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Do rural high school students participate in second chance breakfast programs?

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Abstract

BACKGROUND: Breakfast consumption often decreases as youth get older. The School Breakfast Program (SBP) provides an opportunity to intervene and increase breakfast consumption, especially among high school students.

METHODS: Project breakFAST implemented an expanded breakfast service at 12 high schools. In this longitudinal evaluation, school administrators provided SBP participation and demographic data on all ninth and tenth graders for two full consecutive school years. Students screened for eating breakfast <3 times/week were randomly selected to participate in the cohort study. The cohort completed a survey on perceived barriers, benefits, and breakfast habits.

RESULTS: At baseline, all 12 schools had only traditional before school cafeteria SBP service. Mean participation was 16.3% and ranged from 7.9% - 38.1%. After the intervention, there was an increase in participation to 25.7% ($p = .004$) ranging from 14.1% to 47.5%. There was no change in breakfast participation before school (13.3% $p = .06$). Students who traveled to school by car, bike, or walking at baseline were 4.5% less likely to participate in second chance breakfast at follow-up than those who took the bus to school ($p = .006$).

CONCLUSION: Second chance breakfast is an option for increasing high school breakfast participation, especially for those riding the bus.

Keywords

School Breakfast Program; Second Chance Breakfast; High School Students; Rural Students; Nutrition; Child and Adolescent Health

Consuming breakfast is important for multiple aspects of adolescent health and well-being,¹ including, diet quality,² weight-related behaviors,² cognition,^{3,4} school attendance,⁵ and standardized achievement test scores.^{6,7} Despite this, many adolescents are not eating breakfast³ and as adolescents get older, their frequency of eating breakfast drops even further.⁸⁻¹⁰ For example, in a recent study, 63.1% of high school students missed more than one day of breakfast and students in 12th grade were more likely to miss breakfast than students in 9th, 10th and 11th grade.⁸ Another study estimated that 70% of 5-8th grade students were eating breakfast daily compared to 51% of 9th-12 graders.⁹ The percent of students eating breakfast through the School Breakfast Program (SBP) is even lower, one study reporting only 16% of secondary students participating.¹¹ Given the evidence supporting the potential for positive effects of breakfast and low participation in the SBP, there is growing interest in the implementation of school-based interventions and programs to support young people in consuming a healthy breakfast.¹²⁻¹⁵

Nearly all (92%) schools that participate in the National School Lunch Program also provide students with an opportunity to eat a healthy breakfast through the SBP.¹⁶ Despite this, researchers have identified access-related barriers that keep many students from regularly eating breakfast at school and only 56 children receive free and reduced-priced breakfast for every 100 who receive free and reduced-priced lunch.¹⁶ Hearst et. al., found the most common reported barriers among rural high school students were not being hungry in the morning, breakfast taking too much time, being too busy, and perceptions that the school breakfast tasted bad.¹⁷ Hearst et. al., further found that high school students who missed breakfast reported more barriers to eating breakfast and fewer positive beliefs about the benefits of breakfast than those who ate breakfast.¹⁷ Other studies have reported similar barriers among students^{12,18} along with having to arrive at school early enough to eat breakfast before classes begin, stigma associated with participating in a program intended for youth from low income families,^{13,19} or participating in morning extracurricular activities.¹³

Targeted strategies to expand access to the SBPs may be needed to increase school breakfast program participation (SBPP).^{12,13} The type of expanded breakfast program may be determined by the barriers specific to each school setting and student population For

example, universal school breakfast may be helpful to combat the stigma that only low income students eat the school breakfast for schools with large percentage of free or reduced price eligible students.²⁰ Grab and go carts placed in strategic locations throughout the school may promote breakfast consumption for students who report not having enough time before class, as they can grab breakfast off a cart on their way to class, rather than needing to go to the cafeteria.^{21,22} Second chance breakfast (breakfast in the passing time after first period) is a strategy to increase breakfast consumption among those students who do not have an appetite in the morning, who have activities before school, or who have long commutes to school. However, there has been limited research on the impact of offering breakfast after first period on SBPP in high schools and much of the research around expanded SBPs and alternative breakfast service modes focuses on younger students rather than high school students.²³

This study addresses this research gap by evaluating the effectiveness of a second chance SBP within the context of a larger intervention trial. The analysis will identify whether students facing specific barriers such as, transportation constraints or lack of time to eating school breakfast predict participation in second chance breakfast. Understanding what types of SBPs best serve the varying needs of students and schools will help guide the creation of breakfast programs that maximize SBPP and increase breakfast consumption.

METHODS

Project BreakFAST Parent Study

Data for the current analysis comes from Project breakFAST (Fueling Academics and Strengthening Teens), a multi-component, group randomized controlled trial in 16 rural Minnesota high schools. Schools were randomized into intervention or control groups. Control schools were offered the intervention one year after the intervention schools, hereafter referred to as delayed-intervention schools. The goal of Project breakFAST was to test the impact of an environment and policy focused intervention that expanded access to the SBP to improve student participation. Project breakFAST defined expanded access as serving breakfast grab and go style on carts in a convenient location outside of the cafeteria. This allowed for easier access by students so they could get breakfast on their way to class rather than having to go out of their way to the cafeteria. Schools served their grab and go breakfasts before the start of school (before the bell) and/or after school started (second chance breakfast).

All schools implemented an expanded SBP, but each school adapted the second chance breakfast to meet its own unique needs. Some schools continued to serve traditional cafeteria before the bell breakfast and added a grab and go cart before the bell and after the bell. Some schools continued a traditional breakfast program in the cafeteria before the bell and added a grab and go cart for second chance only. Some schools had cafeteria and grab and go carts before the bell and after first period. More in-depth descriptions of Project breakFAST can be found elsewhere.¹⁴

Schools also were required to allow students to eat in the hallway to facilitate positive peer social interaction during breakfast consumption. The authors hypothesize that when students

are permitted to eat in the hallway, they do not have to choose between eating breakfast and socializing with their friends. Classroom eating was optional, but mostly adopted with some limitations (eg computer room, labs) at all schools. Finally, student-led marketing campaigns were uniquely developed by each school. Intervention schools were supported by a professional marketing company to create student-led marketing campaigns that provided relevant and attractive messages to their peers about school breakfast. Delayed intervention schools took on this task using students in marketing classes, or using student leadership groups. In both groups, campaigns generally consisted of posters, banners, and a short video.

Each school formed a School Breakfast Expansion Team to guide the intervention decision making around program development, implementation and monitoring. School Breakfast Expansion Team membership most commonly consisted of a school principal or an assistant principal, the food service manager and staff, maintenance, the school nurse, a member of the coaching staff, teachers, and students. More in-depth support on how to implement an expanded school breakfast program can be found in the Project breakFAST toolkit developed in partnership by the Project breakFAST research team and University of Minnesota Extension at the following website: <https://www.extension.umn.edu/family/health-and-nutrition/toolkits-and-resources/project-breakfast/>.

School-level Sample

Of the original 16 Project breakFAST schools, there were 12 that recorded the time of breakfast purchases providing objective evidence of the service delivery times available throughout the school year. These 12 schools were included in this current analysis. As part of the parent study, six of the twelve had been randomized to the intervention condition, and six had been randomized to the delayed-intervention condition. In the current study, baseline measures refer to the year before intervention at each school (Year 1, SY 2012/2013, for intervention and Year 2, SY 2013/2014, for control). Follow-up measures refer to the year the intervention was implemented (Year 2, SY 2013/2014, in the intervention schools and Year 3, SY2015/2015, in the delayed intervention schools). At baseline, none of the schools had second chance breakfast. De-identified time stamped administrative data (SBPP, Free and Reduced Price Lunch participation) was obtained from all schools of students in 9th and 10th grade in year 1 and repeated the following two years.

Student Cohort

At each of the 12 schools, a cohort of students was enrolled in the study and followed. All ninth and tenth graders were screened for study eligibility. Students who consistently reported missing breakfast, defined as eating breakfast less than three times per week, being proficient in English, having access to a telephone, and typically being present at the beginning of the school day (N=1,891) were eligible. From this group of students who missed breakfast consistently, students were randomly selected (N=923) for invitation to participate. Students who identified as Hispanic or a race other than white were oversampled to meet an enrollment goal of 30%. All students included in the student cohort had parental consent and provided informed assent. A total of 670 students were enrolled from the 12 schools. All students enrolled in the study took a 40-item online-based survey available on the Project BreakFAST website.

Schools provided linked SBPP for our cohort of students. A final sample of 578 students had records of SBPP for the years before and after implementation of Project BreakFAST and were included in the analysis.

Instrumentation

As part of the baseline Project BreakFAST survey, students were asked questions to assess barriers that may influence breakfast consumption: food insecurity, transportation to school, before school activities and other perceived barriers.¹⁴

Food security was measured using a 9-item Child Food Security Survey Module validated for use with adolescent self-report.²⁴ Responses were categorized and weighted based on the standard scoring criteria to determine food security status. Food security was dichotomized as Food Secure (FS) vs Food insecure (FIS) (low/very-low insecurity combined).²⁵

Students were asked how they usually got to school during a normal school week. Response options were (1) Bus; (2) car; (3) walking; or (4) biking. They were also asked how many miles they usually traveled to get to school with 13 response options ranging from less than 1 mile to more than ten. With reference to a normal school week, students were asked how many days they had activities before school that kept them from eating school breakfast (like work, athletics, clubs). Response options were (1) 0 days; (2) 1 day; (3) 2 days; (4) 3 days; (5) 4 days; or (6) 5 days.

To assess perceived barriers, students were asked to report how strongly they disagreed or agreed (Likert scale 1-4) with a set of statements about barriers related to eating school breakfast: (1) I am too busy to eat school breakfast; (2) Eating school breakfast takes too much time; (3) The bus arrives too late for me to get the school breakfast; (4) It is easy for me to get school breakfast; and (5) I skip breakfast because I am not hungry in the morning. For this analysis, the response options were dichotomized (agree/strongly agree, disagree/strongly disagree).

Data Analysis

School-level and student-level baseline characteristics were summarized and presented using descriptive statistics. SBPP was calculated as $100\% \times \text{annual breakfast count} / \text{annual attendance days}$ at the student level, and then aggregated at the school level in school-level analysis. SBPP was log-transformed due to its skewed distribution. Because no schools offered second chance breakfast at baseline, we could not test if there were significant increase in second chance breakfast participation. Instead, we examined whether total increase was statistically significant and whether before school breakfast increase was statistically significant to assess the importance of second chance breakfast in contributing to the overall increase in breakfast participation. Paired t test was used to evaluate change in school-level SBPP. Change in student-level SBPP was also evaluated using paired t test for each school separately. Change in student-level SBPP combining all 12 schools was examined using linear mixed models to account for cluster of school. Linear mixed models were also conducted to examine baseline predictors of student-level second chance breakfast use at follow up. Models included random effect of school and fixed effects of baseline predictors (one at a time) plus baseline covariates of age, gender, race and Free and Reduced

Price Lunch status. Analyses were performed using Statistical Analysis Software (version 9.3, SAS Institute Inc., Cary, NC)

RESULTS

School-level Results

School characteristics for the twelve schools are shown in table 1. Enrollment of students in grades 9-12 across schools ranged from 159 students to 837 students. Free and reduced price lunch enrollment and percent minority ranged from 12%–57% and 2%–32%, respectively. Figure 1 shows the overall mean baseline school-wide SBPP was 16.3% with a range of 7.9% - 38.1%. At baseline, all 12 schools only served breakfast before the start of school in the cafeteria. After implementation of the expanded breakfast programs there was a statistically significant increase in total (both before school and second chance combined) SBPP of 25.7% ($p = .004$) at all schools ranging from 14.1% to 47.5%. The change in breakfast participation for only before-school participation was not statistically significant (13.3% $p = .06$). The mean rate of second chance breakfast participation at follow-up was 13.2% with a range from 2.2% to 31.1%.

Student-level Cohort Results

Table 2 describes that approximately one third of students represented ethnic/racial minority backgrounds and 45% were boys. Almost half (40%) of students were eligible for the Free and Reduced Price Lunch program and a majority (84%) were food secure. Figure 2 reports that among the cohort of student who regularly miss breakfast, there was, on average, a statistically significant increase in mean total SBPP from 13.5% to 27.8% ($p = .006$). The overall change in mean before school SBPP (-0.1% , range: -11.6% to 7.2% , $p = .49$) was not statistically significant. Second chance SBPP ranged from 2.5% to 34.5% at follow-up.

Reported barriers of students.—Most students (64%) traveled less than five miles to get to school and most traveled to school either by bus (35%) or by car (57%). Nineteen percent of students had activities before school on one or more days that kept them from eating school breakfast. A full list of reported barriers to eating school breakfast are presented in Table 2, the most common being that they were not hungry in the morning (55%).

Predictors of second chance breakfast participation.—Table 3 shows that students who traveled to school by car, bike, or walking at baseline were 4.5% less likely to participate in second chance breakfast at follow up than those who took the bus to school ($p = 0.006$). Students who agreed, “The bus arrives too late for me to get the school breakfast” were 3.7% more likely to participate in second chance breakfast than those who disagreed with the statement, though this was not statistically significant ($p = .06$). The other barriers assessed were not statistically significant predictors of participation in second chance breakfast.

DISCUSSION

Supporting high school students in eating school breakfast is particularly important, especially in rural areas. Previous research has raised concerns about the health of rural students in regards to poor diet quality²⁶ and disparately high rates of obesity in comparison to urban youth.²⁷ In this study, we examined second chance breakfast as a unique strategy to increase SBPP among rural high school students who, for a variety of reasons, may face barriers to participating in a traditional cafeteria SBP served before the start of school. Overall, second chance breakfast is a promising strategy to increase high school breakfast participation.

School-level School Breakfast Participation

In this study, second chance breakfast accounted for a large proportion of the increase in SBPP. This supports the hypothesis that as part of a comprehensive breakfast program, second chance breakfast is a vital component. Our analysis shows that perhaps the most successful expanded breakfast program is implementing multiple methods, such as multiple time or locations, but if a school is looking to expand their breakfast program with limited resources, second chance breakfast may be a good place to start.

It is important to note that half of the schools in this analysis were delayed-intervention schools, which implemented a lower cost, less intensive intervention. These schools, as seen in this and other Project breakFAST analysis findings,²⁸ were as successful at increasing SBPP, as the intervention schools. Larson et al showed also that a comprehensive expanded school breakfast program works to increase participation regardless of income/ethnicity, which strengthens the argument that an expanded school breakfast program may be effective among many different high schools with varying student configurations.

Student Cohort School Breakfast Participation

The cohort analysis showed that different combinations of expanded breakfast programs are important to achieve success across a variety of schools. At 8 out of 12 schools, there was a statistically significant increase in overall school breakfast participation from baseline to post. Among these 8, only 3 had a statistically significant increase in before-school breakfast; at the other 5 schools the increase in overall SBP was due to the increase in both before school breakfast participation and second chance breakfast participation combined. When working to improve school breakfast participation it is important to know the culture and needs of the student body. For example, a welcoming and encouraging staff, along with support from other students to eat school breakfast was found to be important in the Project breakFAST schools.²⁹

Student Cohort Barriers

In this current study, we found that taking the bus to get to school was a significant predictor of second chance breakfast participation. Other studies have cited the bus arriving too late as a barrier for participation in the school breakfast program¹⁷ and second chance breakfast can be seen as a direct response to this issue. This may be particularly important for rural areas. Although none of the other barriers, were predictors of second chance breakfast use in this

analysis. It is still a potentially successful way of addressing some of the barriers reported by students such as not being hungry in the morning, bus arriving late and having activities before school. Other Project breakFAST analyses reported by Hearst et al. showed that there was a decrease in overall barriers reported by the intervention schools due to the Project breakFAST intervention and that the barriers reported by students in intervention schools were statistically significantly lower than barriers reported by students in control schools at post assessment.³⁰ Specifically the proportion of students that agreed that “it was easy for me to get school breakfast” increased 5.49%. Also the percent of students who reported being too busy to eat school breakfast and that school breakfast takes too much time also decreased by 7.22% and 13.01 % in intervention schools respectively.³⁰ These are all barriers that we would expect to see decrease with change in access to breakfast such as adding a grab and go cart; however they also found that the amount of students that reported “skipping breakfast because they are not hungry in the morning” decreased by 7.88%. This barrier may be specifically targeted through the availability of second chance breakfast and is consistent with child development literature supporting later school start times.³¹

Strengths and Limitations

There were a few limitation in our analysis. We were not able to test for significant changes in second chance breakfast because it was not present at baseline. The survey responses were limited to those who were included in the study, and were considered to consistently miss breakfast (breakfast <3 times per week) this may limit the generalizability of the findings. Our data does not allow student follow-up beyond the end of the study, which limits our ability to comment on the sustained impact of breakfast participation. Strengths of this study include the use of administrator provided objective data to assess school breakfast participation and specifically time the breakfast was sold and the design which provides both school-level and student-level data. Additionally, this study adds to the limited literature around school breakfast in rural high schools.

Conclusions

Second chance breakfast is an important component for increasing overall school breakfast participation. Schools may want to utilize findings from the current study to increase breakfast participation of students through a second chance breakfast. Areas for future research may be to assess if second chance breakfast is as effective of a strategy among urban students and if it is as effective with younger students.

IMPLICATIONS FOR SCHOOL HEALTH

Results from this study suggest that adding a second chance breakfast in high schools is a successful strategy to increase school breakfast participation by addressing access barriers. The findings from this study, along with evidence from other high school based studies, ^{17,21,29,30,32} show that a comprehensive approach of, increased *access* through an expanded breakfast program containing a second chance breakfast, intentional and consistent *engagement* of students in the planning process, and strategic *communication* to students and staff about the program is a successful combination of strategies can result in a

significant increase in breakfast participation. Specific strategies which are more successful in implementing a second chance breakfast in high schools include:

- When possible providing second chance breakfast in a high traffic hallway for students to have easy access to during the passing period.
- Adaptability and flexibility in regards to the logistics of the breakfast program is critical, as every school environment and culture is different. Being open to testing multiple service times and locations can increase the magnitude of increased participation.
- Engaging students in making critical decisions about the breakfast expansion, such as deciding the location and timing of the expanded service, assures the program will meet the needs of most of the student body.
- For additional tips and resources for creating an expanded breakfast program, the Project BreakFAST toolkit can be access at: <https://www.extension.umn.edu/family/health-and-nutrition/toolkits-and-resources/project-breakfast/>

HUMAN SUBJECTS APPROVAL STATEMENT

The University of Minnesota Institutional Review Board approved study procedures.

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Figure 1. School-level Change in Student School Breakfast participation Pre and Post Intervention by Service Time

1. School Breakfast Program Participation is calculated as $100\% \times \text{annual breakfast count} / \text{annual attendance days at the student level}$, and then aggregated at the school level.

Figure 2. Student-level Cohort Change in Student School Breakfast Program Participation from Pre to Post Intervention by Service Time

1. School Breakfast Program Participation is calculated as $100\% \times \text{annual breakfast count} / \text{annual attendance days at the student level}$

Table 1.

Rural Minnesota Project BreakFAST School-level Baseline Characteristics

School	School assignment	9 th and 10 th Grade Total Enrollment	Cohort enrollment	% FRPL ^I	% Non-white	% Girls
1	Intervention	837	63	30%	18%	51%
2	Intervention	159	32	31%	16%	50%
3	Intervention	788	55	47%	20%	49%
4	Intervention	385	56	35%	8%	49%
5	Intervention	203	53	23%	3%	44%
6	Intervention	679	50	54%	19%	48%
7	Delayed-Intervention	198	54	36%	8%	49%
8	Delayed-Intervention	696	54	57%	32%	45%
9	Delayed-Intervention	223	42	40%	14%	54%
10	Delayed-Intervention	929	49	39%	7%	48%
11	Delayed-Intervention	364	42	30%	2%	48%
12	Delayed-Intervention	194	28	25%	7%	45%

^I. Free and Reduced Price Lunch Program Participation

Table 2.**Rural Minnesota Project BreakFAST Schools' Student Cohort Characteristics at Baseline**

	Overall student sample (N=670)
Grade, N (%)	
9	345 (51%)
10	325 (49%)
Race, N (%)	
White	401 (63%)
Non-white	240 (37%)
Sex, N (%)	
Girls	371 (55%)
Boys	299 (45%)
Free and Reduced Price Lunch status, N (%)	
Free/reduced	263 (40%)
Full priced	390 (60%)
Food security, N (%)	
Insecure	93 (16%)
Secure	497 (84%)
Miles traveled to get to school, N (%)	
0-5 miles	357 (64%)
>5 miles	197 (36%)
During a normal school week, on how many days do you have activities before school that keep you from eating breakfast, N (%)	
0 days	505 (81%)
1 day	33 (5%)
2 days	47 (8%)
3 days	20 (3%)
4 days	6 (1%)
5 days	11 (2%)
Transportation to school, N (%)	
Bus	234 (35%)
Car	380 (57%)
Walking	45 (7%)
Biking	3 (1%)
School breakfast participation, %, mean (SD)	12.9 (19.9)
Barriers	
I am too busy to eat school breakfast, N (%)	
Strongly agree/agree	271 (44%)
Disagree/strongly disagree	345 (56%)
Eating school breakfast takes too much time, N (%)	
Strongly agree/agree	218 (36%)

	Overall student sample (N=670)
Disagree/strongly disagree	394 (64%)
The bus arrives too late for me to get the school breakfast, N (%)	
Strongly agree/agree	119 (19%)
Disagree/strongly disagree	493 (81%)
It is easy for me to get school breakfast, N (%)	
Strongly agree/agree	433 (71%)
Disagree/strongly disagree	181 (29%)
I skip breakfast because I am not hungry in the morning, N (%)	
Strongly agree/agree	334 (55%)
Disagree/strongly disagree	278 (45%)

Table 3.

Baseline Predictors of Second Chance Breakfast¹ Use at Post Test in Rural Minnesota Project BreakFAST Student Cohort

	Regression Coefficient (SE)	p value ²
Miles traveled to get to school (>5 miles vs 0–5 miles)	–0.22 (1.9)	.91
Activities before school that keep you from eating breakfast (>=1 day vs. 0 days)	0.13 (2.0)	.95
Transportation to school (car/walking/biking vs. bus)	–3.8 (1.7)	.02
I am too busy to eat school breakfast (Agree vs. Disagree)	–1.1 (1.6)	.48
Eating school breakfast takes too much time (Agree vs. Disagree)	0.003 (1.7)	1
The bus arrives too late for me to get the school breakfast (Agree vs. Disagree)	3.2 (2.0)	.11
It is easy for me to get school breakfast (Disagree vs. Agree)	–0.8 (1.7)	.65
I skip breakfast because I am not hungry in the morning (Agree vs. Disagree)	–1.1 (1.6)	.50

¹. % second chance breakfast is treated as a continuous variable

². p values are from linear mixed models that include random effect of school and fixed effects of baseline predictors (one at a time) plus baseline covariates of age, gender, race, and Free and Reduced Price Lunch. Bolded value means significant p <.01