008). Maternal schooling has been one of the most important determinants of the adequate use of health services (Domingues et al., 2015; Victora et al., 2006). A higher level of schooling may lead to a better understanding of the benefits of prenatal care and, thus, to a greater appreciation of procedures essential to the birth of a healthy child (Coimbra et al., 2003; Domingues et al., 2015; Victora et al., 2006).

Living at the same household with seven or more people gave PR=1.54 (1.08-2.18) for the non-performance of QUT in comparison to those living with two or [illegible]ence of more people in the household entails more work for

the mother, especially if they are younger. The more work you have to perform at home, the less time she will have to take care of her health, which can lead to a lower search for prenatal consultations. No study was found addressing the possible effect of family agglomeration on the use of prenatal care.

Among these women, the higher the parity, the greater the risk of not performing QUT. This PR was 1.79 (1.24-2.58) for mothers with five or more children when compared to those with only one or two, It is well known that the higher number of children is associated with inadequate prenatal care, which includes not only performing QUT, but also serology for syphilis, ferrous sulfate supplementation, Pap test and, above all, prenatal consultations (Bernardes et al., 2014; Coimbra et al., 2003; Domingues et al., 2015; Victora et al., 2006). This may be due, among others, to successful experience in previous pregnancies, leading to the mother's belief that recommended care is not required (Brazil and Departamento de Atenção Básica, 2012).

The low number of visits was the variable most strongly associated with non-performance of QUT. Mothers who had between one and three visits showed PR=10.23 (5.18-20.18) compared to those who completed 12 or more visits. A higher magnitude effect was observed in the cohort of live births in a neighboring municipality. In this study, mothers who only had one prenatal visit showed OR=24.5 (10.5-57.4) (Silveira et al., 2008). It is reasonable to assume that the more frequently pregnant women seek health services, the greater the likelihood of them completing all recommended procedures for an appropriate prenatal care. Therefore, a greater number of consultations is the most significant measure to increase the coverage of QUT.

Finally, the PR for the performance of QUT in pregnant women not supplemented with ferrous sulfate was 1.77 (1.41-2.21) in relation to the others. This variable was placed in the model aiming at verifying whether pregnant women would have the same behavior for a care similar to the outcome in question, that is, whether the probability of not being supplemented with ferrous sulfate would be similar to that observed for the QUT. This was confirmed. Thus, non-performance of QUT does not seem to be a selective attitude, indicating that when pregnant women do not perform a certain procedure, there is a high probability that they will not perform a similar procedure.

When interpreting these results it is necessary to take into account a possible reminder and information bias. In the first case, some pregnant women may not

remember the exact number of procedures performed or even make mistakes when mentioning one of them. In the second case, pregnant women may report having performed a certain procedure without however having done so, because this is what was expected of them. This would lead to overestimated performance prevalence, It is also worth mentioning that all the studies that address this topic based on information obtained through the report of pregnant woman bear this risk. Therefore, if this limitation affected this study, it is assumed that it also did so in the other studies mentioned herein, since they obtained information in the same way. This ensures the comparability shown here. This type of limitation will continue to affect this type of study until the quality of Pregnant Woman's Card records is improved and filling the information is more complete.

Conclusions

While the rate of QUT performance was very high, three out of 100 of them did not do this test, If we included pregnant women who did not perform a single prenatal visit, which we could assume, because, as a rule, these pregnant women evidence characteristics of greater vulnerability than others, the rate of non-performance of QUT would increase to 6.4%, which would represent about 660 births. Considering that, of the total studied, about 260 were born with low birth weight (<2.5 kg) or were preterm (<37 weeks pregnancy), it can be verified that not performing QUT has put a substantially higher risk for at least 25% of them being affected by these conditions. It is therefore a very high exposure rate for two of the most important determinants of child mortality. Thus, increasing coverage for the performance of QUT in this municipality should be addressed as a priority action within prenatal care.

In order to improve QUT coverage in the studied locality, at least four aspects should be considered: 1) Prioritizing this test among mothers living without a partner, with low schooling, living with a large number of residents in the household and with high parity. These mothers should be identified in the pre-consultation and the physician or nurse must be aware that this pregnant woman has a high probability of not performing QUT, If this pregnant woman does not return to the health service, which is very likely, it would be advisable for the community health worker to carry out a home visit in order to bring her back to the prenatal visit; 2) Increasing the number of consultations, especially for those who have rarely sought health services. The same recommendation for active search in the community is worth mentioning here, If all mothers performed at least four consultations, the probability of not performing QUT would be reduced to one third. This would increase the coverage not only for QUT, but also for several other procedures offered in prenatal care, such as ferrous sulfate supplementation, serology for syphilis, Pap test, among others; and 3) to verify the reason why the performance of QUT has been in clear decline in the municipality over the last 10 years, although the median number of visits increased from seven to eight and the gestational age at the beginning of these consultations fell from three to two months.

References

Akkerman, D., Cleland, L., Croft, G., Eskuchen, K., Heim, C., Levine, A., Setterlund, L., Stark, C., Vickers, J., Westby, E., Institute for Clinical Systems Improvement (Eds.), 2012. Health care guideline: routine prenatal care, 15th ed. ed. ICSI, Bloomington, Minn.

Barros, A.J.D., Hirakata, V.N., 2003. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. BMC Med. Res. Methodol. 3, 21. doi:10.1186/1471-2288-3-21

Bernardes, A.C.F., da Silva, R.A., Coimbra, L.C., Alves, M.T.S.S. de B., Queiroz, R.C. de S., Batista, R.F.L., Bettiol, H., Barbieri, M.A., da Silva, A.A.M., 2014. Inadequate prenatal care utilization and associated factors in São Luís, Brazil. BMC Pregnancy Childbirth 14. doi:10.1186/1471-2393-14-266

Brazil, Departamento de Atenção Básica, 2012. Atenção ao pré-natal de baixo risco.

Chalmers, B., Mangiaterra, V., Porter, R., 2001. WHO principles of perinatal care: the essential antenatal, perinatal, and postpartum care course. Birth 28, 202–207. doi:10.1046/j.1523-536x.2001.00202.x

Coimbra, L.C., Silva, A.A.M., Mochel, E.G., Alves, M.T.S.S.B., Ribeiro, V.S., Aragão, V.M.F., Bettiol, H., 2003. Fatores associados à inadequação do uso da assistência pré-natal. Rev. Saúde Pública 37, 456–462. doi:10.1590/S0034-89102003000400010

Domingues, R.M.S.M., Viellas, E.F., Dias, M.A.B., Torres, J.A., Theme-Filha, M.M., Gama, S.G.N. da, Leal, M. do C., 2015. Adequacy of prenatal care according to maternal characteristics in Brazil. Rev. Panam. Salud Publica Pan Am. J. Public Health 37, 140–147.

Duncan, B.B., Schmidt, M.I., Giugliani, E.R.J., 2004. Medicina ambulatorial: condutas de atenção primária baseadas em evidências, 3rd edition. ed. Armed, Porto Alegre (Brasil.

Gama, S.G.N. da, Szwarcwald, C.L., Sabroza, A.R., Castelo Branco, V., Leal, M. do C., 2004. Fatores associados à assistência pré-natal precária em uma amostra de puérperas adolescentes em maternidades do Município do Rio de Janeiro, 1999-2000. Cad. Saúde Pública 20, S101–S111. doi:10.1590/S0102-311X2004000700011

Goldenberg, R.L., Culhane, J.F., Iams, J.D., Romero, R., 2008. Epidemiology and causes of preterm birth. The Lancet 371, 75–84. doi:10.1016/S0140-6736(08)60074-4

Harris, P.A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., Conde, J.G., 2009. Research electronic data capture (REDCap) -- a metadata-driven methodology and workflow

process for providing translational research informatics support. J. Biomed. Inform. 42, 377–381. doi:10.1016/j.jbi.2008.08.010

Kirkwood, B.R., Sterne, J.A.C., Kirkwood, B.R., 2003. Essential medical statistics, 2nd ed. ed. Blackwell Science, Malden, Mass.

Kramer, M.S., 1987. Determinants of low birth weight: methodological assessment and meta-analysis. Bull. World Health Organ. 65, 663–737.

Lauritsen, J., 2000. EpiData Classic, data management and basic statistical analysis system. The EpiData Association, Odense, Denmark.

Shah, P.S., Zao, J., Ali, S., Knowledge Synthesis Group of Determinants of preterm/LBW births, 2011. Maternal marital status and birth outcomes: a systematic review and meta-analyses. Matern. Child Health J. 15, 1097–1109. doi:10.1007/s10995-010-0654-z

Silveira, M.F., Barros, A.J.D., Santos, I.S., Matijasevich, A., Victora, C.G., 2008. Socioeconomic differentials in performing urinalysis during prenatal care. Rev. Saúde Pública 42, 389–395. doi:10.1590/S0034-89102008000300001

StataCorp, 2013. Stata Statistical Software: Release 13. StataCorp LP, College Station, TX.

Victora, C.G., Barros, F.C., Vaughan, P., Lombardi, C., 2006. Epidemiologia da desigualdade: um estudo longitudinal de 6.000 crianças brasileiras. Hucitec, São Paulo.

Victora, C.G., Huttly, S.R., Fuchs, S.C., Olinto, M.T., 1997. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. Int. J. Epidemiol. 26, 224–227.

Table 1. Distribution of mothers according to the performance (or not) of qualitative urine test during pregnancy, Rio Grande, RS, Brazil, 2007-2016.

Variable	Qualitative urine test during pregnancy:				Total
	Did	Did not	Unknown	Did not do prenatal care	
Year of perinatal study (P<0.001)					
2007	24.9%	11.3%	26.1%	33.1%	24.7%
2010	23.2%	15.8%	16.8%	32.7%	23.2%
2013	26.5%	30.4%	28.0%	21.7%	26.0%
2016	25.4%	42.5%	29.1%	12.5%	26.1%
Age (years) (P=0.095)					
11 - 19	18.1%	22.4%	13.7%	20.2%	18.2%
20 - 24	26.8%	25.4%	22.4%	30.9%	26.8%
25 - 29	24.6%	22.4%	28.6%	22.9%	24.5%
≥30	30.6%	29.8%	35.4%	26.0%	30.4%
Mean	26.1	25.9	27.4	25.5	26.1
Standard deviation	6.5	7.0	6.9	6.7	6.5
Living with partner (P<0.001)	84.8%	77.0%	85.1%	62.7%	83.7%
Skin color observed (P<0.001)					
White	68.6%	62.1%	72.1%	49.8%	67.9%
Brown/Mixed	20.8%	25.1%	21.7%	25.1%	21.1%
Black	10.6%	12.8%	6.2%	25.1%	11.0%
Number of residents at home (P<0.001)					
2 or 3	35.2%	28.7%	33.5%	11.6%	34.2%
4 - 6	55.1%	54.6%	55.9%	54.4%	55.1%
≥7	9.7%	16.7%	10.6%	33.9%	10.7%
Mean	4.4	4.8	4.5	5.9	4.4
Standard deviation	1.7	2.0	1.9	2.4	1.7
Mother's paid work during pregnancy (P=0.011)	49.1%	42.7%	49.7%	42.2%	48.7%
Schooling (years) (P<0.001)					
0 - 8	40.8%	54.6%	39.7%	78.3%	42.4%
9 - 11	43.8%	31.9%	44.1%	20.5%	42.7%
≥12	15.4%	13.4%	16.1%	1.2%	14.9%
Mean	9.4	8.7	9.6	6.4	9.3
Standard deviation	3.4	3.6	4.0	2.9	3.4
Total (n)	92.0% (9,508)	3.2% (335)	1.6% (161)	3.2% (327)	100.0% (10,331)

Table 1. Continuation.

Variable	Qualitative urine test during pregnancy:				Variable
	Did	Did not	Unknown	Did not do prenatal care	
Monthly family income in minimum wages (P<0.001)					
<1	10.4%	13.8%	23.2%	32.3%	11.4%
1 a 1.9	30.8%	35.4%	23.2%	37.2%	31.1%
2 a 3.9	36.6%	35.1%	33.5%	24.3%	36.2%
≥4	22.1%	15.7%	20.0%	6.1%	21.4%
Mean	3.2	2.6	3.2	1.6	3.1
Standard deviation	4.6	2.4	4.6	1.5	4.5
Planned pregnancy (P<0.001)	38.5%	33.1%	41.0%	12.2%	37.5%
Previous child born dead (P<0.001)	2.7%	3.9%	3.7%	5.5%	2.8%
Parity (P<0.001)					
1	44.6%	37.3%	41.6%	14.1%	43.4%
2	13.7%	11.6%	7.4%	8.6%	23.5%
3	23.4%	24.2%	30.4%	22.9%	23.5%
≥4	18.3%	26.9%	20.5%	54.4%	19.7%
Mean	2.3	2.8	2.4	4.2	2.4
Standard deviation	1.6	2.0	1.4	2.4	1.6
Total (n)	92.0% (9,508)	3.2% (335)	1.6% (161)	3.2% (327)	100.0% (10,331)

Tabela 2. Prevalence of non-performance of qualitative urine test by category of the variable included in the model and crude and adjusted analysis for associated factors, Rio Grande, RS, Brazil, 2007-2016. (n = 10,004)

Level	Variable	Prevalence of non-performance of qualitative urine test	Prevalence ratio (CI95%)	
			Crude	Adjusted
I	Age (years)		p=0.040	p=0.976
	11 - 19	4.1%	1.30 (1.01-1.67)	0.99 (0.75-1.31)
	≥20	3.2%	1.00	1.00
	Skin color observed		p=0.038	p=0.432
	White	3.0%	1.00	1.00
	Brown/Mixed	4.0%	1.31 (1.02-1.69)	1.17 (0.91-1.52)
	Black	4.0%	1.33 (0.96-1.84)	1.11 (0.79-1.55)
	Living with partner		p<0.001	p=0.003
	Yes	3.1%	1.00	1.00
	No	5.0%	1.63 (1.27-2.09)	1.50 (1.14-1.96)
	Schooling (years)		p<0.001*	p<0.001*
	0 - 4	5.2%	2.00 (1.40-2.86)	1.76 (1.22-2.56)
	5 - 8	4.3%	1.65 (1.32-2.07)	1.49 (1.16-1.91)
	≥9	2.6%	1.00	1.00
	Monthly family income in minimum wages		p=0.011	p=0.796
	<1	4.3%	1.80 (1.21-2.68)	1.19 (0.79-1.78)
	1 - 1.9	3.8%	1.59 (1.15-2.21)	1.16 (0.83-1.62)
	2 - 3.9	3.2%	1.33 (0.96-1.85)	1.14 (0.82-1.57)
	≥4	2.4%	1.00	1.00
	Mother's paid work during pregnancy		p=0.020	p=0.210
	No	3.8%	1.28 (1.03-1.59)	1.14 (0.92-1.42)
	Yes	3.0%	1.00	1.00
III	Parity		p<0.001*	p=0.003*
	1 or 2	2.8%	1.00	1.00
	3 or 4	3.5%	1.23 (0.97-1.55)	1.23 (0.94-1.60)
	≥5	6.4%	2.24 (1.65-3.03)	1.79 (1.24-2.58)
	Previous child born dead		p=0.197	p=0.904
	Yes	4.7%	1.42 (0.83-2.45)	1.03 (0.59-1.80)
	No	3.3%	1.00	1.00
	Planned pregnancy		p=0.045	p=0.843
	Yes	2.9%	1.00	1.00
	No	3.6%	1.25 (1.00-1.57)	1.02 (0.80-1.29)

Table 2. Continuation.

Level	Variable	Prevalence of non-performance of qualitative urine test	Prevalence ratio (CI95%)	
			Crude	Adjusted
IV	Number of prenatal consultations performed (n=9,922)		p<0.001*	p<0.001*
	1 - 3	14.9%	16.93 (9.34-30.68)	10.23 (5.18-20.18)
	4 - 5	4.4%	4.94 (2.65-9.21)	3.52 (1.76-7.03)
	6 - 11	2.6%	2.93 (1.63-5.24)	2.69 (1.46-4.94)
	≥ 12	0.9%	1.00	1.00
	Month of initiation of prenatal visits (n=9,938)		p<0.001	p=0.239
	1	2.0%	1.00	1.00
	2 or 3	2.6%	1.28 (0.92-1.79)	1.02 (0.72-1.43)
	≥4	6.3%	3.13 (2.25-4.34)	1.28 (0.87-1.89)
	Local of prenatal care		p<0.001	p=0.384
	Private	2.4%	1.00	1.00
	Public	4.0%	1.66 (1.32-2.09)	1.12 (0.86-1.46)
	Ferrous sulfate supplementation		p<0.001	p<0.001
	Yes	4.9%	1.00	1.00
	No	2.7%	1.83 (1.48-2.27)	1.77 (1.41-2.21)

* Linear trend test

Equations of adjustment:

Level I: mother's age, living with partner, skin color, mother's education, family income and mother's paid work during pregnancy;

Level II: skin color, mother's education and monthly family income;

Level III: skin color, mother's education, monthly family income, number of residents at home, parity, stillbirth and pregnancy planning;

Level IV: skin color, mother's education, monthly family income, number of residents at home, parity, pregnancy planning, number of prenatal consultations performed, month of pregnancy in which the prenatal consultations started, type of service in which he underwent prenatal care and received supplementation with ferrous sulfate.