Epidemiology: Open Access

de Oliveiraa et al., Epidemiology (Sunnyvale) 2016, 6:6
DOI: 10.4172/2161-1165.1000273

Mini Review OMICS International

Innovation in Prenatal Screening as a Strategy to Control the Transmission of Diseases During Pregnancy

Botelho Carlos Augusto de Oliveiraa[1*], Benigno Alberto Moraes da Rocha[2,3], Fernando Saab[2], Maria Aparecida de Oliveira Botelho[2] and Rivaldo Venâncio Cunha[1,4]

[1]*Medical School, Federal University of Mato Grosso do Sul-UFMS, Mato Grosso do Sul, Brazil*

[2]*Union Goyazes University, Goiás, Brazil*

[3] *Nursing School, State University of Goiás, State of Goiás, Brazil*

[4]*Oswaldo Cruz Foundation, State of Mato Grosso do Sul, Brazil*

[*]**Corresponding author:** Botelho Carlos Augusto de Oliveiraa, Medical School, Federal University of Mato Grosso do Sul-UFMS, Mato Grosso do Sul, Brazil, Tel: +55 6235069300; E-mail: carlosbotelho@fug.edu.br

Received date: October 17, 2016; **Accepted date:** November 01, 2016; **Published date:** November 08, 2016

Abstract

The State Protection Program for Pregnant Women (PEPG) is an innovative prenatal screening program to detect diseases affecting pregnant women. It is a public health program aimed at offering quality health care services equally to all socioeconomic strata, regardless of the epidemiological and ethnic variances within and among states. The main difference of this program is the biological material analyzed for screening; dried blood spots collected on filter papers. Software collects epidemiological, clinical, and laboratory data necessary to determine the regional infection rates in order to provide public health services in accordance with the screening coverage. In addition, the software systematizes data useful for the implementation of strategies for control and prevention of new infections. Since its initiation, the PEPG has taken crucial health care measures.

Keywords: Pregnancy; Prenatal care; Abortions; Screening Dried blood spot test on filter paper; Syphilis; Morbidity and mortality; Brazil

Summary

Brazil is the fifth largest country in the world and encompasses the largest geographical area in the South and Latin America. Its land area is 8.51 million km^2 (equivalent to 47% of the South American territory) [1], including a coastal area of 55,455 km^2 [2]. Its population of approximately 205 million inhabitants is spread across 5,570 municipalities, and it is one of the most culturally and ethnically diverse nations due to the strong immigration flow from across the globe.

As a continental territory, its metropolitan areas are densely populated; however, it has extensive marsh and forest areas as well, including the Amazon, the largest forest in the world [3-5].

Despite current developments, the ease of access to health care services in the large centers contrasts with the limited access in remote areas such as forests, caating, and Pantanal [5]. These interregional differences are observed in addition to the greater development of the southern region compared with the northern region.

The Brazilian Ministry of Health recommends the performance of at least six prenatal consultations: one in the first trimester, two in the second trimester, and three in the third trimester of gestation [6]. However, difficulties in timely and adequate access to health care services limit achievement of this goal. In an attempt to overcome these barriers, a technological innovation was proposed in the state of Mato Grosso do Sul, located in the Midwest region of Brazil, bordering Paraguay and Bolivia. The use of dried blood spot on filter paper was proposed here to enable adequate and large-scale prenatal screening for early diagnosis, and implementation of measures to prevent congenital infections. The Protection Program for Pregnant Women (PEPG) was structured and involved the execution of 13 tests to diagnose several diseases, including Chagas disease, hepatitis B, hepatitis C, human T-cell leukemia virus (HTLV), rubella, human immunodeficiency virus (HIV), syphilis, and toxoplasmosis, during pregnancy. The use of filter paper allowed these tests to be performed in pregnant women from remote population groups such as the indigenous populations, residents of the Pantanal, and African-descendants.

A retrospective ecological study, including 2,143,729 pregnant women who underwent prenatal screening tests from 2002 to 2016, was carried out in the states of Mato Grosso do Sul, Goiás, the Rio Grande do Sul, Rio de Janeiro, Sergipe, Alagoas, and the Federal District, Brazil.

The program was initiated in the late 1990s with the creation of the Association of Parents and Friends of the Exceptional Children (Associação de Pais e Amigos dos Excepcionais - APAE) laboratory at Campo Grande, Mato Grosso do Sul, along with the implementation of a program that used dried blood spots collected on filter papers as the biological material to screen pregnant women for various diseases [7].

This strategy enabled the performance of screening tests on a large scale and significantly improved the adherence of patients to prenatal care. In addition, the quality of the tests carried out using the dried blood spots was similar to that of serological tests; syphilis was also tested In Mato Grosso do Sul, this screening program was implemented fourteen years ago, in late 2002. In 2003, the program was implemented in Goiás [8], while the Rio Grande do Sul; Rio de Janeiro; Sergipe; Alagoas; and the Federal District; among others, were

included later. A total of 2,143,729 pregnant women have been screened since then [7].

The program screened for Chagas disease, HIV, HTLV, hepatitis B and C, maternal phenylketonuria, syphilis, congenital toxoplasmosis, among others [8].

The screening coverage during 2003–2016 ranged from 67.4% in the state of Goiás to 93% in Mato Grosso do Sul. The logistical ease was a significant improvement as the sample collection could be performed anywhere, including indigenous villages, hinterland settlements, and small towns. In addition, as the blood samples were dried onto filter papers (SS903), they could be mailed in proper envelopes, and the blood tests could be carried out in less time, allowing for faster disease diagnoses and confirmations, and timely control of the screened diseases [9]. Several studies have already validated the use of dried blood spots as biological testing material for disease screening [7-9].

The PEPG is based on neonatal screening programs already widespread around the world. The program is extremely important for populations living in large cities, small towns, indigenous territories, and hinterland settlement of Brazil as the epidemiological and ethnic differences are not only regional but also exist between states. Similar programs may also be used in other countries with similar population characteristics.

It should be borne in mind that some alterations may be risk factors for the simultaneous occurrence of infections with different maternofetal etiology. Cortese et al. recently published an important review on the early and late infections of the newborns that continue to cause high morbidity and mortality in this age group [10]. The program collects epidemiological, clinical, and laboratory data necessary to assess the regional rates of infection, and provides public health services on the basis of the percentage of screening coverage. Moreover, the associated software systematizes data that can then serve as a guide for the implementation of strategies for the control and prevention of new infection cases. The practical actions of the PEPG have been crucial in providing widespread health care access.

References

1. IBGE (2016) Instituto Brasileiro de Geografia e Estatística.
2. (2016) The World Factbook: BRAZIL, USA, CIA, Central Intelligence Agency.
3. BRASIL (2002) Presidência da República.
4. (2016) webciencia.com.
5. (2016)IBGE/DPE/ Department of Population and Social Indicators. Division of Studies and Analysis of Demographic Dynamics. UNFPA/ BRAZIL project (BRA/98/P08)-Integrated Projections and Population Estimates and Indicators Socio-demographic.
6. Brasil, Ministry of Health (2005) Health Technical Area of Women. Prenatal and Puerperium: skilled care and humane-technico manual/ Ministry of Health Care Department of Health.
7. Botelho CAO (2008) Prevalence of diseases screened in the protection program to the state of pregnant women in Mato Grosso do Sul from 2004 to 2007. J tropical dis 37: 341-354.
8. Saab F (2009) Syphilis prevalence in pregnant women who had abortions attended by the protection program for pregnant women in the state of Sergipe, 2005-2007.
9. Duarte G, Fontes JAS, Nasciturno O (2009) Editora Atheneu, São Paulo.
10. Cortese F, Scicchitano P, Gesualdo M, Filaninno A, De Giorgi E, et al. (2016) Early and Late Infections in Newborns: Where Do We Stand? A Review. Pediatr Neonatol 57: 265-273.