J Pediatr (Rio J). 2015;91(5):471–477

Jornal de Pediatria
www.jped.com.br

ORIGINAL ARTICLE

Socio-economic and demographic determinants of childhood anemia☆

Sankar Goswmai[a,*], **Kishore K. Das**[b]

[a] *Department of Statistics, Gurucharan College, Silchar, India*
[b] *Department of Statistics, Gauhati University, Guwahati, India*

Received 17 February 2014; accepted 2 December 2014
Available online 10 June 2015

KEYWORDS
India;
Child;
Anemia;
Risk factors

Abstract
Objective: To evaluate socio-economic and demographic determinants of anemia among Indian children aged 6–59 months.
Methods: Statistical analysis was performed on the cross-sectional weighted sample of 40,885 children from 2005 to 2006 National Family Health Survey by using multinomial logistic regression to assess the significance of some risk factors in different degrees of child anemia. Anemia was diagnosed by World Health Organization (WHO) cut-off points on hemoglobin level. Pearson's chi-squared test was applied to justify the associations of anemia with different categories of the study population.
Results: The prevalence of anemia was 69.5%; 26.2% mild, 40.4% moderate, and 2.9% severe anemia. Overall prevalence rate, along with mild and moderate cases, showed an increasing trend up to 2 years of age and then decreased. Rural children had a higher prevalence rate. Of 28 Indian states in the study, 10 states showed very high prevalence, the highest being Bihar (77.9%). Higher birth order, high index of poverty, low level of maternal education, mother's anemia, non-intake of iron supplements during pregnancy, and vegetarian mother increased the risks of all types of anemia among children ($p < 0.05$). Christian population was at lower risk; and Scheduled Caste, Scheduled Tribe, and Other Backward Class categories were at higher risk of anemia.
Conclusion: The results suggest a need for proper planning and implementation of preventive measures to combat child anemia. Economically under-privileged groups, maternal nutrition and education, and birth control measures should be priorities in the programs.

☆ Please cite this article as: Goswmai S, Das KK. Socio-economic and demographic determinants of childhood anemia. J Pediatr (Rio J). 2015;91:471–77.

* Corresponding author.
E-mail: sankar_goswami@yahoo.com (S. Goswmai).

http://dx.doi.org/10.1016/j.jped.2014.09.009

PALAVRAS-CHAVE
Índia;
Criança;
Anemia;
Fatores de risco

Fatores socioeconômicos e demográficos determinantes de anemia infantil

Resumo

Objetivo: Avaliar os fatores socioeconômicos e demográficos determinantes de anemia em crianças indianas com idade de 6 a 59 meses.

Métodos: A análise estatística foi realizada na amostra transversal ponderada de 40885 crianças da Pesquisa Nacional de Saúde da Família de 2005–2006, Governo da Índia, utilizando a técnica de regressão logística multimodal para avaliar a relevância de alguns fatores de risco em diferentes graus de anemia infantil. A anemia foi diagnosticada pelos pontos de corte de nível de hemoglobinas da OMS. O teste Qui-quadrado de Pearson foi utilizado para justificar as associações da anemia com diferentes categorias de população estudada.

Resultados: A prevalência de anemia foi de 69,5%, sendo 26,2% de anemia leve, 40,4% de anemia moderada e 2,9% de anemia grave. A taxa de prevalência geral, juntamente com a de anemia leve e moderada, mostrou uma tendência de aumento até os dois anos de idade e, depois disso, de queda. As crianças da zona rural têm maior taxa de prevalência. Dos 28 Estados indianos do estudo, 10 apresentaram prevalência muito alta, sendo Bihar o maior deles (77,9%). A ordem de nascimento elevada, alto índice de pobreza, baixo nível de escolaridade materna, anemia materna, não ingestão de suplementos de ferro durante a gravidez e vegetarianismo materno aumentaram os riscos de todos os tipos de anemia entre crianças ($p < 0,05$). A população cristã tinha o menor risco; e as categorias Casta Reconhecida, Tribo Reconhecida e Outras Classes Atrasadas tinham o maior risco de anemia.

Conclusão: Os resultados sugerem a necessidade de planejamento e implementação adequados de medidas preventivas contra a anemia infantil. Grupos economicamente carentes, a nutrição e escolaridade maternas e o controle da natalidade devem ser prioridades nos programas.

Introduction

Childhood anemia is one of the main deficiency diseases in the world and is associated with functional abnormalities of lymphocytes and neutrophils, including increased mortality.[1,2] The condition leads to the lack of oxygen in organs and tissues, and people with anemia often feel tired, weak, cold, and short of breath. Worldwide, 47.4% of children under 5 years of age are anemic, with the burden being greatest in low- and middle-income countries.[3,4]

According to the United Nations Children's Fund, 90% of all types of anemia in the world are due to iron deficiency. Iron deficiency is a problem that contributes to low birth weight, lowered resistance to infection, and decreased work capacity. Young children are more vulnerable to this disease because of their rapid growth and high need for iron. Sickle cell anemia, associated with episodes of acute illness and progressive organ damage, is also becoming a common inherited disorder in the world.[5] The risk factors of anemia most often cited in the literature are low family income and low maternal level of education, lack of access to healthcare services, inadequate sanitary conditions, and a diet with poor quantities of iron.[6,7] The disease is also becoming common among the Scheduled Tribe (ST), Scheduled Caste (SC), and Other Backward Class (OBC) population in some parts of India.[8,9]

In view of magnitude and severe consequences of anemia, in order to better plan preventive measures, this study aims to identify the significant socio-economic and demographic risk factors of anemia in Indian children of 6–59 months by means of statistical modeling.

Methods

The relevant data from children aged 6–59 months, who were tested for hemoglobin levels, from the 2005 to 2006 National Family Health Survey (NFHS), Ministry of Health and Family Welfare, Govt. of India,[10] were analyzed using SPSS 15.0 software (SPSS Inc. Released 2007. SPSS for Windows, Version 15.0. Chicago, USA). The study was approved by the Ethics Committee of the Gauhati University in India. The reference number of the approval letter is GU/ACA/Ethics/2014/4044, dated November 25, 2014.

The NFHS are nationwide surveys conducted with a representative sample of households throughout the India. Samples from urban and rural areas within each State were drawn separately. The rural sample was selected in two stages, with the selection of villages, using probability proportional to population size (PPS) at the first stage, followed by the random selection of households within each village in the second stage. In urban areas, a three-stage procedure was followed. In the first stage, wards were selected with PPS sampling. In the next stage, one census enumeration block (CEB) was randomly selected from each sample ward. In the final stage, households were randomly selected within each selected CEB.

Women of age 15–49 years from the selected households were interviewed for information about their children.