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The impact of premature birth: A correlational study assessing the need for children to access
educational support services

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Abstract

Accumulating evidence suggests children born premature are at increased risk of lower cognitive abilities, poor academic performance, low social competence and behavioral problems, compared with individuals born full-term (e.g., Whitside-Mansell, Barrett, Bradley & Gargus, 2006; Litt, Taylor, Klein, & Hack, 2005) . The goal of the current study was to provide further analysis of the effects of premature birth, including how the amount of social support, parent education level, and family socioeconomic status may affect children accessing academic or behavioral support services in the school setting. Data was gathered from 84 parents/guardians of middle school-aged children in two Midwestern school districts, one urban and one rural. A parent survey including items about the gestation of their child, educational support services being used, if any, parental education, social supports, and overall family earnings were completed during parent-teacher conferences. A multiple linear regression was used to answer both research questions. Results indicated socioeconomic status and premature birth were contributing factors for children needing to access academic support services in school. Together these factors explained 13% of a child's need to access educational support services ($R^2 = .13$). Only socioeconomic status was found to contribute to children needing to access behavior support services in school, with 11% being attributed to this factor.

The impact of premature birth: A correlational study assessing the need for children to access educational support services

Advancements in science and technology have made it possible for premature infants born several months early to survive. With more premature infants surviving, it is important that we understand the long term affects these children may face, and what other factors contribute to the level of educational services they need, so they may be better served in our schools.

Litt, Taylor, Klein, and Hack (2005) stated that children born with very low birth weight (VLBW, <1,500 g) often face later developmental challenges such as deficits in cognitive abilities, behavior, and academic achievement. As such, the authors claim many studies indicate children with VLBW have higher rates of specific learning disabilities (LD) than those children born full-term. Additionally, Rose and Feldman (1996) revealed that IQ scores vary significantly depending on whether a child is born preterm or full-term, with full-term children having a mean IQ score of 98.9 and preterm children having a mean IQ score of 89.6. A similar study by Casey, Whitside-Mansell, Barrett, Bradley and Gargus (2006) revealed seven percent of children who were low birth weight, preterm (<2,500 g., <37 weeks gestation) scored more than two standard deviations from the mean on the Wechsler Intelligence Scale for Children-Fourth Edition, compared to only 1.9 percent of the normal growth group.

Regarding the effect that premature birth has on behavioral problems, Schapp, Wolf, Bruinse, Smolders-de Haas, van Ertbruggen, and Treffers (1999) looked at children who were born from 1984 to 1989 at the gestational age of 26 to 32 weeks. In their study, they found that 39% of the assessed children ($N=127$) were considered to have behavioral problems.

Additionally, Reigneveld, de Kleine, van Baar, Kollee, Verhaak, Verhulst, and Verloove-Vanhorick (2006) concluded that children who were born very preterm and very low birth weight

were more likely to score in the clinically significant range for behavioral and emotional problems on the *Child Behavior Checklist* than children in the general population (13.2% and 8.7%, respectively). The results of the study also reflected that the main difference between the two groups was largest for social and attention problems.

In contrast, it should be noted not every preterm child experiences difficulties such as these. Van Baar, Ultee, Gunning, Soepatmi, and de Leeuw, (2006) discussed how some preterm children with abnormal neonatal ultrasound brain scans show normal development, while some preterm children without neonatal brain scan abnormalities have developed many disabilities. It is still quite unclear what specific characteristics of development play a role in a preterm child's developmental outcome and level of functioning.

Considering the aforementioned information, it seems reasonable to assume premature children are more likely to receive support services in school. However, despite preterm children having higher rates of learning disabilities and other deficits, Litt et al. (2005) found there was not a significant difference between the rates of services/interventions (special education or tutorial/remedial assistance) in schools for the preterm and term children.

Purpose

The purpose of this study was to examine factors related to children accessing support services in schools. The target goal was to determine which factors seem to be most highly correlated to accessing educational support services – or which factors seem to aid in preventing the need for them. With the advancement of technology and more premature infants surviving, it was believed this would be crucial research for the years to come. Specifically, the hope is that this research will provide new insight into what preventative steps should be taken with children born prematurely, and with those risk factors identified by the study.

Ultimately, the objective of this study was to determine if a relationship exists between premature birth and the need for a child to access educational support services, and how social, educational, and financial factors may influence that relationship. This research was exploratory in nature. Though we believed that children born prematurely – and to parents that lack appropriate social, educational, and/or financial aspects in their lives – would correlate with the need for more assistance from educational support services, we hoped to determine which factor, or which set of factors, was most highly correlated to accessing educational support services. The following two specific research questions were developed:

- 1) Are the following factors – birth status, parent education level, amount of social support, and socioeconomic status – significantly related to a child’s need to access academic support services in school?
- 2) Are the following factors – birth status, parent education level, amount of social support, and socioeconomic status – significantly related to a child’s need to access behavioral support services in school?

Methods

Participants

Eighty-four participants were involved in this study. The participants were parents/guardians of middle school-aged children that attended two Midwestern schools. Of the surveys, 80.7 percent were completed in the rural setting. Additionally, 74.7 percent were completed by a female parent/guardian, and of the total number of parents and guardians completing the survey, 91.6 percent were biological parents.

A fairly even split was found in regard to the gender of the children examined, with 49.4 percent being male and 50.6 percent being female. Of these children, 24.1 percent were in 6th

grade, 36.1 percent in 7th grade, and 38.6 percent in 8th grade. The age of the children was entered as years and months, with the months in decimal format. Eleven children were marked as being premature, which comes out to 13.3 percent of the overall sample.

Materials

Each participant received a cover letter explaining the research study and a questionnaire to be completed and returned. Participants were asked about a variety of information regarding their child and their family. Specific variables studied include: parent gender, relationship of parent to the child, child's gender, child's age, child's grade, birth status (full-term or premature), education level of parents/guardians, support in raising child, income of family, child's academic needs, and child's behavioral needs. If a parent identified their child as premature, they were then asked how many weeks gestation their child was at birth. Also, if a parent had more than one child in middle school, they were told they could either choose one child to complete the survey on or they could complete a separate survey for each child. For specifics pertaining to the survey, a copy of the cover letter and questionnaire parents/guardians received is available for review in Appendix A.

Regarding the distribution of the sample, most of the variables fell within an acceptable range, meaning they adequately resembled the normal curve. However, there was one instance of skewness and four instances of kurtosis. The behavior variable was found to be positively skewed with a value of 3.075, which indicates a greater number of small values were recorded. In addition, the family support, home support, academic, and behavior variables were all found to have a positive kurtosis, with values greater than two. This means that the distribution was more peaked than normal; more of the values were close to the mean than would have been

expected. Overall, this means that when looking at these variables, the sample may not be completely representative of what is “normal.”

Procedure

The researchers obtained permission from the school district and building principals to hand out the surveys during their parent-teacher conferences. Discussion about placement of a table for researchers, building layout, rules/regulations of the school were discussed in advance. The researchers were able to set up near the entrance of each building in order to greet parents as they entered. The researchers found the most success in asking parents/guardians to fill out the surveys while they were waiting in line to meet with their child’s teacher. When the parents were approached they were asked to carefully read the cover letter, and if they felt comfortable to continue, to fill out the questionnaire. The researchers brought various clipboards with surveys attached to them to the sites in order to make completion of the surveys easier for parents. The researchers collected the completed questionnaires individually when possible, and a table and basket was also provided at the front of the building for parents to return the completed questionnaires if they were not collected in person. Using this procedure in both schools, a total of 84 participants were obtained.

Results

The following results were obtained from the study and are organized under each research question.

Are the following factors – premature birth, parent education level, amount of social support, and socioeconomic status – significantly related to a child’s need to access academic support services in school?

To answer this research question, a stepwise multiple linear regression was used. It was originally thought that premature birth, parent education level, amount of social support, and family socioeconomic status might all contribute to accessing academic educational support services; however, of these, it was found that socioeconomic status and premature birth were the only contributing factors. Together, these factors correlated at $R = .358$ in regards to accessing academic support services. Together they explain about 13% of a child's need to access this type of educational support services ($R^2 = .13$).

By itself, socioeconomic status, defined in the study by income level, was found to contribute significantly to a child's need to access academic educational support services with a small zero-order correlation ($r = -.286, p < .05$). The r squared of .082 indicates that, of what is known about a child's need to use educational support services, about 8% can be attributed to socioeconomic status. Socioeconomic status was found to negatively contribute to services needed, as income increased, need for services decreased.

Additionally, the r squared of premature birth was .046, contributing 5% of the variance of a child's need to access academic educational support services. Premature birth also negatively contributed to services needed. As birth status changed from premature to full-term, need for services declined.

Are the following factors – premature birth, parent education level, amount of social support, and socioeconomic status – significantly related to a child's need to access behavioral support services in school?

To answer this research question, another stepwise multiple linear regression was used. It was originally thought that premature birth, parent education level, amount of social support,

and socioeconomic status might all contribute to accessing behavioral support services; however, of these, it was found that only socioeconomic status was a contributing factor.

Socioeconomic status was found to have a medium zero-order correlation ($r = -.329$, $p < .05$). The r squared of .108 indicated that, of what is known about a child's need to use behavioral support services, about 11% can be attributed to socioeconomic status.

Socioeconomic status was found to negatively contribute to services needed, as income increased, need for services decreased.

Discussion

The results of this study suggest family socioeconomic status and premature birth were contributing factors for children needing to access academic support services, while family socioeconomic status was the only factor for children needing to access behavioral support services in school. Although only these factors were contributors to children accessing academic/behavioral support services, there are various other factors not studied in this research that may also contribute.

These findings seem to be consistent with previous research suggesting preterm children face more difficulties with cognitive abilities (e.g., Casey et al., 2006; Litt, et al., 2005; Rose & Feldman, 1196). Perhaps the most important finding of the current study was that preterm birth status correlated significantly with support services access. Nonetheless, this very finding is inconsistent with Litt et al. (2005) who determined there was not a significant difference between the rates of services/interventions in schools for the preterm and term children. However, the literature differed from the current study in many ways which may have led to these contradictory results. For example, in Litt et al. birth weight was used to determine groups; it looked specifically at services needed in regard to learning disabilities in the areas of reading and

math, and it did not include behavioral issues as a possible means of need for additional educational services.

Additionally, our study did not identify premature birth as a contributing factor in children needing behavioral support in school. However, previous research suggests that premature birth does have an affect on children developing social, emotional, and/or behavioral problems and further research in this area should be considered. One explanation for these inconsistencies may be our limited sample size in which only eleven students were identified as preterm.

Although it was determined that premature birth and a family's socioeconomic status contributed to children needing to access educational services, the following limitations to this study should be noted. First, the population sample was limited to only two districts, minimizing the number and diversity of participants. Specifically, according to 2004-2005 census data, the majority of students attending the rural school – where most of our data was collected – were identified as Caucasian (91.3%); at the urban school less than half (48.1%) were identified as Caucasian. Richfield also had an equal distribution of Latino (21%) and African American students (21.5%) whereas Northfield's largest minority group was composed of Latino students (6.3%).

Furthermore, as previously discussed in the Methods section, several variables (behavioral, academic, family support, and home support) were either skewed and/or had significant kurtosis. The sample may not be completely representative of what is “normal,” thus limiting the degree to which results on these variables can be attributed to the population as a whole.

Additionally, though it was found that as birth status changed from premature to full-term the need for services declined, the small sample size of those identified as premature ($N = 11$) greatly limits our ability to generalize the findings to the population as a whole. Due to this, further research in this area is highly recommended in order to better identify those factors that influence a premature child's need to access academic and/or behavioral supports in school. For example, a specific limitation to the present study was the manner in which preterm children were identified. The current study survey simply asked the parent/guardian to select whether the child was full-term or premature. If the child was premature, they were asked to write in weeks gestation. However, to obtain solid data that could be more easily compared to other related research, a recommendation for similar studies would be for the survey to ask for weeks gestation of every child, allowing the researcher to later determine the child's birth status, based on medical definitions. Also, a question should be added in regard to the child's birth weight. Adding and/or changing these survey questions would allow for more complete analysis of data and would also provide the opportunity to look at children born after full gestation (40 weeks) and/or with high birth weights to see how they compare.

Furthermore, additional research should be gathered on premature birth and the possible behavioral effect, as our data was inconsistent with previous findings. Also, due to the significant role of socioeconomic status, defined by family income in the current study, in both need for academic and behavioral supports, it is seems vital that further research be done on preventative and intervention strategies for children who come from lower socioeconomic backgrounds. One suggestion for further research would be to obtain more specific information regarding the child: the types of behavioral difficulties he/she is having, weeks gestation, and/or birth weight. For example, obtaining data from a *Behavioral Assessment System for Children, Second Edition*

(Reynolds & Kamphaus, 2004) would allow the researcher to determine possible common areas of problem-behavior (e.g., attention, conduct, depression) for children of a certain gestation or birth-weight range. Analyzing specific behavioral difficulties together with either birth weight and/or weeks gestation may encourage the creation of more useful, problem-specific preventative and/or intervention strategies. While this type of comprehensive data collection may be more difficult to obtain, the results would better indicate the specific areas impacted.

In summary, our findings help support the previous literature that suggests children born prematurely may face more academic difficulties and need more academic support in the school system. However, it still seems unclear the role premature birth has on the need for behavioral support. Also remaining unclear are the characteristics that determine whether a preterm child may need educational support services. While it seems socioeconomic status may play a role in the level of academic and behavioral supports needed, this finding is not specific to preterm children.

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Appendix A

Dear Parent,

We are graduate students in the school psychology program at the University of Wisconsin – River Falls. As part of our graduate program, we are conducting a research study and are interested in some background information regarding you and your child.

The purpose of this study is to better understand what factors may contribute to the level of educational support services needed by children. The following questionnaire asks several questions regarding your child and your family. Your participation in this survey is voluntary and completely anonymous. By completing and returning the questionnaire to us, you are giving your consent to be involved in the research. You should be able to complete the questionnaire about 5 minutes. We encourage you to answer all the questions to the best of your knowledge, although you have the right to discontinue participation at any time for any reason.

The risks to you are minimal, though you may encounter some level of discomfort when answering personal questions regarding your family situation. However, we believe the information you provide will be of great use in identifying various factors that may contribute the level of educational support that children need, which in turn could be valuable in creating preventative strategies.

This research project has been approved by the UW – River Falls Institutional Research Board for the Protection of Human Subjects, protocol # H06-77. If you have any concerns about how you were treated in this study, please contact: Dr. William Campbell, Director of Grants and Research, 104 North Hall, UW-RF, (715)425-3195.

We realize your time is limited and valuable. We greatly appreciate your participation.

Thank you, Laura Jensen & Rebecca Miller

Parent Survey: Please answer the following questions about you and one of your children.

1. Your gender: ___ Male ___ Female
 Your relation to the child:
 ___ Biological Parent
 ___ Adoptive Parent
 ___ Step Parent
 ___ Grandparent
 ___ Other (please specify) _____
2. Your child's gender: ___ Male ___ Female
3. Your child's age: ___ Years ___ Months
4. Your child's grade: ___
5. Your child was ___ full term or ___ premature (___ weeks gestation).

6. Place a checkmark in front of the level of education for the following:

| | |
|-------------------------------|-------------------------------|
| <u>Parent/Guardian 1</u> | <u>Parent/Guardian 2</u> |
| ___ Less than HS | ___ Less than HS |
| ___ G.E.D. | ___ G.E.D. |
| ___ H.S. | ___ H.S. |
| ___ Associate's Degree | ___ Associate's Degree |
| ___ Bachelor's Degree | ___ Bachelor's Degree |
| ___ Graduate Degree or higher | ___ Graduate Degree or higher |

7. Please rate the level of support in raising your child that you receive from others.

| | <u>Never</u> | <u>Occasionally</u> | <u>Sometimes</u> | <u>Most of the time</u> | <u>Always</u> |
|---|--------------|---------------------|------------------|-------------------------|---------------|
| I feel I have the support of my family. | 0 | 1 | 2 | 3 | 4 |
| I feel I have the support of my friends. | 0 | 1 | 2 | 3 | 4 |
| I feel I have the support of co-workers. | 0 | 1 | 2 | 3 | 4 |
| I feel I have the support of neighbors. | 0 | 1 | 2 | 3 | 4 |
| I feel I have support from another adult in the home. | 0 | 1 | 2 | 3 | 4 |

8. Please place a checkmark in front of your approximate family income.
 - ___ 0 – 14,999
 - ___ 15,000 – 34,999
 - ___ 35,000 – 54,999
 - ___ 55,000 – 74,999
 - ___ 75,000 – 99,999
 - ___ 100,000 and higher

9. Place a checkmark in front of the statement that most closely resembles your child's **ACADEMIC** educational services.

Child does well independently. No out of the ordinary educational support for academics is required at this time.

Child currently receives occasional regular education teacher support in his/her regular education classroom for academic struggles (for example: extra reminders, prompts, adjusted assignments, etc. that are slightly beyond other children).

Child currently receives some regular education support for academic struggles (for example: structured intervention in the classroom, tutoring).

Child currently receives many educational services for academic struggles (for example: 504 plan is needed and used, several interventions in place).

Child currently meets special education criteria for one or more disabilities. Moderate special education support is required.

Child currently meets special education criteria for one or more disabilities. Significant special education support is required.

10. Place a checkmark in front of the statement that most closely resembles your child's **BEHAVIORAL** educational services.

Child does well independently. No out of the ordinary educational support for BEHAVIOR is required at this time.

Child currently receives occasional regular education teacher support in his/her regular education classroom for BEHAVIORAL struggles (for example: extra reminders, prompts, discipline, etc. that are slightly beyond other children).

Child currently receives some regular education support for BEHAVIORAL struggles (for example: structured intervention in the classroom).

Child currently receives many educational services for BEHAVIORAL struggles (for example: 504 plan is needed and used, counseling or group intervention in place).

Child currently meets special education criteria for a disability related to his/her BEHAVIOR. Moderate special education support is required.

Child currently meets special education criteria for a disability related to his/her BEHAVIOR. Significant special education support is required.