

RESEARCH ARTICLE

The Relationship Between School-Based Health Centers, Rates of Early Dismissal From School, and Loss of Seat Time

MAUREEN VAN CURA, EdD, MS, FNP

ABSTRACT

BACKGROUND: This study sought to understand the relationship between school-based health centers (SBHCs) and academic outcomes such as early dismissal and loss of seat time (the time students are available in school to learn or to access support services).

METHODS: A quasi-experimental research design was used to compare rates of early dismissal and loss of seat time between students who received SBHC and traditional school nursing services and students who received only traditional school nursing services. This study was a secondary data analysis of 764 “walk-in” visits during a 3-week period in 2 urban high schools in western New York state. Both schools provided school nursing services, and 1 of the 2 offered the option to enroll in an SBHC.

RESULTS: SBHCs significantly reduced the number of early dismissals from school ($p = .013$) in a comparison with students who received school nursing services alone. Students not enrolled in an SBHC lost 3 times as much seat time as students enrolled in an SBHC. Race, gender, age, poverty status, and presence of a preexisting illness did not influence these findings.

CONCLUSIONS: These findings suggest that SBHCs have a direct impact on educational outcomes such as attendance. Recommendations for further research include replication of this study to increase confidence in its findings and using early dismissal and loss of seat time as indicators of attendance to measure other health outcomes related to SBHCs and school nursing.

Keywords: school-based clinics; child and adolescent health; evaluation.

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Assistant Professor, (mvancura@sjfc.edu), Wegman's School of Nursing, St. John Fisher College, 3690 East Avenue, Rochester, NY 14618.

Address correspondence to: Maureen Van Cura, (mvancura@sjfc.edu), Assistant Professor of Nursing, St. John Fisher College, 3690 East Avenue, Rochester, NY 14618.

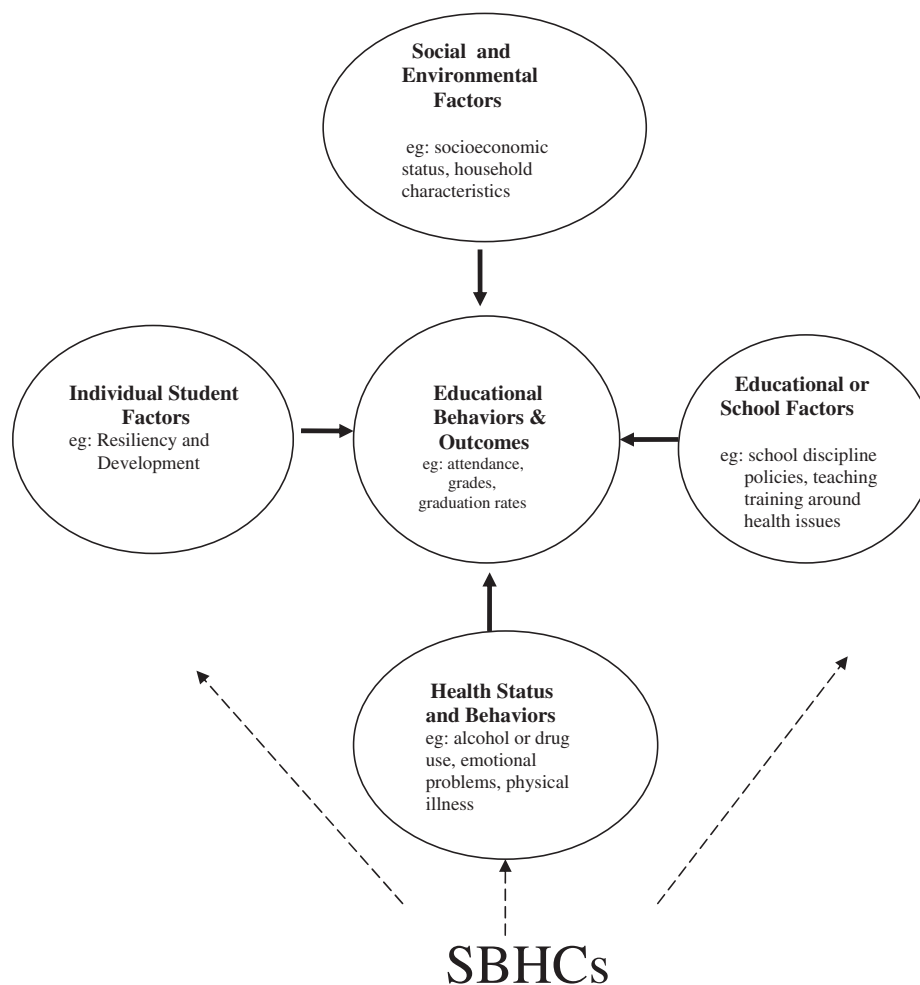
In the United States, decreasing rates of high school graduation and increasing dropout rates have prompted a reevaluation of our academic system. Mandates such as No Child Left Behind have challenged US schools to assess all of their programs, including school-based health centers (SBHCs), for the contribution they bring to the academic setting. Although the literature is overwhelmingly positive about the relationship between services provided by SBHCs and improved health care outcomes such as better management of chronic health conditions, decreased use of emergency room services, fewer hospital stays, and increased access to health care,¹⁻⁷ findings on the relationships between SBHCs and academic outcomes have been weak and inconsistent.⁸⁻¹⁰

In a meta-analysis whose results were published in 2004, Geierstanger et al¹⁰ examined the relationship between SBHC services and academic outcomes and

found either a weak relationship or no association at all for outcomes such as better attendance, improved test scores, and higher grade point average. On the other hand, these investigators found that SBHCs indirectly supported the education environment by intervening on intermediate outcomes such as the use of alcohol, tobacco, and drugs; mental health problems; and high-risk sexual behavior. The findings from this meta-analysis were used to develop a conceptual framework and to guide a roundtable discussion about the relationship between SBHC services and academic outcomes that was convened at the National Assembly on School-Based Health Care.⁸

This framework (Figure 1) shows the multiple factors that influence academic outcomes and portrays SBHCs as providing an indirect influence on academic behaviors and outcomes by supporting the learning environment.

Figure 1. School-Based Health Center and Academic Performance Conceptual Framework. Note: From Geierstanger and Amaral.⁸ School-based health centers and academic performance: What is the intersection? April 2004 Meeting Proceedings. White Paper. National Assembly on School-Based Health Care; Washington, DC. Reprinted with permission



Intuitively, one would believe that enrollment in an SBHC, with its provision of primary health care services, would increase school attendance rates. Determining whether this is actually true, however, is not an easy task, in large part because of inconsistencies in how attendance data are collected. A better way to find out whether school health services actually increase attendance may be to measure rates of early dismissal from school and loss of seat time (a decrease in the time that students are available in school to learn or to access support services such as those from the school counselor, social worker, or psychologist).⁸ In the present study, rather than looking at school attendance records, we chose to use the health records of the school nurse and of the SBHC to assess time away from school. Our purpose was to bring further clarity to the relationship between SBHC services and attendance, in this case by using alternative outcome variables.

METHODS

Because urban high schools are challenged by a disproportionate number of minority students with lower socioeconomic status, this study was carried out in 2 such schools.

Research Questions

The principal research questions were the following:

1. Do students enrolled in a secondary-level SBHC have lower rates of early dismissal from school than students who receive only traditional school nursing services?
2. Do students enrolled in a secondary-level SBHC lose less seat time due to fewer early dismissals from school than students who receive only traditional school nursing services?

Methodology

A quasi-experimental method with a nonequivalent control group design was used. A convenience sample from 2 urban high schools in western New York state was used to compare early dismissal rates and loss of seat time between students enrolled in an SBHC and students who received only traditional school nursing services. Students enrolled in the SBHC in school A were the experimental group (85% of the students in that school were enrolled in the SBHC). This experimental group was compared with 2 groups that received traditional school nursing services only: (a) students from school A who were not enrolled in the SBHC and (b) students in school B.

A demographic comparison between school A, school B, and the school district is shown in Table 1.

School nursing services in both school A and school B were provided by 1 full-time registered

Table 1. Comparative School Demographics

| | City School District, N = 32,717 (%) | School A, N = 1989 (%) | School B, N = 1192 (%) |
|------------------------------|---|---------------------------|---------------------------|
| Gender | | | |
| Male | 16,663 (50.9) | 1080 (54.3) | 662 (55.5) |
| Female | 16,054 (49.1) | 909 (45.7) | 530 (44.5) |
| Race | | | |
| Black | 21,405 (65.4) | 1350 (67.9) | 746 (62.6) |
| Hispanic | 6891 (21.1) | 406 (20.4) | 213 (17.9) |
| Caucasian | 3673 (11.2) | 203 (10.2) | 151 (12.7) |
| Asian | 572 (1.8) | 26 (1.3) | 76 (6.4) |
| Native American | 106 (0.3) | 4 (0.2) | 6 (0.4) |
| Multiracial | 70 (0.2) | — | — |
| Non-White | 88.8 | 89.8 | 87.4 |
| Poverty status* | 81.2% | 78.4% | 79.6% |
| Age (years) | | | |
| 12-14 | — | 797 (40.1) | 390 (32.7) |
| 15-17 | — | 910 (45.7) | 631 (52.9) |
| 18-21 | — | 282 (14.2) | 171 (14.4) |
| Attendance rate [†] | | 84.6% | 85.2% |

Compares demographics from school year 2007-2008 between school A (has an SBHC), school B (no SBHC), and the city school district.

*Percent students who qualified for a free or reduced lunch.

[†]Rates from 2006 to 2007 school year.

nurse and 1 full-time nurse's aide throughout the school year. In addition, the SBHC (within school A) employed 3 full-time nurse practitioners, 1.5 full-time medical assistants, a full-time billing specialist, and a part-time on-site coordinator. Thus, school A had both school nurse and SBHC services available throughout the school day.

Key Terms

Because the school day includes not only educational time but also time for support services, seat time, as indicated above, was defined as the time students were available in school to learn or to access support services. Early school dismissal was defined as a health-related event during the school day that required a student to leave school before the end of the school day. This dismissal, or approval, to leave the school was based upon an evaluation of the event by the school health center (either the SBHC or the traditional school nursing service). The term "Enrolled in an SBHC" indicates that the student had received written permission from her/his parent(s) or guardian to receive health care from the SBHC.

Participants

Participants included a convenience sample of all students in schools A and B who received school health services between December 1, 2007, and December 21, 2007. To be a part of the study, students had to enter the health center in 1 of the 2 schools for a health-related problem. Those who entered the

health center for reasons not related to their personal health, such as needing a safety pin, clean clothes, administrative forms, or feminine hygiene products, were excluded. In addition, students who entered the health center for requalification to play sports or for preventive screenings for concerns such as scoliosis, vision, or hearing were excluded.

Instruments

Data on early dismissal were collected on the Welligent school health electronic medical system (<http://www.welligent.com>), which was maintained by the school nurses and school health aide. This system collected data on all students who entered the health center (the SBHC or the regular school nursing center); among the items captured were the reason for the visit and the care that was provided. School health staff were careful to accurately complete the Welligent electronic school health record, as the data are important for several reasons: (a) the record validates where students are at particular times during the day and is an important resource for administrators and teaching staff, (b) the school district has made it a priority for employees to accurately document health visits because Medicaid reimbursement is tied directly to provision of services, and (c) the information on the record is used to complete quarterly state reports for the SBHC.

To access demographic, attendance, and health care information, approval was received from the city school district that provided school nursing services and the health care organization that provided SBHC services to the students.

Visits that met the inclusion criteria for the 3-week study period were entered into Statistical Program for the Social Sciences (SPSS, SPSS Inc., Chicago, IL). In addition to the Welligent system, sources of data included enrollment registration records from the city school district and medical records from the SBHC. Each student was assigned a numeric code generated from a random list of numbers. Variables entered into SPSS included gender, race, age, eligibility for free or reduced lunch, health problems per the medi-alert list, SBHC enrollment status, date of SBHC enrollment, date of service, whether the student was referred to the SBHC, disposition after service (return to class, early dismissal from school, or need for emergency care [call 911]), and time of day the student entered and exited the health center. Data on eligibility for free or reduced lunch are used by the school district as an indicator of poverty status.

The SBHC medical record was reviewed for each student referred to the SBHC. An early dismissal was determined by the presence of documentation in the Welligent system by school health employees or in the SBHC student medical record by nurse practitioners.

For each student dismissed prior to the end of the school day, loss of seat time was calculated (regardless of SBHC enrollment status) as the elapsed time from when the student entered the health center until the official end of the school day.

Data Analysis

A demographic comparison of student visits within the 3 groups (1 experimental, 2 comparison) did not find a significant difference between them by poverty status ($p = .052$; $\chi^2 = 5.910$, $df = 2$). In contrast, a significant difference was found by race ($p = .001$; $\chi^2 = 27.132$, $df = 8$), age ($p = .000$; $F(8,761) = 5.30$), and gender ($p = .005$; $\chi^2 = 10.533$, $df = 2$) (Table 2).

For research question 1, all student visits were coded as either returned to class (code 1) or received an early dismissal (code 2). Six visits were coded as "missing" in the analysis because of an early dismissal due to a requirement for emergency medical services. The total number of analyzed visits ($N = 764$) by group was as follows: school A (not enrolled in the SBHC): $n = 91$ (of 92, 1 missing); school A (enrolled in the SBHC): $n = 351$ (of 355, 4 missing); and school B: $n = 322$ (of 323, 1 missing).

The frequency tabulation for each study group is shown in Table 3; the table provides both the actual count and the expected count for students who returned to class versus those who received an early dismissal. A significant relationship at the .05 level ($p = .013$) was found between the study groups and rates of early dismissal ($\chi^2 = 8.614$, $df = 2$). A review of actual counts and expected counts for rates of early

Table 2. Demographics of Health Service Users by Total Visits

| | School A Enrolled Visits N = 355 (%) | School A Nonenrolled Visits N = 92 (%) | School B Nonenrolled Visits N = 323 (%) |
|-----------------|---|---|--|
| Gender | | | |
| Male | 150 (42.3) | 56 (60.9) | 156 (48.3) |
| Female | 205 (57.7) | 36 (39.1) | 167 (51.7) |
| Race | | | |
| Black | 245 (69.0) | 69 (75) | 204 (63.2) |
| Hispanic | 75 (21.1) | 13 (14.1) | 55 (17.0) |
| Caucasian | 35 (9.9) | 10 (10.9) | 50 (15.5) |
| Asian | 0 | 0 | 13 (4.0) |
| American Indian | 0 | 0 | 1 (0.3) |
| Poverty status* | 84.2% | 80.4% | 89.2% |
| Age (years) | | | |
| 12-14 | 153 (43.1) | 51 (55.4) | 91 (28.2) |
| 15-17 | 167 (47.0) | 39 (42.4) | 190 (58.9) |
| 18-21 | 35 (9.9) | 2 (2.2) | 42 (12.9) |

Walk-in visits to school health center by enrollment in SBHC from December 1, 2007 through December 31, 2007. School A has an SBHC; not all students are enrolled in the SBHC. School B does not have an SBHC. Schools A and B have school nursing services.

*Percent of student who qualified for a free or reduced lunch.

Table 3. Cross-Tabulations Between Study Groups and Early Dismissal Rates

| Study Group | Returned to Class | Received Early Dismissal | Total |
|------------------------|-------------------|--------------------------|-------|
| School A: enrolled | | | |
| Count | 340 | 11 | 351 |
| Expected count | 331.2 | 19.8 | 351 |
| School A: not enrolled | | | |
| Count | 82 | 9 | 92 |
| Expected count | 85.9 | 5.1 | 91 |
| School B: no SBHC | | | |
| Count | 299 | 23 | 322 |
| Expected count | 303.9 | 18.1 | 322 |
| Total | | | |
| Count | 721 | 43 | 764 |
| Expected count | 721 | 43 | 764 |

Table 4. Univariate Analysis of Early Dismissals by Group

| | df | F | Significance |
|----------------|----|-------|--------------|
| Study group | 2 | 4.078 | .017 |
| Age | 1 | 0.000 | .989 |
| Gender | 1 | 0.409 | .523 |
| Race | 1 | 1.677 | .196 |
| Poverty status | 1 | 0.002 | .967 |

Relationship between study group and early dismissal rates significant at .05 level. Analysis controlled for by age, gender, race, and poverty level.

dismissal and return to class for each group indicated that students enrolled in an SBHC were significantly more likely to return to class or not to be dismissed early from school than students not enrolled in an SBHC. A univariate analysis showed that these findings were not influenced by age, gender, race, or poverty level (Table 4).

Research question 2 was answered by computing loss of seat time for each student who entered the health center, received an early dismissal, and was then sent home or to another health care provider.

Loss of seat time was analyzed from 2 perspectives: a comparison of the 3 groups on mean loss of seat time and a comparison of actual loss of seat time to total possible loss of seat time within each group. In all, the 3 groups had 43 early dismissals. An analysis of variance (ANOVA) was used to compare the mean loss of hours between the 3 groups (Table 5); the differences between the means were not statistically significant ($p = .183$; $F(2,40) = 1.773$).

For the comparison of actual loss of seat time to total possible loss of seat time, the latter value was calculated using the assumption that every student with a health visit was sent home. Within each of the 3 groups, actual loss of seat time was divided by possible loss of seat time to provide a percentage. On this comparison, students not enrolled in an SBHC lost 3 times as much seat time as students enrolled in an SBHC (Table 6).

Table 5. Mean and Standard Deviation of Loss of Seat Time for 3 Study Groups

| Group | Mean (hours) | Standard Deviation |
|--------------------------------|--------------|--------------------|
| School A: enrolled (N = 11) | 2.73 | 1.58 |
| School A: not enrolled (N = 9) | 3.34 | 1.52 |
| School B: no SBHC (N = 23) | 3.9 | 1.84 |

Loss of seat time is calculated for students who received an early dismissal from school and is calculated from the time of entry into the health center until the end of the school day.

Table 6. Percent Loss of Seat Time Within Each Group

| Group | Actual Loss of Seat Time (hours) | Possible Loss of Seat Time (hours) | Loss of Seat Time (%) |
|------------------------|----------------------------------|------------------------------------|-----------------------|
| School A: enrolled | 30.07 (N = 11) | 1168.18 (N = 355) | 2.57 |
| School A: not enrolled | 30.07 (N = 9) | 322.23 (N = 92) | 9.33 |
| School B: no SBHC | 89.83 (N = 23) | 1083.36 (N = 323) | 8.30 |

A chi-square analysis was performed to examine the relationship between race, gender, poverty status, and rate of early dismissal. No difference was found at the .05 level of significance between race ($\chi^2 = 3.082$, $df = 4$), gender ($\chi^2 = 0.804$, $df = 1$), or poverty status ($\chi^2 = 0.001$, $df = 1$) and early dismissal rates.

A *t* test for independent samples was used to analyze the relationship between student age and early dismissal rates; the test revealed no significant difference between the age of the student and rates of early dismissal at the .05 level ($t = -0.130$, $df = 762$; Levene's test [$F = 0.803$, significance = .371]).

A 1-way ANOVA was used to measure the relationship between gender, race, poverty status, and loss of seat time. No significant difference was found between gender and loss of seat time at the .05 level ($F(1,768) = 0.095$), and the samples were of similar variance (Levene's statistic = 1.311, $df = 1768$, significance = .253). No significant difference was found between race and loss of seat time ($F(4,764) = 0.816$) at the .05 level, and the samples were of similar variance (Levene's statistic = 0.728, $df = 4765$, significance = .573). No significant difference was found between poverty level and loss of seat time at the .05 level ($F(1,768) = .291$), and the samples were of similar variance (Levene's statistic = 0.022, $df = 1768$, significance = .882). A regression analysis of the relationship between age and loss of seat time found no significant relationship between the 2 variables at the .05 level ($B = .047$, $t = 1.248$, significance = .212).

DISCUSSION

This study finds that students not enrolled in an SBHC are significantly more likely to be sent home

during the school day than are students enrolled in an SBHC. Theoretically, this relationship could be due to confounding variables, but gender, race, age, and poverty status were all held constant during the statistical analysis, eliminating the possibility that they accounted for the relationship we found.

SBHCs improve attendance by keeping students in school who otherwise would have been sent home or to a community health care provider. Using data on early dismissal as an indicator of attendance provide more specific information regarding the impact of health services than does the use of attendance data alone. In New York schools, the custom is to tally as present for the day students who are sent home during the school day but were in school for more than 1.5 hours. Thus, a student must miss more than 6 hours of a 6.5-hour school day to be considered absent. Furthermore, it is difficult to separate absenteeism for health reasons from absences for nonhealth reasons such as appointments or discipline. This study relied on data for early dismissals that were generated from health records, which provided a concise measurement and a means to compare variables that affect missed school time for health reasons. These findings suggest that school nursing services augmented by the services of an SBHC significantly decrease rates of early dismissal rates when a comparison is made to school nursing services alone. SBHCs increase student learning time, a necessary component for successful academic outcomes.¹¹⁻¹⁸

Perhaps surprisingly, we found that students not enrolled in an SBHC but who had access to one in their school (school A) had the greatest loss of seat time. Because SBHCs improve the use of time within the academic setting and because school attendance is strongly linked to improved academic outcomes,^{17,19-21} SBHCs may lead to improved academic performance.

Limitations

Although we found a relationship between enrollment in an SBHC and reduced rates of early dismissal as well as less loss of seat time, a generalization of these findings to other schools cannot be made. Furthermore, this study had a narrow time frame for data collection. Further studies need to consider using a sample that is more representative of the school year.

More studies should be performed using loss of seat time as a measure of attendance. Past studies that used conventional attendance data have been unsuccessful because of inconsistency in the collection of this data, high mobility of high-risk students, and the inability to separate data on nonattendance for health reasons from nonattendance for such other reasons as suspensions and appointments.^{2,10,22-24}

Conclusion

This study has shown promise in the use of data on early dismissal and on loss of seat time as indicators of attendance when measuring the impact of SBHCs on academic outcomes. Collecting and analyzing such data from within the health center setting provide greater control of selected outcome measures and how the data are to be collected, and it simplifies access to the data for research purposes. This study provides new information that further defines the relationships between SBHCs and attendance and suggests that SBHCs may both indirectly support academic outcomes by maintaining the physical and emotional health of students and directly improve academic outcomes by decreasing rates of early dismissal, which increases the time a student is available in the academic setting to learn.

IMPLICATIONS FOR SCHOOL HEALTH

These findings provide key accountability outcomes for schools that currently have an SBHC and can serve as a catalyst for the development of SBHCs in all schools that serve high-risk youth or youth with limited access to care. The results of this study provide health care entities with crucial empirical support they can use when submitting grants or advancing SBHC initiatives with elected representatives on the local, state, or federal level.

Human Subjects Approval Statement

This study was approved by St. John Fisher College institutional review board.

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