

Quality assessment of a system of prenatal information

Avaliação da qualidade de um sistema de informação de pré-natal
Evaluación de la calidad de un sistema de información prenatal



Vivian Kecy Vieira Maia^a
 Eliane de Fátima Almeida Lima^a
 Rhaísa Almeida Volpato Machado^b
 Ana Inês Sousa^c
 Franciele Marabotti Costa Leite^a
 Cândida Caniçali Primo^a

How to cite this article:

Maia VKV, Lima EFA, Machado RAV, Sousa AI, Leite FMC, Primo CC. Quality assessment of a system of prenatal information. Rev Gaúcha Enferm. 2017;38(3):e67747. doi: <http://dx.doi.org/10.1590/1983-1447.2017.03.67747>.

doi: <http://dx.doi.org/10.1590/1983-1447.2017.03.67747>

ABSTRACT

Objective: To evaluate the quality of the Prenatal Information System of the city of Vitoria – ES.

Methods: This is a cross-sectional study with an analysis of the Prenatal Information System Data (SISPRENATAL) from a municipality in the Southeast Region of Brazil. The quality of the system was evaluated according to the accessibility criteria, methodological clarity, timeliness and completeness defined by the Economic Commission for Latin America and the Caribbean (ECLAC). Completeness was evaluated according to the criteria of incompleteness proposed by Romero and Cunha, and assigned scores in degrees of evaluation for: excellent, good, fair, bad and very bad.

Results: Most of the results presented scores of bad and very bad quality. Fields with excellent or good quality for incompleteness are related to the mandatory items.

Conclusion: Professionals need to be aware of the proper registration of the care provided to pregnant women.

Keywords: Prenatal care. Health evaluation. Quality of health care. Obstetric nursing.

RESUMO

Objetivo: Avaliar a qualidade do Sistema de Informação de Pré-Natal do município de Vitória – ES.

Métodos: Trata-se de um estudo transversal com análise do Sistema de Informação Pré-natal (SISPRENATAL) de um município da região sudeste do Brasil. A qualidade do sistema foi avaliada segundo os critérios de acessibilidade, clareza metodológica, oportunidade e completude definidos pela Comissão Econômica para a América Latina e Caribe (CEPAL). A completude foi avaliada segundo os critérios de incompletude propostos por Romero e Cunha e atribuídos escores em graus de avaliação quanto a: excelente, bom, regular, ruim e muito ruim.

Resultados: A maioria dos resultados apresentou escore de qualidade ruim e muito ruim. Os campos com qualidade excelente ou boa para incompletude estão relacionados aos itens de preenchimento obrigatório.

Conclusão: Os profissionais precisam ser sensibilizados para o adequado registro da assistência prestada à gestante.

Palavras-chave: Cuidado pré-natal. Avaliação em saúde. Qualidade da assistência à saúde. Enfermagem obstétrica.

RESUMEN

Objetivo: Evaluar la calidad del Sistema de Información Prenatal del municipio de Vitoria – ES.

Métodos: Se trata de un estudio transversal con análisis del Sistema de Información Prenatal (SISPRENATAL) de un municipio de la región sudeste de Brasil. La calidad del sistema se evaluó en criterios de accesibilidad, claridad metodológica, oportunidad y completitud definidos por la Comisión Económica para América Latina y el Caribe (CEPAL). La completitud se evaluó de acuerdo con los criterios de incompletitud propuestos por Romero y Cunha y fueron asignadas las puntuaciones en evaluación de grado como: excelente, bueno, regular, malo y muy malo.

Resultados: La mayoría de los resultados han presentado una puntuación de mala calidad y muy mala. Los campos con excelente o buena calidad para incompletitud están relacionados con los elementos obligatorios.

Conclusión: Los profesionales necesitan ser orientados para el adecuado registro de la asistencia prestada a la mujer gestante.

Palabras clave: Atención prenatal. Evaluación en salud. Calidad de la atención de salud. Enfermería obstétrica.

^a Universidade Federal do Espírito Santo (UFES), Centro de Ciências da Saúde, Programa de Pós-Graduação em Enfermagem. Vitória, Espírito Santo, Brasil.

^b Universidade Federal do Espírito Santo (UFES), Centro de Ciências Exatas, Departamento de Estatística. Vitória, Espírito Santo, Brasil.

^c Universidade Federal do Rio de Janeiro (UFRJ), Escola de Enfermagem Anna Nery, Departamento de Saúde Pública. Rio de Janeiro, Rio de Janeiro, Brasil.

■ INTRODUCTION

An information system is characterized as a process of information and communication production that provides analysis for the generation of knowledge⁽¹⁾. Assessing the quality of the information produced is indispensable since they are important tools for the diagnosis of the health situation, for they distinguish populations of greater vulnerability and make it possible to plan therapeutic strategies according to the needs and specificities of each population group⁽²⁾.

However, several studies highlight the low credibility of the information systems, which results from the poor quality of the data, either because of the high degree of omission in filling the fields in the basic documents that feed them, or because of the inconsistency of the data⁽³⁻⁵⁾.

Regarding the follow-up of information on care, during the puerperal pregnancy period, in 2000 the Ministry of Health created the System for the Follow-up of the Prenatal and Birth Humanization Program (SISPRENATAL). With this system, it was possible to follow up, monitor and evaluate the obstetric care offered through the Prenatal and Birth Humanization Program (PBHP). And in 2011, it becomes SISPRENATAL web, which is an online system⁽⁶⁻⁷⁾.

The feeding of SISPRENATAL must be done by completing the clinical form of assistance that, in general, is filled out by doctors or nurses. In the city of Vitória/ES, the SISPRENATAL web is fed by information collected from an electronic medical record network, known as "Bem Estar" Network (BEN), completely replacing the medical record in paper. The system aims to manage, plan, control, evaluate and operationalize the actions and services of the Municipal Health Secretary (SEMUS). Within the electronic medical record there is a specific form for recording all the prenatal care, including the registration of the pregnant woman at the first visit, follow-up at the subsequent visits, until the puerperal consultation. It is an online care tool, denominated Prenatal Clinical Record, which has been adapted from the Brazilian Federation of Gynecology and Obstetrics Societies (FEBRASGO), that acts as a systematized filling guide to be used during all the prenatal care, allowing more accurate data collection and a systematized care among professionals⁽⁸⁾.

The adequate completion contributes to the timely and permanent transfer of information to SISPRENATAL, providing support to managers to analyze the conditions for completing the clinical file during the prenatal care, it also allows the definition of priorities, mobilization of resources and development of public policies for quality care, with the consequent reduction of maternal and neonatal morbidity and mortality^(7,9).

However, when comparing SISPRENATAL with other sources of information, such as the medical record, it seems to present a lack of record of the procedures and activities recommended by the PBHP^(4,10). Thus, considering that the quality of the information is an important tool for the knowledge of the epidemiological profile of pregnant women, as well as for the elaboration of health indicators, for the analysis of trends, for the indication of priorities and, consequently, for the planning of actions that are related to women's health in the city, the following question has emerged: How is the quality of the Prenatal Information System in the city of Vitória/ES?

In view of the above, the objective of this study was to evaluate the quality of the Prenatal Information System of the city of Vitória/ES.

■ METHODS

This is a cross-sectional study based on the analysis of secondary data from the Pre-Natal Information System (SISPRENATAL) of the city of Vitória, in the state of Espírito Santo (ES), based on the years 2013 and 2014. This period has been chosen because, as of January 2013, all the prenatal appointments began to be filled in the BEN Prenatal Clinical Record.

The population was all the pregnant women who underwent prenatal care at the Basic Health Units (BHU) at the Municipal Specialty Center (MSC) in the city of Vitória/ES, with their first prenatal appointment between January 1, 2013 and December 31, 2014, and the completion of the prenatal care until October 2014. The pregnant women who interrupted the prenatal follow-up at the BEN have been excluded from the study. After applying the inclusion and exclusion criteria, 5030 Prenatal Clinical Records have been analyzed.

In order to evaluate the data quality of the BEN Prenatal Clinical Record, the criteria of accessibility, methodological clarity, timeliness and completeness defined by the Economic Commission for Latin America and the Caribbean (ECLAC) have been used⁽²⁾. The **accessibility** criterion evaluated the availability of the data and how it was obtained (paid or free), the type of information (individual or aggregated), the location and flow to follow for data delivery, the delivery time and the format of the files. The **methodological clarity** criterion evaluated the collection instructions, the filling manuals and the database documentation^(2,11). For this, the registration manual and the follow-up of the prenatal care of the city of Vitória/ES have been analyzed. As for the **opportunity**, this refers to the time between the delivery of the results and the reference period established

for the availability of the data to the user or to whom it is intended; in this work, the interval between the production of the data and its availability⁽²⁾.

The **completeness** criterion depicts the blank fields of each variable with data classification assigned according to the incompleteness criteria proposed by Romero and Cunha⁽¹²⁾. The calculation used corresponds to the number of blank fields found in each variable, divided by the total of chips selected for analysis, multiplied by 100. Then, a score has been established in degrees of evaluation for: excellent (<5%), good ($\geq 5\%$ and <10%), regular (≥ 10 and <20%), poor ($\geq 20\%$ and <50%) and very poor ($\geq 50\%$)⁽¹¹⁾.

The variables to assess the completeness of the data have been divided into the first prenatal appointment and follow-up appointments. For the first appointment, the following variables have been used: marital status, schooling, race/color, date of last menstruation (DLM), height, weight at the first visit, tetanus vaccination, smoking, alcohol, maternity visit, planned pregnancy, dental examination, previous weight, gynecological examination, breast examination and clinical examination. The follow-up appointments included: laboratory tests of urine (Abnormal Sediment Elements - ASE), fasting glycaemia, hemoglobin (Hb), hematocrit (Ht), HbsAg, HIV testing, typing (human immunodeficiency virus) Blood and Rh factor, toxoplasmosis, uroculture, syphilis test (VDRL – Venereal Disease Research Laboratory); tetanus, hepatitis B and influenza vaccines; technical procedures of weight, blood pressure (BP), uterine fundus height, fetal presentation, fetal movements, fetal heart beat (FHB), edema examination in the lower limbs; Ultrasonography (USG) in the items gestational age (GI), fetal weight, placenta and amniotic fluid; participation in collective activity, dental appointment, puerperal appointment performed with information on the gestational risk, place of birth and type of delivery defined in the Prenatal and Birth Humanization Program (PBHP), “Rede Cegonha” and Technical Manual of the Ministry of Health^(6,9).

The database with each of the variables of the Prenatal Clinical Record has been provided by the Sub Secretary of Information Technology (SUBIT) of the city. The separate spreadsheets had their data grouped into a single database by two researchers; then, they were checked and analyzed in the months of October and November of 2015. A descriptive statistical analysis has been performed using absolute frequency (N) and percentage (%) using STATA 13.3. The research project was approved by the Research Ethics Committee of the Universidade Federal of Espírito Santo, on July 5, 2015, under the number 1,138,587 and CAAE No. 44199915.9.0000.5060.

■ RESULTS

The analysis of the Prenatal Information System comprised 5030 BEN Prenatal Clinical Records completed during the follow-up of pregnant women in the years of 2013 and 2014 in the BHU and MSC in the city of Vitória/ES, corresponding to approximately 56% of the estimated number of live births for the city in the two years of the study period (average estimate of 4500 live births per year)⁽⁸⁾.

The criterion of **accessibility** of the prenatal information system was considered **accessible** in the individual form, through electronic means (intranet), in each BHU or through the Technical School of the Unified Health System (TSUHS) - Vitória / ES or the Municipal Secretary (SEMUS) to professionals who have a password to access BEN, through the BEN page - within the tab reports - electronic form – form query - prenatal form. At that moment, the individual research was done by the name of the pregnant woman, micro area, gestational age or doses of tetanus vaccine. Professionals within each BHU are allowed to view only the pregnant women they accompany in their assigned territory, otherwise they must have access via TSUHS or SEMUS. However, it was not possible to generate reports, comparability of variables and the system was not available to users.

The **methodological clarity** of the prenatal registration and monitoring manual provided by the Sub-Secretary for Information Technology (SUBIT) explains the step-by-step to start the first prenatal appointment and the follow-up appointments; it informs that the scheduling of the puerperal appointment completes the prenatal follow-up; it also clarifies how to complete the interruption of the prenatal care and its reasons. But it does not set the default to be used for fields that do not need to be filled in, if it is necessary to keep the blanks, enter zero or hyphen; As well as maternal height, current or previous maternal weight, if it is necessary to type in centimeter, meter, or if it is necessary to separate by semicolon. However, during the service, the system automatically places a comma as you enter a dot and reports height in meters and weight in kilograms.

The data is available individually, at any time, at immediate opportunity, being possible to access the BEN shortly after the consultation carried out using the path described above within each BHU or via TSUHS and SEMUS (intranet).

Regarding **completeness**, the DLM variables, weight at first appointment, height, and smoking presented excellent quality incompleteness, with percentages of 0.02%, 1.01%, 3.02%, and 3.76%, respectively.

The worst incompleteness is for the variable conjugal situation, which was considered very bad with 100% of the

blank fields, followed by tetanus vaccination (74.85%), previous weight (58.89%), normal gynecological examination (51.63%), and planned pregnancy (50.28%).

Table 1 presents the absolute and percentage frequency of the incompleteness results of the prenatal information system, through the BEN Prenatal Clinical Record for the first appointment.

Figure 1 shows the number of appointments recorded in each pregnant woman's prenatal clinical record, with 44.91% of the pregnant women presenting 6 or more prenatal appointments, 35.17% between 1 and 3 appointments, and 19, 92% between 4 to 5 appointments.

Table 2 shows the absolute frequency and the percentage of incompleteness results of the prenatal information system through the BEN Prenatal Clinical Record during the prenatal follow-up. In the evaluated period, 28.95% of the pregnant women had their first prenatal appointment up to 12 weeks of gestation and 66.24% had no registered puerperal appointment.

■ DISCUSSION

This study evaluated the quality of the data of the Prenatal Information System through the BEN Prenatal Clinical Record in the city of Vitória/ES. For the majority of the results, approximately 74% of the fields presented poor or very poor-quality scores.

Corroborating with the findings, researches indicate that SISPRENATAL was not a reliable source for the assessment of information on follow-up during pregnancy, and the documentation was insufficient regarding the data of all the minimum requirements and process indicators of the Prenatal and Birth Humanization Program⁽⁴⁾. Another study that has carried out an evaluation of SISPRENATAL in a city of São Paulo found errors in the transfer of information; inadequate records management and differences in the number of pregnant women enrolled in the system when compared to the number of patients attending the health services⁽¹³⁾.

Table 1 – Incompleteness of the mandatory variables common to all pregnant women during the first prenatal appointment in the city of Vitória/ES, 2013-2014.

Variable	N	%	Evaluation score
Personal Information			
Marital status	5030	100.00	very poor
Education	2120	42.15	poor
Race/Color	1847	36.72	poor
Current gestation			
DLM	1	0.02	excellent
Tetanus vaccination	3765	74.85	very poor
Smoke	189	3.76	excellent
Alcohol	408	8.11	good
Visit to maternity	2249	44.71	poor
Planned pregnancy	2529	50.28	very poor
Dental care	2151	42.76	poor
Physical exam			
Height	152	3.02	excellent
Weight at first appointment	51	1.01	excellent
Previous Weight	2962	58.89	very poor
Gynecological examination	2597	51.63	very poor
Breast exam	1967	39.11	poor
Clinical Examination	1548	30.78	poor

Source: "Bem Estar" Network.

DLM: Date of last menstruation.

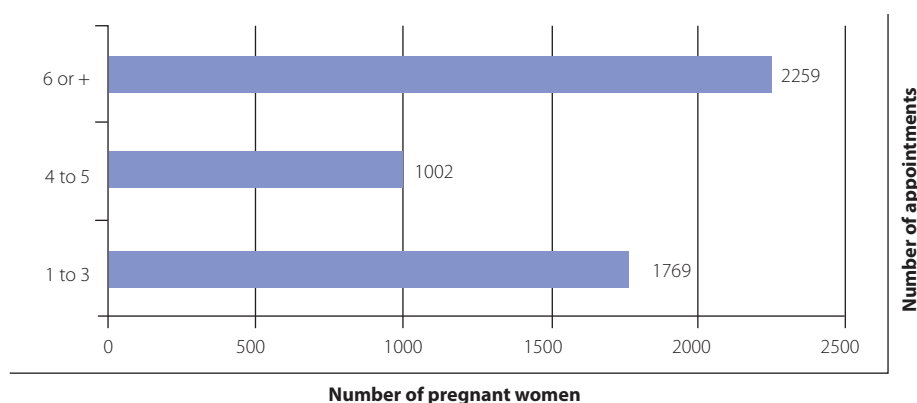


Figure 1 – Distribution of the number of pregnant women by the number of prenatal appointments

Source: Research data, 2014.

Table 2 – Incompleteness of the mandatory variables common to all pregnant women during the prenatal follow-up appointments in the city of Vitória/ES, 2013–2014 (to be continued)

Variable	N	%	Evaluation score
Laboratory tests			
ASE	1527	30.36	poor
Glucose Fasting	1903	37.83	poor
Hb/Ht	1418	28.19	poor
HbsAg	1463	29.09	poor
Anti-HIV Test	1390	27.63	poor
Blood typing and Rh factor	1521	30.24	poor
Toxoplasmosis	1587	31.55	poor
Uroculture	1566	31.13	poor
Test for syphilis - VDRL	1300	25.84	poor
Vaccines			
Anti-tetanus	1903	37.83	poor
Hepatitis B	3823	76.00	very poor
Influenza	4225	84.00	very poor
Technical procedures			
Weight	26	0.52	excellent
Blood pressure	16	0.32	excellent
Uterine Height	236	4.69	excellent
Fetal Presentation	690	13.72	regular
Fetal Movements	359	7.14	good
Cardiopulmonary Beats	262	5.21	good
Search for edema in lower limbs	366	7.28	good

Table 2 – Incompleteness of the mandatory variables common to all pregnant women during the prenatal follow-up appointments in the city of Vitória/ES, 2013–2014 (continuation)

Variable	N	%	Evaluation score
Ultrasonography			
Gestational Age	1127	22.41	poor
Fetal weight	1495	29.72	poor
Placenta	1472	29.26	poor
Liquid	1456	28.95	poor
Other information			
Participation in Collective Activity	4752	94.47	very poor
Dental appointment	2470	49.11	poor
Puerperal appointment			
Not done	3332	66.24	very poor
Degree of Risk	5030	100.00	very poor
Birth place	3965	78.83	very poor
Type of Delivery	3935	78.23	very poor

Source: "Bem Estar" Network.

ASE: urinalysis (Abnormal Elements of Sediment); Hb: hemoglobin; Ht: hematocrit; HIV: Human Immunodeficiency Virus; VDRL: Venereal Disease Research Laboratory.

In the same way, some studies have discussed issues related to the low quality and reliability of the data, which weaken the use of different information systems in Brazil and in the world, pointing out that the data is universally collected, however, the quality and the information is uncertain⁽¹⁴⁻¹⁶⁾.

The poor and very poor quality can be attributed to the lack of training of the professionals, since the manual was made available for individual reading and there was no official training in the handling of the system. A research has pointed out that there are several factors that compromise the reliability of the information generated by SISPRENATAL, and an important step for improving the records related to PBHP is the training of all the professionals, even those who perform their functions at the central management⁽³⁾. In addition to the training of the professionals, it is necessary to adapt the technological structure of the city to the SISPRENATAL computerized system, and to carry out on-site supervision of the data production⁽⁵⁾.

The lack of knowledge of the health professionals who collect or provide data, the underreporting of information, and the unreliability of the data to health information systems may undermine the entire purpose of the use of such data⁽¹⁷⁾.

It should be highlighted that the prenatal information system through the prenatal clinic form serves for the timely and permanent transfer of information to the SISPRENATAL web. Thus, an important issue regarding the non-com-

pletion of the fields during the prenatal care refers to the fact that this data is not passed on to the SISPRENATAL web adequately. Thus, the system does not portray the reality of the city and, consequently, it may not receive the financial resources from the feedback of this system⁽³⁾.

Regarding the mandatory prenatal laboratory tests, according to PBHP/"Rede Cegonha", all presented poor quality for incompleteness, representing a high number of pregnant women with no record of the requested/performed exams. In agreement with the findings, a study in the city of Cuiabá/MT verified that the set of tests recommended by the PBHP did not reach 25% of the pregnant women, and the most frequent examination was Urine in the 1st routine (64.3%), and the lowest was the VDRL in the second routine (27.8%)⁽¹⁸⁾.

Regarding the technical procedures, there was incompleteness good to regular for fetal movements, FHB, edema examination in lower limbs and fetal presentation. This shows that the professionals are performing the physical examination of the pregnant women during the prenatal follow-up at least once in their visit to the health service. Comparing the result found, a survey that evaluated the registration of pregnant women's cards in the Metropolitan Region of Greater Vitória/ ES, it was verified that clinical exams have been neglected by more than 90% of the professionals who conducted the prenatal care, except for FHB, which has had good to excellent record levels⁽¹⁹⁾.

For the variable puerperal appointment, it was also observed very poor quality, with 66.24% of this item without registration. One of the problems identified was the fact that the professionals filled in the interruption of follow-up field together with the field of puerperium appointment, and the system guideline makes clear the difference between the two registries. Similar results are found in studies in Porto Alegre (RS)⁽²⁰⁾ and in a city in the south of Brazil⁽¹⁷⁾, which found absence of puerperal appointment in 83.2% and 52%, respectively. This result demonstrates the lack of planning for the return of the pregnant woman to the BHU up to 42 days postpartum or through a home visit of the professional to the puerperium in the first week, between 7 and 10 days after the delivery⁽⁹⁾, being considered a marker for the prenatal care of the pregnant woman.

Electronic medical records are often indicated at the expense of paper clinical records. However, the lack of registration or incomplete data make it difficult to evaluate the information^(13,17), the care provided and, consequently, the registration in the SISPRENATAL web of the Ministry of Health. In this study, it has been observed that, regarding the incompleteness of the information system, the city does not have a single database of access to professionals, in a consolidated way, with reporting, comparability between variables or indicators, and also it does not provide users with access to the information system.

After 16 years of the creation of the PBHP by the Ministry of Health, it constitutes a reference for prenatal, childbirth and puerperium care throughout the national territory and, thus, challenges are imposed in order to improve the quality of services and information provided. It is important to point out that it is necessary to actively seek out pregnant women and women who have recently given birth, and that the records should effectively measure the quality of the care provided. Also, it is necessary to involve and commit professionals, institutions and health managers, who must fulfill their role, seeking strategies to mitigate the underreports mentioned in this study, as well as improve the quality of the services provided^(4,10,13).

■ CONCLUSIONS

This study presented poor and very poor quality of incompleteness for most of the variables, except for the fields of automatic completion and mandatory for the closure of the service. The incompleteness of the socio-cultural conditions of the pregnant women, education, race/color and marital status can be highlighted, which, when properly completed, they would allow greater precision in the assessment of social vulnerability and maternal and neonatal risk factors.

Professionals need to be sensitized and trained to adequately record the care provided to the pregnant woman, and follow-up is necessary through constant supervision of the records made to detect failures in their completeness.

Regarding nursing contributions, professionals and managers should be encouraged to try to reduce the incompleteness of the records, knowing that the use of this system is of fundamental importance for the planning, organization and evaluation of the services provided to pregnant women.

The limitation observed in the study was the lack of a single database with all the necessary variables for system evaluation. In addition, it is evident the need to carry out other studies that analyze the care process from other sources, such as printed medical records, in order to compare these data with the records in the information system.

■ REFERENCES

1. Zillmer JGV, Schwartz RMM, Muniz RM, Lima LM. Avaliação da completude das informações do hiperdia em uma unidade básica do Sul do Brasil. *Rev Gaúcha Enferm.* 2010 [cited 2015 jul 4];31(2):240-6. Available from: <http://www.scielo.br/pdf/rgefn/v31n2/06.pdf>.
2. Arribas C, Casado J, Martínez A. Gestión orientada a asegurar la calidad de los datos en los Institutos Nacionales de Estadística. Santiago de Chile: CEPAL; 2003.
3. Lima AP, Correa ACP. A produção de dados para o sistema de informação do pré-natal em unidades básicas de saúde. *RevEscEnferm USP.* 2013;47(4):876-83.
4. Andreucci CB, Cecatti JG, Macchetti CE, Sousa MH. Sisprenatal como instrumento de avaliação da qualidade da assistência à gestante. *Rev Saúde Pública.* 2011;45(5):854-64.
5. Lima AP, Corrêa ACP. A produção de dados e informações para o SISPRENATAL no nível central de gestão. *Cienc Cuid Saude.* 2012;11(2):352-9.
6. Ministério da Saúde(BR). Portaria no 569, de 1 de junho de 2000. Institui o Programa de Humanização no Pré-natal e Nascimento, no âmbito do Sistema Único de Saúde. *Diário Oficial [da] República Federativa do Brasil.* 2000 Jun 8[cited 2014 Sep 20];138(110 Seção 1):4-6. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2000/prt0569_01_06_2000_rep.html.
7. Ministério da Saúde(BR). Nota técnica conjunta: SISPRENATAL web e e-SUS atenção básica. Brasília: Ministério da Saúde; 2014 [cited 2014 Sep 20]. Available from: http://189.28.128.100/dab/docs/portaldab/notas_tecnicas/nt_sispre-natal_web_e_susab.pdf.
8. Prefeitura Municipal de Vitória (BR). Diagnóstico situacional para plano municipal de saúde 2014-2017. Vitória; 2013.
9. Ministério da Saúde (BR). Portaria no 1.459, de 24 de junho de 2011. Institui no âmbito do Sistema Único e Saúde – SUS a Rede Cegonha. *Diário Oficial [da] República Federativa do Brasil.* 2011jun 27 [cited 2014 Sep 25];148(121 Seção 1):109-11. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2011/prt1459_24_06_2011.html.
10. Andreucci CB, Cecatti JG. Desempenho de indicadores de processo do Programa de Humanização no Pré-Natal e Nascimento no Brasil: uma revisão sistemática. *Cad Saúde Pública.* 2011;27(6):1053-64.
11. Maia VKV. Avaliação de um serviço de pré-natal [dissertação]. Vitória (ES): Universidade Federal do Espírito Santo; 2016.

12. Romero DE, Cunha CB. Avaliação da qualidade das variáveis sócio-econômicas e demográficas dos óbitos de crianças menores de um ano registrados no sistema de informações. *Cad Saúde Pública*. 2006;22(3):673-84.
13. Moimaz SAS, Garbin CAS, Garbin AJL, Zina LG, Yarid SD, Francisco KMS. Sistema de informação pré-natal: análise crítica de registros em um município paulista. *Rev Bras Enferm*. 2010;63(3):385-90.
14. Lannon C, Kaplan HC, Friar K, Fuller S, Ford S, White B, et al. Using a state birth registry as a quality improvement tool. *Am J Perinatol*. Epub 2017 Mar 22. doi: <http://dx.doi.org/10.1055/s-0037-1600898>.
15. Prazeres MLJ, Oliveira CM, Bonfim CV. Avaliação da completude e da concordância das variáveis dos sistemas de informações sobre nascidos vivos e sobre mortalidade no Recife-PE, 2010-2012. *Epidemiol Serv Saúde*. 2016;25(4):849-54.
16. Almeida MVS, Amorim MHC, Thuler LCS, Zandonade E. Avaliação da qualidade dos dados do sistema de informação do câncer do colo do útero em Vitória – ES, Brasil. *Rev Bras Cancerol*. 2012;58(3):427-33.
17. Nyamtema AS. Bridging the gaps in the Health Management Information System in the context of a changing health sector. *BMC Med Inform Decis Mak*. 2010;10:36.
18. Corrêa ACP, Arantes RB, Lima AP, Nakagawa JTT. Análise da atenção pré-natal no município de Cuiabá-Mato Grosso segundo dados do SISPRENATAL. *R Pesq Cuid Fundam online*. 2013 [cited 2015 Jul 4];5(2):3740-8. Available from: <http://seer.unirio.br/index.php/cuidadofundamental/article/download/1993/2323>.
19. Santos Neto ET, Oliveira AE, Zandonade E, Gama SGN, Leal MC. O que os cartões de pré-natal das gestantes revelam sobre a assistência nos serviços do SUS da Região Metropolitana da Grande Vitória, Espírito Santo, Brasil. *Cad Saude Pública*. 2012;28(9):1650-62.
20. Hass CN, Teixeira LB, Bechetto MG. Adequabilidade da assistência pré-natal em uma estratégia de saúde da família de Porto Alegre – RS. *Rev Gaucha Enferm*. 2013[cited 2015 Jul 4];34(3):22-30. Available from: <http://www.scielo.br/pdf/rgenf/v34n3/a03v34n3.pdf>.

■ **Corresponding author:**

Eliane de Fátima Almeida Lima
E-mail: elianelima66@gmail.com

Received: 09.13.2016

Approved: 06.01.2017