Abstract

Breastfeeding has been proven to be beneficial for both mother and infant. Previous studies have supported these findings; however, few have indicated if breastfeeding has an impact on intelligence and more specifically test-taking ability. The purpose of this study was to determine if there is a correlation between breastfeeding and test performance among high school students. A correlational design was used to complete the process of this study. A convenience sample of approximately 365 11th grade students at a local high school was examined through the use of a questionnaire, and letter of consent completed by their parents. The submitted questionnaires were then compared with the corresponding 11th grade student’s PSAT results. The findings of this study showed a slightly positive correlation but did not prove to be clinically significant; therefore, further research is needed in this area.

Statement of Purpose

The purpose of this study was to determine if there is a correlation between breastfeeding and test performance among high school students. The study’s findings can be used to better educate the public about the benefits of breastfeeding and encourage new mothers to use this method of feeding.

Literature Review

The benefits of breastfeeding an infant have been researched since the early 1900’s. When a mother delivers her baby she is given the option of breastfeeding or formula feeding her baby. Breast milk is specially formulated by the mother’s body to fit the specific needs of her baby. It has been proven to boost the infant’s immune system by providing the mother’s antibodies. Breast milk has even been linked to increasing the intelligence of the infant throughout his or her childhood, and even into adulthood. This connection between breastfeeding and higher intelligence of the child has been researched throughout the 1900s, but still has not been declared as a definite fact, even though most of the research conducted on this topic reveals a positive correlation.

In April of 1996, Catherine R. Gale and Christopher N. Martyn published a study titled, “Breastfeeding, Dummy Use, and Adult Intelligence.” The purpose of their study was to “assess the relation between method of infant feed-
ing and adult intelligence.” All participants took part one of the AH4 IQ test on a computer and were also “interviewed and asked about their father’s occupation, their mother’s age at the time of birth, and their position in the birth order.” A significant difference in the IQ scores was detected between the three feeding groups, the highest of which being the strictly breastfed group, and the lowest being the strictly bottle-fed group (Gale et al., 1996).

Another study published by Michaelsen, Mortensen, Reinsch, & Sanders in the Journal of the American Medical Association in May of 2002 also looked at the correlation between breastfeeding and adult intelligence. Each subject was tested using the Wechsler Adult Intelligence Scale (WAIS) as well as the Borge Priens Prove (BPP) test. The results of this study showed a positive correlation between the length of breastfeeding, and the scores on both the WAIS and BPP tests. These results are significant due to the positive correlation that was demonstrated in two different sample groups, each using different intelligence tests (Michaelsen et al., 2002).

“Breastfeeding and Cognitive Development in Childhood: A Prospective Birth Cohort Study,” written in 2003, suggests “the association between the duration of full breastfeeding and cognitive outcome (verbal IQ and a performance subtest) measured at 6 and 8 years of age, taking into account several perinatal, social, and family factors” (Blair et al., 2003). The results of this study showed a positive correlation between the duration of breastfeeding, and cognitive development by a substantial IQ point elevation above children who were never breastfed (Blair et al., 2003).

The correlation between breastfeeding and intelligence has been studied for almost a century; however, a definite conclusion regarding this correlation has not yet been reached. This is a topic that can drastically affect future generations because a slightly positive correlation has been established. If mothers know that breastfeeding their baby for at least 6-9 months will increase their intelligence, they will most likely be more willing to breastfeed. For this reason, more research is needed in this area to support the correlation that breastfeeding has a positive effect on the intelligence of a child.

Research Question

The research question in this study is: Do infants who are breastfed demonstrate increased PSAT scores in their 10th grade year of high school over those who were formula fed?

Study Setting

This study setting was a local high school of approximately 1100 students in west Georgia. The study involved reviewing current eleventh grade stu-
A Correlational Study of Breastfed 11th Graders and PSAT Scores

dents’ PSAT scores from the previous year, and then correlating them with the survey completed by their parents.

Study Design

A correlational design was used to collect and analyze data from a convenience sample. A correlational design is most appropriate for this study because it allows to variables to show if they have a positive or negative relationship.

Sampling Procedure and Characteristics

The study was conducted through convenience sampling. Burns and Grove (2002, 248) describe convenience sampling as including subjects in the study because they happen to be in the right place at the right time. The sample included all 11th grade students at a local high school. Every 11th grader at this specific high school was required to take the PSAT during their sophomore year of school; therefore all 11th graders at the high school have taken the PSAT and received their scores. By way of this selection, approximately 365 subjects were chosen conveniently to be in this study, due to ease of accessibility, and meeting inclusion criteria.

The Data-Collection Strategies or Instruments

The data was collected through the use of a questionnaire. This questionnaire was designed by the researchers and is displayed in Appendix B. It contains nine, easy-to-answer, multiple choice questions, most of which require yes or no answers. The survey is directed towards the parents of the 11th graders, and is designed to take only 1-2 minutes to complete.

Plans for Storing, Retrieving, and Analyzing Data

The surveys were returned by the participating students directly to the head counselor of this high school. She then correlated the appropriate PSAT score with each survey and recorded that score on the survey. Since no identifying information is listed on the survey, they were then given to the researchers for analysis, and the consent forms were kept by the head counselor in a locked filing cabinet. After all data from the surveys was analyzed and recorded by the researchers, the surveys were destroyed via paper shredder. At the same time the consent forms kept by the head counselor will also be destroyed via paper shredder.

Ethical Considerations

All subjects chosen for the study were given a letter of informed consent, which was signed for participation in the study. The signed and returned letter of consent signified the subject’s agreement to participate in the study. Students with unreturned letters of consent were not included in the study. Each participating subject was kept anonymous to the public, and all information
retrieved from the subjects was kept confidential. Further measures to protect
the confidentiality and rights of participants included reviews by LaGrange
College IRB, as well as the principal of the participating high school.

**Timetable for the Conduct of the Study**

Once the researchers assembled all consent form and survey packets and
divided them to distribute to each homeroom teacher, approximately three days
were allowed to assume the survey packets have reached all homes of the 11th
grade students. A response date of March 1, 2006 was requested for return of
the consent form and the completed survey of the potential participants.
Assuming some participants disregard returning the survey by the appropriate
time, approximately one week past the requested return date was allowed before
beginning analysis of the data collection. The surveys were returned by the stu-
dent to the head counselor of this high school. She then correlated the participat-
ing student’s PSAT score to the survey they returned and wrote that score
directly on the survey. This process took one week for completion, and then the
surveys were handed over to the researchers for analysis of the data, while the
consent forms containing any identifying information remained with the head
ounselor in a locked filing cabinet. In summary, the conduction of the study
(from the time the questionnaires are distributed to the time analyzing data
begins) was completed over a 3 week timetable. After all data was analyzed and
recorded the surveys were destroyed by the researchers, and the consent forms
were destroyed by the head counselor, both via paper shredder.

**Budget and Statement of Resources Available or Needed**

The researchers provided the supplies for copies of the questionnaires and
consent forms that were distributed to each 11th grade student. They also pro-
vided one envelope per student for packaging of the consent form and survey, as
well as a manila envelope for each homeroom teacher to distribute the surveys.
Any additional costs or needs discovered throughout the study were provided by
the researchers performing this research study.

**Data Analysis**

After receiving 30 surveys back from the participating subjects, the
researchers analyzed the data and formed a conclusion based on the information.
The results showed a slightly positive correlation but did not prove to be clinica-
ly significant. Of the 30 subjects, 53% were breastfed, while 47% were not.
The highest possible raw score on the PSAT was 240. Those who were breastfed
had scores ranging from 110 to 183 on the PSAT. Scores ranged from 91 to 159
on the subjects who were not breastfed. A total of 56% of the subjects were
breastfed for less than 6 months. The remaining 44% were breastfed greater

Davis, Gamble, Humphries, Mitchell, Pendergrass

Citations
than 6 months. Twenty-three percent of those who answered the questionnaire felt there was a correlation between breastfeeding and test-taking ability. Other pertinent information gathered through the surveys provided useful information for nurses. Fifty percent of the parents who did not breastfeed felt they were not given adequate information regarding what feeding method is best. This is useful because it confirms that more education is needed among new mothers concerning feeding methods. Forty-two percent of the non-breastfed group stated they would breastfeed if given the opportunity. The researchers found that there was not enough information to prove that breastfeeding directly affected test-taking abilities. However, the researchers did determine that more research with a greater number of subjects and variables would be beneficial to nursing. Through this new information nurses would be able to provide valuable education to new and expectant mothers.

References
Appendix A

Dear Parents and Guardians,

A research study is in progress at LaGrange High School. As nursing students at LaGrange College, we have elected to study the effects of breastfeeding on test taking abilities of 11th grade students. A short survey of the feeding activities of your child during infancy and a comparison to their PSAT scores will enable us to perform this research.

In order to complete our research study, we would like to obtain access to your child’s PSAT score and compare it to the information reviewed from the survey. All information obtained during this study will be kept strictly confidential, as your privacy is of great concern. A numerical coding system will be used in place of names to pair the survey results with the PSAT score. In signing this consent form we will be allowed access to only your child’s PSAT score under the supervision of a LaGrange High School faculty member.

Much research and preparation has been completed prior to this nursing research project, and your participation would be greatly appreciated. Please sign below if you would like to allow us to access your child’s PSAT score, and complete the attached survey. The survey should be returned in the provided envelope by______. Thank you for your time and cooperation in helping us complete our goal. Your efforts are greatly appreciated.

Sincerely,
Senior Nursing Students
LaGrange College

Lauren Mitchell
Betsy Humphries
Janell Gamble
Erica Pendergrass
Katie Davis

I, _________________________, allow access to my child’s PSAT score for this undergraduate research project conducted by Lauren Mitchell, Betsy Humphries, Janell Gamble, Erica Pendergrass, and Katie Davis.

Parent Name___________________ Child’s Name_____________________

(Please Print) (Please Print)
Appendix B

Dear Parent,

Please answer the following questions to the best of your knowledge:

1. In your opinion, breastfeeding is better than formula for both mother and infant.
   a. True
   b. False

2. Did you breastfeed your 11th grade child as an infant?
   a. Yes
   b. No

3. If no, did you have any complications or barriers that kept you from breastfeeding?
   a. Yes
   b. No

4. If yes, how long did you breastfeed?
   a. Less than 1 week
   b. Less than 1 month
   c. Less than 6 months
   d. 6 months or more

5. If you breastfed less than 6 months, were there barriers or complications that caused you to stop?
   a. Yes
   b. No
   c. Not applicable

6. If 6 months or more, did you breastfeed exclusively to that point?
   a. Yes
   b. No
   c. Not applicable

7. Looking back, do you feel you received all the necessary information to make an informed decision on whether to bottle or breastfeed?
   a. Yes
   b. No

8. If you had the opportunity, would you choose the same method of feeding for your child?
   a. Yes
   b. No

9. In your opinion, do you think there is a correlation between breastfeeding and test-taking ability later in life?
   a. Yes
   b. No