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Evaluation of the completeness of variables in the Information System on Live Birth in Ceará (2011 – 2019)

Avaliação da completitude das variáveis do Sistema de Informação sobre Nascidos Vivos no Ceará (2011 – 2019)

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ABSTRACT

This work aims to assess the completeness of filling in the fields related to Live Birth Information System (SINASC) variables from 2011 to 2019, in the State of Ceará, Brazil. It is a longitudinal, descriptive study based on secondary data and composed of SINASC variables, whose percentage of incompleteness was classified by the Romero e Cunha score. The study shows that 81.8% of the variables evaluated, i.e., 09, have adequate filling classified with an excellent score. The variables duration of pregnancy and congenital anomaly were the ones that had the highest frequencies of incompleteness. Although most variables have their completeness classified with an excellent score, all incompleteness percentages, whether caused by blank or ignored data, point to the need for adjustments in the data collection and recording process. Organizing a systematic routine for monitoring the completion of the Live Birth Declaration and the insertion of data in the digital system, with feedback for the team, is one of the recommendations resulting from this evaluation.

Keywords: Health Evaluation. Data quality. Information systems. Live birth.

RESUMO

Este trabalho tem por objetivo avaliar a completitude do preenchimento dos campos relacionados às variáveis do Sistema de Informação sobre Nascidos Vivos (SINASC) no período de 2011 a 2019, no Estado do Ceará, Brasil. Trata-se de um estudo longitudinal, descritivo, baseado em dados secundários e composta por variáveis do SINASC, cujo percentual de incompletitude foi classificado pelo escore de Romero e Cunha.





O estudo mostra que 81,8% das variáveis avaliadas, ou seja 09, apresentam adequado preenchimento, sendo classificadas com o escore excelente. As variáveis duração da gestação e anomalia congênita foram as que tiveram as maiores frequências de incompletude. Embora a maioria das variáveis tenha sua completude de preenchimento classificado com escore excelente, todos os percentuais de incompletude, sejam provocados por dados em branco ou ignorados, apontam para necessidade de adequações no processo de coleta e registro de dados. Organizar rotina sistemática para o monitoramento do preenchimento da Declaração de Nascido Vivo e da inserção dos dados no Sistema digital, com retorno a equipe, é uma das recomendações decorrentes desta avaliação.

Palavras-chave: Avaliação em Saúde. Qualidade dos dados. Sistemas de informação. Nascidos vivos.

Introduction

Health information systems are built from collected data that allow an evaluation of their variables and their associations, enabling the construction of indicators that, when analyzed, support the processes of planning, management, evaluation, social control, teaching, and search.

Regarding epidemiological data, they allow the identification of risk factors that can be worked on to support actions to improve the quality of care and health services, constituting a primary tool for analyzing situations, contributing to the efficiency of management.

In Brazil, the Live Birth Information System (SINASC), the Notifiable Diseases Information System (SINAN), the SUS Hospital Information System (SIH-SUS) and the Mortality Information System (SIM) stand out as those with the greatest scope, with their data generated, processed and made available for the different purposes of planning, management, evaluation, social control, teaching and research (BRASIL, 2009).

In the case of SINASC, the data provided by the system allow an extended view of the vital event of birth and of the maternal-infant binomial, making it possible to carry out actions related to the evaluation of policies, the improvement of actions and the promotion of good quality health care for mothers and children.

SINASC, which enables the construction of useful indicators for planning the management of health services, was officially implemented in 1990, with the aim of collecting data on reported births throughout the national territory and providing data on birth rates for all levels of the Health System. The system manager at the national level is the



Health Surveillance Secretariat (SVS/MS) and is a standard document for mandatory use throughout the national territory. Essential to the collection of data on live births in Brazil is the Declaration of Live Births (DN), which is completed by health professionals, or traditional midwives (recognized and linked to health units) responsible for assisting the birth or newborn. born, in the case of hospital or home births with assistance and collected regularly by the Municipal Health Departments (Brazil, 2022b).

Although over the years there has been a commitment to improving information systems, it is necessary to periodically evaluate the quality of the systems' data, considering that the monitoring of planned actions depends on their quality and the reliability of this data.

It is worth highlighting that improving efficiency, quality and reliability of registered health information are essential actions for the sustainability of the National Health Information and Informatics Policy (PNIIS), which focuses on the interoperability of health information systems and advancement in the quality of health services, aiming to enhance the reach of benefits to the community in terms of social control and the democratization of health information and communication (Brazil, 2016).

When it comes to the quality of information, completeness stands out as an important attribute, as it is related to the record itself and can be measured. For Correia, Padilha and Vasconcelos (2014, p.4468) completeness is an attribute that “results from the inclusion of all the data necessary to answer a question about a given problem”.

Knowing that completeness is a term used to fill in variables in data systems, incompleteness in filling out a vital event can be considered as a comprehensive, severe problem that requires intervention, being a dimension of relevance in the National/State context.

Considering that information systems need to be evaluated periodically to the implementation of improvements and, also, given the scarcity of studies pointed out by Pedraza (2021, p.144), who states that “systematized data on studies focusing on the quality of SINASC information are only available until 2010”, this study intends to evaluate the completeness of filling in the fields related to SINASC variables in the period from 2011 to 2019, in the state of Ceará, Brazil.



1 Methodology

This is a longitudinal, descriptive study, conducted using secondary data from SINASC, obtained from the Tabnet database, whose domain is public and made available by the Department of Informatics of the Unified Health System – DATASUS (Brazil, 2022a), therefore, exempt from evaluation by the Research Ethics Committee.

The study was carried out in March 2022 and considered the state of Ceará as a research scenario, the time frame established for data collection was from 2011 to 2019, since the tabulation of the new fields of the new DN form is available from 2011 and the data from 2020 are not yet available in the system.

All records related to the incompleteness of the variables were considered: place of occurrence; mother's age; mother's instruction; duration of pregnancy; type of pregnancy; type of birth; prenatal consultations; APGAR in the 1st minute; APGAR at the 5th minute; birth weight and congenital anomaly.

The data collected in the system were recorded in a table with simple frequency and percentage, prepared for the exclusive purposes of this study. During the search, the data was respected, that is, it was copied as it was recorded, taking ethical aspects into consideration. The organization of the data occurred concomitantly with the collection and the analysis of the data displayed in the table was supported by the reviewed literature.

The Instruction Manual for filling out the DN contains guidance that you should avoid leaving fields blank, marking the option “Ignored” when the requested information is not known, or a dash (-) when it does not apply to the corresponding item or in the impossibility of obtaining information (Brazil, 2011).

Thus, the proportion of ignored information, that is, the blank fields and the codes assigned to the specified ignored information fall under the incompleteness criterion, as stated by the authors Romero and Cunha (2006).

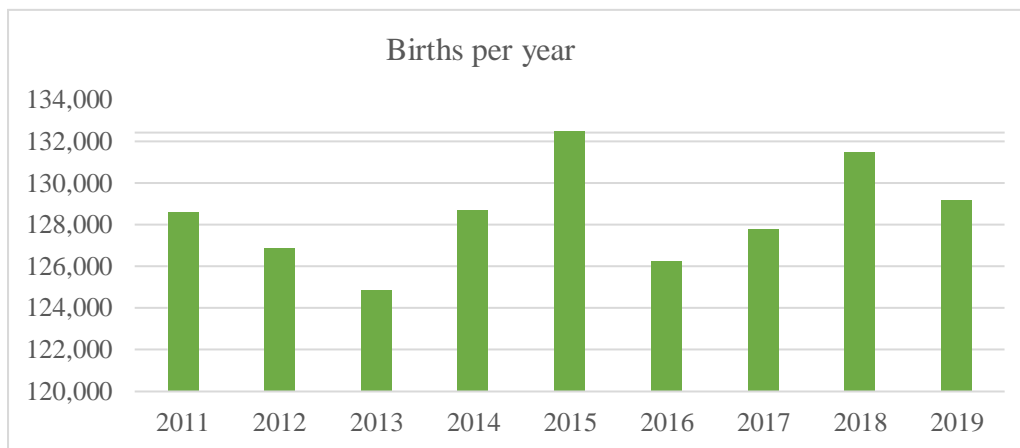
The calculation of the percentage of incompleteness was classified according to the Romero and Cunha (2006) score, which establishes the following levels of assessment: excellent (less than 5%), good (5% to 10%), fair (10% to 20%), poor (20% to 50%), and very poor (50% or more).



2 Results

The data collected shows that in the period from 2011 to 2019 the State of Ceará recorded 1,156,252 births, distributed evenly each year, as shown in Graph 1.

Graphic 1. Data on the number of live births in Ceará between 2011 and 2019.



Source: MS/SVS/DASIS. Information System on Live Births – SINASC.

All records have the DNV as their data source, which, as per guidance from the Ministry of Health, must have all its fields filled in, as the data generates information capable of supporting the planning of actions in the maternal and child area.

Based on the number of birth records in the given period, each variable selected for this study had its data identified from the perspective of completeness, as shown in Chart 1.



Chart 1. Distribution of the number of SINASC variables with incomplete data by year of birth, 2011-2019, Ceará/Brazil.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Births per year	128,592	126,868	124,876	128,681	132,516	126,246	127,797	131,491	129,185	1,156,252
Location	1	3	5	4	1	3	4	4	2	27
Mother's age	7	6	-	12	9	2	-	-	-	36
Mother's educational level	4,189	5,559	5,858	4,763	4,072	5,569	8,332	9,016	6,067	53,425
Duration of pregnancy	7,514	8,727	8,547	6,660	7,596	6,397	6,530	4,955	4,075	61,001
Type of pregnancy	430	324	262	260	257	1,268	3,577	3,417	187	9,982
Type of birth	519	354	319	248	222	248	240	259	222	2,631
Prenatal consultation	1,490	1,644	2,220	831	352	384	316	391	262	7,890
APGAR 1 min	1,015	873	769	793	888	1,938	4,343	4,831	2,228	17,678
APGAR 5 min	1,192	910	772	770	890	1,932	4,324	4,827	2,232	17,849
Weight at born	15	9	7	3	9	10	3	1	3	60
Congenital anomaly	10,472	8,322	6,948	6,597	6,621	8,127	8,873	8,573	7,271	71,804

Source: Own elaboration based on data from MS/SVS/DASIS - Information System on Live Births – SINASC.

This study did not seek to evaluate the reasons for the absence of records, considering that this would require the construction of another methodological path, however, it is known that the reasons are varied and may be related to professional inattention, improper filling out of documents health (E.g.: pregnant woman's card), the lack of equipment for measurements (E.g.: scales to weigh the newborn), the lack of knowledge regarding standardized measurements (E.g.: APGAR), as well as the failure to obtain data questioned by the informant.

In the points proposed by Romero and Cunha (2006), SINASC's quality analyses were observed through the incompleteness expressed in Chart 2.



Chart 2. Classification of Incompleteness of SINASC variables according to the Romero and Cunha score, 2011-2019, Ceará/Brazil.

	2011 - 2019	Total	% INCOMPLETITUDE	SCORE Romero and Cunha
	Births per year	1,156,252		
Number of Incomplete Data	Location	27	0.0%	Excellent
	Mother's age	36	0.0%	Excellent
	Mother's educational level	53,425	4.6%	Excellent
	Length of pregnancy	61,001	5.2%	Good
	Type of pregnancy	9,982	0.8%	Excellent
	Type of birth	2,631	0.2%	Excellent
	Prenatal consultation	7,890	0.6%	Excellent
	APGAR 1 min	17,678	1.1%	Excellent
	APGAR 5 min	17,849	1.5%	Excellent
	Birth weight	60	0.0%	Excellent
	Congenital anomaly	71,804	6.2%	Good

Source: Own elaboration based on data from MS/SVS/DASIS. Information System on Live Births – SINASC.

3 Discussion

According to Pedraza (2021), in his systematic review, the ignored or blank information is due to several factors such as deficiencies related to the professional responsible for filling out the ND - whether due to high turnover or lack of attention - and related to commitment. It also states that it may be due to methodological problems in filling out the variables, hospital flow and data that are difficult to obtain.

In Chart 1, it is observed that the variables Place of occurrence, Mother's age and Birth weight have the lowest rate of non-completion, which can generate more reliable information that will assist in various situation analyses, such as access to services health and their structuring, family planning actions, prevention of teenage pregnancy and care for low birth weight newborns.

Regarding Maternal Instruction, significant numbers of non-completions were identified, a situation that deserves attention, considering that it is a variable related to the socioeconomic situation, associated with the course of pregnancy and, also, with adequate care for the newborn.



Aquino *et al.* (2003, p. 2859) state that “low education causes misinformation, also constituting a conditioning factor of less interest in health care or greater difficulty in accessing health services, aspects that can have an important effect in determining mortality perinatal.”

The duration of pregnancy is also a variable with a high non-completion rate. The incompleteness of this variable deserves attention, as it is related to fetal maturity and prematurity, which constitutes a public health problem, and may result in consequences not only related to morbidity and mortality, but also to the high financial cost of providing assistance to health.

As for the variable Type of pregnancy, its completeness allows better planning of health actions, especially regarding adequate care. Considering that the DN is filled out by those who were, in some way, present during the maternal care, not filling out the type of pregnancy can harm future planning, requiring greater preparation in care, such as twins.

According to Martins, Barra and Mauad-filho (2006, p. 423), “Women with multiple pregnancies are subject to greater risks, both for themselves and their fetuses, when compared to women with single pregnancies.”

Regarding prenatal consultation, the amount of incompleteness has decreased over the years, which points to greater compliance in filling out this variable, which evaluates prenatal care during pregnancy, and which involves reception from the woman at the beginning of pregnancy until the birth of the newborn.

When dealing with the subject, Brazil (2005, p.10) states:

Qualified and humanized prenatal and puerperal care is provided through the incorporation of welcoming behaviors and without unnecessary interventions; easy access to quality health services, with actions that integrate all levels of care: promotion, prevention and health care for pregnant women and newborns, from basic outpatient care to hospital care for high-risk patients.

About APGAR, an incompleteness stands out that requires attention, since with the measurement of the index it is possible to better direct care behaviors. D'orsi and Carvalho (1998, p. 368) state that the APGAR “is a composite index that measures the vitality of the newborn in the first and fifth minutes after birth; It consists of: skin color, breathing, heartbeat, muscle tone and response to nervous stimuli.”



Regarding the importance of measuring the index, in the 1st and 5th minutes of life, Cunha *et al* (2004, p. 799) emphasize that “it may be the only form of assessment in developing countries, where laboratory tests may not be available. The low APGAR score is useful for identifying children who require additional care, even in the absence of laboratory data.”

Congenital Anomaly, whose incompleteness presents numbers that need to be reduced, stands out as a SINASC variable, considering that “the notification of congenital anomalies in SINASC is compulsory, regulated by Law No. 13,685, of June 25, 2018.” (BRASIL, 2021, p. 6).

In this same publication (Brazil, 2021), it is stated that, in SINASC, approximately 25 thousand Brazilian live births are registered annually with some type of congenital anomaly, however, there is a clear spatio-temporal heterogeneity in the notification of anomalies at a national level, which in most cases can be attributed to under-reporting or erroneous registration of certain types of anomalies.

In view of the above, the Ministry of Health, in an attempt to improve the quality of the registration of anomalies in SINASC, launched the book “Saúde Brasil: priority congenital anomalies for birth surveillance”, with the aim of providing theoretical, epidemiological and practical information on congenital anomalies in Brazil, in order to strengthen their registration in SINASC and enable the qualification of health policies.

In Chart 2 there is an analysis of the quality of SINASC through incompleteness, which was based on the cutoff points proposed by Romero and Cunha. The results obtained express that 09 of the 11 variables evaluated present adequate completion, being classified with an excellent score. The variables Length of pregnancy and Congenital anomaly were those with the highest frequencies of incompleteness.

It is known that the score adopted in this study is a method proposed by the aforementioned authors to enable a reading against a defined parameter, however, even with the evaluative indication of excellent, the score includes the possibility of not completing up to 5% in each variable, which, although acceptable as measured, requires attention and actions to minimize any incompleteness.



Final considerations

Although the completeness of most of the variables is considered excellent, all the percentages of incompleteness, whether caused by blank or ignored data, point to the need for adjustments in the data collection and recording process, considering that, regardless of the reasons, the absence of any filling affects the construction of information, which may harm the analysis process, the evaluation process, the decision making, as well as the implementation and execution of actions to improve health care.

In view of the above, the following recommendations arise from the results Periodically sensitize health professionals to the importance of adequately filling out the ND; invest in the continuous training of all professionals involved in the records, from data collection to insertion into the system; organize a systematic routine for monitoring and evaluating the completion of the Declaration of Live Birth and the insertion of data into the digital system, with feedback to the team; expand the use of the information produced in epidemiological studies and in decision-making; promote periodic improvement cycles; study other dimensions, such as reliability, validity and coverage, which, like completeness, can influence the quality of information.

It is noteworthy that an adequate data collection and its completeness generate safe and reliable information, fundamental for a more accurate situational diagnosis, capable of supporting, with greater quality, the definition of priorities, planning, monitoring, evaluation, control, and improvement of actions.

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