Breastfeeding and infant pneumonia in Brazil: the value of electronic surveillance information systems

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Breast milk is recommended as the first food for infants and should be initiated immediately after delivery. According to the World Health Organization (WHO), breast milk should be the only food given to infants during the first 6 months of life; once complementary foods are introduced, breastfeeding should continue until the child is at least two years old. These recommendations are supported by numerous studies that demonstrate substantial advantages for breastfeeding over formula feeding not only for the child but also for the mother, family, and society. Thus, breastfeeding is considered to save money to the health sector and to improve the quality of life of the population.

Over the last three decades, Brazil has shown major progress at improving breastfeeding exclusivity and duration[1] and infant health, including a reduction in infant mortality.[2] It is important to underscore that these major improvements have happened in part as a result of the strong support and openness of the Brazilian government for the development of evidence-informed maternal-child health and nutrition policies and programs.

Indeed, key epidemiological studies have been conducted in Brazil during the last four decades. Specifically, longitudinal studies have identified risk factors for suboptimal infant feeding practices[3] as well as the benefits and cost-effectiveness of breastfeeding.[4] Case-control studies have also contributed to this body of evidence.[5] Even though randomized controlled trials are not as abundant due to their cost and complexity, quasi-experimental studies have strongly contributed for understanding how best to promote breastfeeding in Brazil both at the hospital and community levels.[6,7]

Previous studies have not examined the potential impact of breastfeeding on improving child health outcomes at the municipal level in Brazil. Thus, the study by Boccolini et al., entitled "Breastfeeding can prevent hospitalization for pneumonia among children under 1 year old" and included in this issue of Jornal de Pediatria,[8] is a welcome contribution. This municipal-level secondary data multivariate analysis based on an ecological study design documents that both exclusive breastfeeding among infants under 6 months of age and breastfeeding at 9-12 months are associated with a significant reduction in the risk of hospitalization for pneumonia among children under 1 year of age. Interestingly, the study found that the maximum benefit in terms of pneumonia hospitalization can be obtained when both breastfeeding conditions are met (i.e., exclusive breastfeeding and adequate breastfeeding duration). In short, the study confirms that breastfeeding is inversely associated with the risk of pneumonia hospitalization during infancy at the municipal level in Brazil.

The study by Boccolini et al. demonstrates the utility of investing in national electronic surveillance and management information systems to identify needs in a timely fashion and to understand points of opportunity for investing in cost-effective maternal-child health programs. Brazil has indeed developed a major health outcome information system known as DATASUS. This system collects population morbidity and mortality data and makes it available to diverse audiences, including investigators. The study also used socio-economic data (in this instance the Gini coefficient) collected by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE). Smoking prevalence data were obtained from a national telephone surveillance system. Finally, breastfeeding data were collected through national immunization campaign surveys. Thus, this study built upon multiple electronic data sources, an approach that indeed allows for timely surveillance of maternal-child health outcomes and their risk factors.

It is important to recognize the need to minimize biases in inferences drawn from ecological studies. Special attention needs to be paid to under-reporting or over-reporting of disease outcomes and/or corresponding risk factors, and

to the consistency of measures and diagnostic criteria used across time (e.g., pneumonia, exclusive breastfeeding). It is also essential that researchers understand sampling framework variations across surveys and potential biases associated with the different frameworks used. For example, as Boccolini et al. indicate, because the smoking data were collected over fixed phone lines, the sample may not be truly representative of the Brazilian populations across regions. Likewise, although the pneumonia data derived from DATASUS do not include children enrolled in private health plans, these children are included in the breastfeeding data derived from the immunization campaigns. Because these children have a higher prevalence of exclusive breastfeeding, the relationship of this infant feeding behavior with the prevention of pneumonia hospitalization may have been biased. To improve the explanatory power of data collected through the Brazilian surveys, it is important to consider innovative information technologies such as geocoding and environmental variables (e.g., environmental temperature and humidity).

The study by Boccolini et al. provokes two reflections. First, even though the relationship between breastfeeding and pneumonia had been previously reported, the fact that this study confirms the relationship using municipal-level analysis in Brazil has strong policy implications. Well-designed small-scale studies that control for confounders either statistically or by design have been instrumental in strengthening causal inferences by explaining the relationship of interest. The findings presented by Boccolini et al. not only complement those studies, but their 'real world' nature is likely to generate substantial interest among decision makers. Second, the use of data from diverse surveillance activities in Brazil is a strength of the study. However, it is important to recognize that the value of the information depends on the quality of the data from which it is drawn. The fact that the associations between pneumonia and the independent variables were in the expected directions suggests that the data used in this instance was scientifically valid. Because the approach used by Boccolini et al. can (and must) be extended to understanding diverse maternal-child health outcomes and their corresponding risk factors on an ongoing basis, it is important for Brazil to consider establishing a national maternal-child health and nutrition surveillance system analogous to what has been proposed in the USA.[9] A well-coordinated national information system formed by numerous survey, surveillance, and research activities can indeed facilitate the implementation and oversight of data quality control measures across the board, identify the type of data that needs to be collected avoiding redundancies, and facilitate linking data across surveys and surveillance initiatives, perhaps even at the individual level. Of course this can only happen if there is adequate funding, technical, and scientific resources in place.

The study by Boccolini et al. deserves to be disseminated among maternal-child health decision makers in Brazil and in the rest of Latin America and the Caribbean. It clearly shows the need for reinforcing the promotion, support, and protection of breastfeeding in municipalities across Brazil. Towards this end, it is essential to take into account the WHO code for the ethical marketing of breast milk substitutes and the Baby Friendly Hospital Initiative[6] that has now been extended to the community level.[10] Breastfeeding counseling at the hospital and community levels has indeed been shown to increase breastfeeding initiation, duration and exclusivity in different world regions, independently of their economic development level.[7] With regards to the WHO code, the Brazilian experience strongly suggests that protecting the population against the unethical marketing of breast milk substitutes is indeed an important measure to increase breastfeeding duration.[11] In spite of the major advances in breastfeeding promotion in Brazil, it is important to address the breastfeeding and child care support needs of vulnerable population groups such as employed mothers.[12] The study by Boccolini et al. should provide strong reassurances to policy makers that investing in breastfeeding promotion on a large scale means investing in the wellbeing of the children and the future of Brazil.

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