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# Barriers related to non-adherence in a mammography breast-screening program during the implementation period in the interior of São Paulo State, Brazil

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**Abstract** Mammography is the best exam for early diagnosis of breast cancer. Developing countries frequently have a low income of mammography and absence of organized screening. The knowledge of vulnerable population and strategies to increase adherence are important to improve the implementation of an organized breast-screening program. A mammography regional-screening program was implemented in a place around 54.238 women, aged 40–69 years old. It was proposed to perform biannual mammography free of cost for the women. We analyze the first 2 years of the implementation of the project. Mammography was realized in 17.964 women. 42.1% of the women hadn't done de mammography in their lives and these women were principally from low socio-economic status (OR = 2.99), low education (OR = 3.00). The best strategies to include these women were mobile unit (OR = 1.43) and Family Health Program (OR = 1.79). The incidence of early breast tumors before the project was 14.5%, a fact that changed to 43.2% in this phase. Multivariate analysis showed that the association of illiterate and the mobile

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unit achieve more women who had not performed mammography in their lives. The strategies to increase adherence to mammography must be multiple and a large organization is necessary to overpass the barriers related to system health and education.



## 1. Introduction

Globally, breast cancer is the most commonly occurring cancer in women, comprising 23% of new cases and 14% of cancer-related deaths; furthermore, half of the cases and 60% of the related deaths occur in developing countries [1]. In countries with limited resources, diagnoses are delayed, and a high percentage of advanced cases occur consequent to the limited ability to promote appropriate early detection and diagnosis throughout the population [2].

Breast cancer prognosis is considered good, with a survival rate of approximately 73% in developed countries and 57% in developing countries [3]. In the United States, the increased incidence of breast cancer has been associated with reduced mortality, which has been attributed to improved treatment and early diagnosis [4]. However, both an increased incidence and mortality have been observed in Brazil [5], because a large number of women are diagnosed at advanced stages [6] resulting in more expensive treatments and reducing the likelihood of achieving a cure.

To reduce the breast cancer mortality rates in developing countries such as Brazil, it is necessary to improve strategies related to the control and early detection of the disease. This is because despite the higher overall mortality rates in Brazil, compared with those in the United States, the results of the 2 countries were similar when mortality was compared according to the clinical stage [7].

The literature regarding the implementation of mammography screening programs in developing countries is limited because the transition from diagnostic mammography to population-based opportunistic screening is gradual and has no specific parameters. In the previous decades in Brazil, there were improvements in the public health system, with a gradual increase in the number of mammograms performed. However, there is no organized screening program, and only isolated studies were conducted [8]. A regional pilot screening program was initiated in the countryside of São Paulo State, in which mammography screening was implemented at the population level [8,9]. In this sense, identification of the vulnerable population and knowledge regarding adherence strategies will facilitate the implementation and multiplication of screening centers in Brazil and other developing countries.

Thus, the objective of this study is to evaluate the barriers [10] related to mammogram non-adherence in a region of Brazil prior to the implementation of a mammography screening program and strategies to achieve this objective.

## 2. Materials and methods

A mammography screening program was implemented in 2003 by the 5th Regional Health Administration of the State Department of Health/State of São Paulo, which is located in the countryside of São Paulo State. A total of 19 municipalities were involved, and the program was headquartered in the city of Barretos, including both rural and urban populations. This project anticipated the performance of a biennial mammography screening for an estimated population of 54,238 women aged between 40 and 69 years [11].

A comprehensive discussion with the State and Municipal departments occurred before beginning of the project, and it was decided that a Tertiary Oncology Hospital, the Barretos Cancer Hospital (BCH), would be responsible for conducting the mammography screenings, complementary tests, medical care, diagnosis, treatment, and follow-up.

The municipalities' health care team was previously trained through lectures, discussions, and visits to their respective cities in an attempt to increase the team's awareness and training. Through their representatives (nurses and physicians), each municipality was responsible for disseminating the project via radio, loudspeaker-equipped cars, brochures, posters, home visits, and appointments at the Public Health Centers with regard to the Family Health Program [12].

Mammograms could be performed at either the BCH or at the Mobile Health Unit (MHU), and a total of 40 exams were offered per day by each place. The MHU was built to provide mammograms to women in remote cities and comprised a modified