Annals of Epidemiology 23 (2013) 646–651

Contents lists available at SciVerse ScienceDirect

Annals of Epidemiology

journal homepage: www.annalsofepidemiology.org

Original article

Does breastfeeding contribute to the racial gap in reading and math test scores?

Kristen E. Peters MSW [a,*], Jin Huang PhD [a], Michael G. Vaughn PhD [a], Christopher Witko PhD [b]

[a] School of Social Work, College for Public Health & Social Justice, Saint Louis University, St Louis, MO
[b] Department of Political Science, University of South Carolina, Columbia, SC

ARTICLE INFO

Article history:
Received 21 February 2013
Accepted 17 June 2013
Available online 21 July 2013

Keywords:
Breastfeeding
Academic achievement
Child development

ABSTRACT

Purpose: The aim of this study was to examine the impact of divergent breastfeeding practices between Caucasian and African American mothers on the lingering achievement test gap between Caucasian and African American children.
Methods: The Child Development Supplement of the Panel Study of Income Dynamics, beginning in 1997, followed a cohort of 3563 children aged 0–12 years. Reading and math test scores from 2002 for 1928 children were linked with breastfeeding history. Regression analysis was used to examine associations between ever having been breastfed and duration of breastfeeding and test scores, controlling for characteristics of child, mother, and household.
Results: African American students scored significantly lower than Caucasian children by 10.6 and 10.9 points on reading and math tests, respectively. After accounting for the impact of having been breastfed during infancy, the racial test gap decreased by 17% for reading scores and 9% for math scores.
Conclusions: Study findings indicate that breastfeeding explains 17% and 9% of the observed gaps in reading and math scores, respectively, between African Americans and Caucasians, an effect larger than most recent educational policy interventions. Renewed efforts around policies and clinical practices that promote and remove barriers for African American mothers to breastfeed should be implemented.

Introduction

Disparities in educational outcomes between different socioeconomic groups are a major concern of educational reformers. Indeed, educational policies mandated in No Child Left Behind are aimed mostly at low-income, minority students. There is limited evidence, however, that these policies work. Because of the variation in breastfeeding practices across racial and ethnic groups and the association between breastfeeding and positive cognitive development, we consider whether different breastfeeding practices can explain some of the childhood "test gap" between Caucasians and African Americans.

The gap in achievement test scores between racial groups in America is stubbornly persistent; although it has decreased by 30% in the past 30–40 years, African Americans are still 2–3 years of learning behind Caucasians [1]. Why one racial group achieves more in school than another is a complex question, which makes it difficult to craft programs that increases achievement for low-performing groups. Although policy enacted to reduce the test gap has typically focused on changes within the school system, research shows that other factors have a greater impact on academic performance [2–5]. With children spending merely 15% of waking hours between birth and the age of 18 years in the classroom [6], research has consistently shown that family characteristics comprise, at minimum, two-thirds of the gap in academic performance between socioeconomic groups [7]. The negative impact of the test gap is unquestionable. Gaps in academic achievement have been linked with future income, health outcomes, and risk of incarceration [1] and can explain enduring socioeconomic stratification in American society.

Cognitive effects of breastfeeding

Research has shown that breastfeeding is associated with positive cognitive development and academic performance. Kramer et al. [8] found that increased duration and exclusivity of breastfeeding is associated with higher scores on the Weschler Abbreviated Scales of Intelligence at the age of 6.5 years. Oddy et al. [9] found that children who were mostly breastfed for more than 6 months had higher test scores at 10 years old. Additionally, a meta-analysis of 11 studies found that children breastfed as infants had significantly higher cognitive development than children who had been formula-fed as infants [10].

* Corresponding author. School of Social Work, Saint Louis University, 3550 Lindell Boulevard, St Louis, MO 63103. Tel.: +1 314 977 2712; fax: +1 314 977 2731.
E-mail address: kpeter26@slu.edu (K.E. Peters).

1047-2797/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.annepidem.2013.06.091

The current study

The objective of this study was to examine the impact of breastfeeding practices between Caucasian and African American mothers on the achievement test gap between Caucasian and African American children. Although several studies have examined the relationship between breastfeeding and cognitive development, past research has not considered how different breastfeeding practices may affect the achievement test gap. Furthermore, we capitalize on a nationally representative sample cohort that assessed breastfeeding duration throughout infancy and children's achievement test scores to determine the association between breastfeeding and children's achievement.

Rates and longevity of breastfeeding are known to vary greatly across different racial groups [11,12]. According to data collected through the National Immunization Survey between 2004 and 2008, 74% of Caucasian children and only 54% of African American children were ever breastfed [12]. If African Americans breastfed at similar rates as Caucasians, millions more African American children would be breastfed. Thus, it seems probable that some of the achievement test gap between Caucasians and African Americans results from this discrepancy. Because research shows breastfeeding improves cognitive development and there are divergent breastfeeding practices between Caucasian and African American mothers, we hypothesize that after accounting for the impact of having been breastfed during infancy, the difference in achievement test scores between Caucasian and African American children will be reduced. Figure 1 displays the conceptual model that guides our empirical analysis.

Methods

Data and sample selection

We examined the research question using data from the first two waves of the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID). The PSID is a longitudinal survey that collects demographic information and socioeconomic characteristics from a nationally representative sample of individuals and their families annually between 1968 and 1997 and biennially thereafter. Beginning in 1997, the PSID supplemented its core data with additional information from a group of children aged 0–12 years ($N = 3563$) in the CDS. The same children were interviewed three times in 1997, 2002, and 2007, respectively, if they were still younger than 18 years at the time of each interview. The recruiting, eligibility, and attrition of the PSID–CDS have been described elsewhere [13,14]. The CDS collected the breastfeeding information of children in the first wave (1997) and conducted standardized achievement tests on children older than 6 years in all three waves.

To maximize the sample size, we included African American and Caucasian children who were interviewed in 2002 ($N = 2552$) and had valid information on breastfeeding and achievement test scores ($N = 2257$). The study further limited subjects to children living with biological mothers and having parents (i.e., mothers, fathers, or stepfathers) as their householders ($N = 2002$) because biological mothers are more likely to report reliable information on breastfeeding and household dynamics could be different for children living with parents and those living with grandparents or other relatives. Finally, the few children with missing values on variables listed in Table 1 were excluded; the final sample size was 1928.

Outcome variables

The two outcome variables were children's reading and math scores in the Woodcock-Johnson Revised Tests of Achievement administered in the second wave of the CDS in 2002. Two subtests on reading ability, the Letter–Word Identification and the Passage Comprehension, and one subtest on math ability, the Applied Problems, were conducted. The raw scores of reading and math tests were standardized to a 0–200 continuous variable, respectively. The Woodcock-Johnson Revised Tests of Achievement have been widely used and have demonstrated excellent reliability and validity [15].

Independent variables

We used three major independent variables: children's race, a dichotomous indicator on whether children were breastfed, and a categorical variable of the duration of breastfeeding. Children's race was coded as "1" for African American if caregivers indicated that children were "Black non-Hispanic" and coded as "0" for Caucasian if caregivers indicated that children were "White non-Hispanic." In regards to breastfeeding, caregivers were first questioned, "Was the child breastfed as an infant?" Children who had ever been breastfed had the value "1" on the dichotomous measure of breastfeeding and

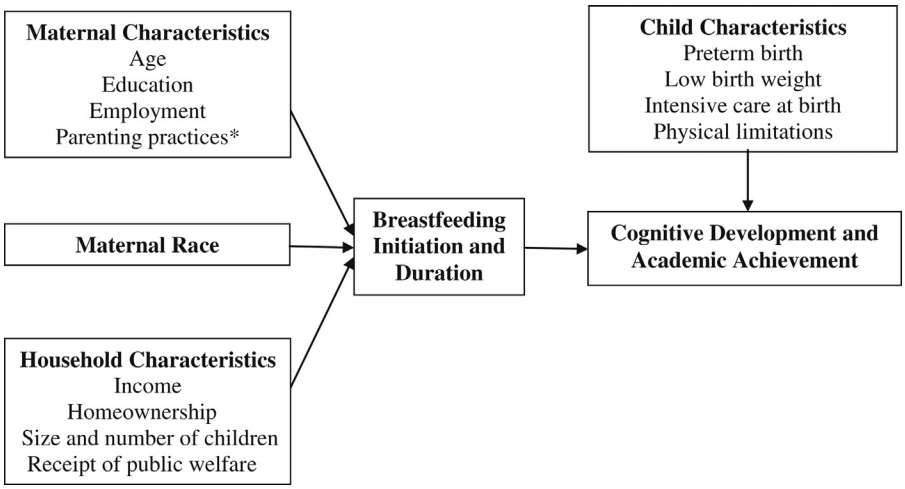

Fig. 1. Conceptual model of breastfeeding and academic achievement. * Parenting practices includes behaviors such as maternal warmth, emotional support, and cognitive stimulation.