THE HEALTH DATA PROJECT: STUDENT-FAMILY HEALTH AND ACADEMIC ACHIEVEMENT

2018

Introduction

Academic achievement of school-age children, as measured by the National Assessment of Educational Progress, has improved over time (Bohrnstedt et al., 2015). However, the persistent achievement gap between high and low performing children, particularly the disparate achievement of White students and their Black and Hispanic peers and between children from moderate to high income families and children of low-income families, suggests the importance of continuing to innovate coordinated education strategies. One component of an optimally coordinated education program is integrating learning and health for the purpose of promoting the cognitive, physical, social, and emotional development of every child (CDC, 2015). Children who are experiencing physical or emotional pain cannot fully engage in the classroom and miss class time due to absences and/or visits to the school nurse (Dunkle & Nash, 1991).

Research has established the link between student health and academic achievement; notably, as compared to healthy students, students with poor health perform worse in school (Forest et al, 2011; Lavin, Sapiro & Weill, 1992; Novello, Degraw & Kleinman, 1992; Swingle, 1997; Symons, Cinelli, James & Groff, 1997). In addition, poor health increases the frequency of visits to the school nurse, leads to increased student absences which, in turn, leads to progressively lower academic ability (Joost et al, 1993; Leaver, 2014). Beyond an established linkage, however, the extent of the impact of poor student health on academic performance is still uncertain. Consequently, important education policy decisions and school-based interventions have relied on studies restricted primarily to measures of absenteeism and nurse report of student health (Maughan, 2003). However, for a complex problem such as student health, data from absenteeism and nurse report alone are not sufficient to predict student academic achievement.

Partnership Description

This project addressed important physical and behavioral gaps by combining the resources of the educational community with those of the mental and behavioral health community. The impact of reported student health problems (physical and mental/behavioral) on academic achievement measured by longitudinally assessed student performance on a standardized assessment of academic achievement has proven to be meaningful. Ongoing research represents a significant first step in understanding differences in how health impacts academic achievement, and how interventions (both academic and social emotional) can provide increases in both academic achievement and health outcomes.

Through data analysis in social determinants screenings and school-based health center encounters, the educational institution can screen and identify the highest-risk population of students (and their families). This population can be assisted by both communities (school and mental/behavioral health) both during the school day and outside of the school day. These identified families receive increased attention during the school day with supplemental academic instruction and benchmarked assessments to closely monitor and academic weaknesses as they arise. At the same time, home-based supports can be applied through mental behavioral services alongside supportive school-based home visits.

This wrap around model would be unique in its ability to leverage cross-sector data to assist families in crisis, providing comprehensive supports that would be otherwise disconnected.

Program Questions

- Will cross sector coordination between health and education provide measurably positives outcomes of a school's highest-risk population?

- Is student academic achievement, retention, and attendance impacted by coordinated, cross-sector student health (physical or mental/behavioral) supports.

Initial Data Source

This program is based on an initial study using data collected by the Community Health Network across multiple school years from 2013-14 to 2016-17. The data contained 622 third to eighth graders who reported a total number of 8949 physical and mental health visits.

Key Variables / Studies Factors

To examine the questions posted in this program, a dataset was constructed that included student demographics such as gender, race/ethnicity and grade, the number of visits to the school nurse, the outcome of these visits, and student scores on Acuity, a standardized assessment of student academic achievement. Specifically, student acuity scores as well as their class averages were collected as measures of student academic achievement. The Acuity assessment is administered longitudinally at three time points of the year (i.e., beginning, middle, and end of the year) in two subject areas: math and English language (ELA). In addition to the acuity scores, class averages were also calculated.

Students health data was also categorized by the reasons that students visit the school nurse. In this study, visit reasons were collected by 16 categories (excluding regular RX and OTC medication reasons): (1) Cardiovascular, (2) Dental, (3) Dermatological, (4) Eye/Ears/Nose/Throat, (5) Endocrine, (6) Gastrointestinal, (7) Genitourinary, (8) Gynecological/Obstetrical, (9) Musculo/Skeletal, (10) Nutrition/Metabolic, (11) Neurological, (12) Parasites/Infections, (13) Disorder from Physical Agents, (14) Psychosocial, (15) Respiratory, (16) Other/Miscellaneous.

Results

It is important to note that the majority of the visits to the school nurse were related to health issues that could be considered Social Determinants of Health, or *diseases of poverty*. These determinants/diseases are often associated with stress, poor diet or poor sleep habits. In the dataset described in this research, it was found that gastrointestinal issues made up 16% of the sample, while neurological and dermatological reasons made up another larger proportion (10% and 12%, respectively). These categories included acid reflux, rashes, headaches and other health issues that are reflective of a student whose stress is manifesting itself in bodily illness.

Distribution of Nurse Visit Reasons

	2013-17		2013-14		2014-15		2015-16		2016-17	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Cardiovascular	9	0.10			8	0.30			1	0.00
Communicable/ Reportable Diseases	35	0.39	33	2.80					2	0.10
Consult with MD/Other Provider	1	0.01					1	0.10		
Dental	278	3.11	8	0.70	48	1.80	71	3.80	151	4.70
Dermatological	1070	11.96	59	5.00	245	9.00	240	12.80	526	16.50
Disorder from Physical Agents	1	0.01			1	0.00				
Endocrine	223	2.49	108	9.20	76	2.80	20	1.10	19	0.60
Eye/Ears/Nose/Throat	1374	15.35	114	9.70	374	13.80	365	19.50	521	16.30
Gastrointestinal	1450	16.20	87	7.40	472	17.40	323	17.30	568	17.80
Gynecological/Obstetrical	248	2.77	9	0.80	4	0.10	87	4.60	148	4.60
Immune System (Allergies)	16	0.18	3	0.30			12	0.60	1	0.00
Muscular/Skeletal	974	10.88	63	5.40	336	12.40	219	11.70	356	11.20
Neurological	934	10.44	60	5.10	277	10.20	170	9.10	447	13.40
Nutrition/Metabolic	10	0.11	1	0.10	7	0.30	1	0.10	1	0.00
Parasites/ Infections	57	0.64	23	2.00	12	0.40	10	0.50	12	0.40
Psychosocial	12	0.13	3	0.30	4	0.10	4	0.20	1	0.00
Respiratory	716	8.00	150	12.70	288	10.60	108	5.80	170	5.30
Genitourinary	89	0.99	6	0.50	8	0.30	20	1.10	55	1.70
Consult with Parent/Caregiver	23	0.26					23	1.20		
School Physical	1	0.01					1	0.10		
Other	590	6.59	28	2.40	139	5.10	190	10.20	233	7.30
NULL	838	9.36	422	35.90	410	15.10	6	0.30		

ORIGINAL STUDY: The Relationship between Health and Academic Achievement

One of the main questions being addressed in this original research was whether student health, as measured by visits to the school nurse, impacts academic achievement as measured by the Acuity standardized assessment. To examine this question a linear regression model was used to

determine the degree to which the number of visits to the school nurse affected scores on the Acuity assessment.

The linear regression revealed that academic performance in the language arts was lower among children with more frequent school nurse visits in 2013-14 (β = -0.19, p = 0.01) and 2015-16 (β = -0.42, p = 0.01, and that academic performance in Math was also lower among children with more frequent school nurse visits in 2013-14 (β = -0.15, p = 0.03). Simply put, there is a negative correlation between the number of visits to the school nurse and Acuity scores—as the number of nurse visits increases, Acuity scores decrease. This pattern was found in the Language Arts in the 2013-14 and 2015-16 academic years, and in Math in the 2013-14 academic year, as can be seen in the following table.

	2013-14		2014-15		2015-16		2016-17	
	β	Std. Error	β	Std. Error	β	Std. Error	β	Std. Error
Language Arts	-.19*	0.072	X	X	-0.42*	.16	X	X
Math	-.15*	0.06	X	X	X	X	X	X

Discussion

One goal of the initial research was to determine whether the frequency of visit to the school nurse was impacted by factors such as gender, race/ethnicity or grade. The analyses suggest that there are differences in the percentage of times students of different gender, race and grade visit the school nurse. The data suggests that Black students visit the school nurse more frequently than other students. It is important to note, however, that this finding bears further examination due to the fact that demographic breakdown of students by race/ethnicity at PSOE is only slightly lower than the number of students who visit the school nurse when it is broken down by race/ethnicity.

The main question of this current collaborative program is whether student academic achievement is impacted by student health (physical or mental/behavioral). For that question, this research suggests that there is a significant negative correlation between academic achievement and the number of visits a student makes to the school nurse. Specifically, 2 out of 3 years of available data shows that there is a significant correlation between achievement in language arts and number of visits to the school nurse, and data from 1 out of 3 years shows a similar pattern for mathematics.

The overall results of this study are encouraging and suggest that additional research would be valuable and would add to the body of knowledge regarding health and academic success. Additionally, this work is valuable in that it reflects a collaborative design that is responsive to the needs and concerns of students, families and educators. In addition to enhancing the

partnership between the school, community, and health partners, this work has important implications for improving student education outcomes and family outcomes. Specifically, further exploration of the impact of educational interventions targeted to students and families with multiple visits to the school nurse or positive responses to social determinants of health screeners could reveal efficient entry points for offering a student (and their family) additional help before any educational and emotional deficits have time to fully impact the student's future.

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