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Abstract

Background: In Sweden, the local government is responsible for funding schools in their district. One funding initiative is for schools to provide students with mental health problems with additional support via extra teachers, personal assistants, and special education classes. There are evidence-based preventive interventions delivered in schools, which have been shown to decrease the levels of students’ mental health problems. However, little is known about how much the local government currently spends on students’ mental health support and if such evidence-based interventions could be financially beneficial.

Aims of the Study: The aim of this study was to estimate the costs of providing additional support for students’ mental health problems and the potential cost-offsets, defined as reduced school-based additional support, if two evidence-based school interventions targeting children’s mental health problems were implemented in routine practice.

Methods: This study uses data on the additional support students with mental health problems received in schools. Data was collected from one school district for students aged 6 to 16 years. We modeled two Swedish school interventions, Comet for Teachers and Social and Emotional Training (SET) which had evidence of reducing mental health problems. We used a cost-offset analysis framework, assuming both interventions were fully implemented throughout the whole school district. Based on the published studies, the expected effects and the costs of the interventions were calculated. We defined the cost-offsets as the amount of predicted averted additional support for students with ongoing mental health problems who might no longer require receiving services such as one-on-one time with an extra teacher, a personal assistant, or to be placed in a special education classroom. A cost-offset analysis, from a payer’s perspective (the local government responsible for school financing), was conducted comparing the costs of both interventions with the potential cost-savings due to a reduction in the prevalence of mental health problems and averted additional support required.

Results: The school district comprised of 6,256 students, with 310 students receiving additional support for their mental health problems. Of these, 143 received support in their original school due to either having ADHD (n = 111), psychosocial problems (n = 26), or anxiety/depression (n = 6). The payers’ total cost of additional support was 2,637,850 Euro per school year (18,447 Euro per student). The cost of running both interventions for the school district was 953,643 Euro for one year, while the potential savings for these interventions were estimated to be 627,150 Euro. The estimated effects showed that there would be a reduction of students needing additional support (25 for ADHD, eight for psychosocial problems, and one for anxiety/depression), and the payer would receive a return on their invested resources in less than two years (1.5 years) after implementation.

Discussion: Preventive school interventions can both improve some children’s mental health problems and be financially beneficial for the payer. However, they are still limited in their scope of reducing all students’ mental health statuses to below clinical cut-offs; therefore, the preventive school interventions should be used as a supplement, but not a replacement, to current practices.

Implications for Health Policies: The findings have political and societal implications, in that payers can reallocate their funds toward preventive measures targeting students’ mental health problems, while reducing the costs.

Implications for Future Research: When evaluating public health actions, it is necessary to consider their economic impact. The resources are scarce and the decision makers need knowledge on how to allocate their resources in an efficient way. Cost-offset analysis is seen as one way for decision makers to comprehend research findings; however, such analyses tend to not include the full benefits of the interventions, and actual impacts need to be fully evaluated in routine implementation.

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Background

Approximately 15 to 25% of children have mental health problems, both in Sweden1 and internationally.2 The most prevalent problems are attention deficit, oppositional, and separation anxiety disorders, while conduct and overanxious
disorders are intermediate, and depression is the least, but still relatively prevalent. This means that mental health problems negatively impact children both externally and internally, and are associated with educational, behavioral, and emotional problems. For example, children’s school attendance, high school drop-out rates, drug use, unemployment, unwanted pregnancy and criminality are all associated with mental health problems.

To help offset the negative consequences of child mental health problems, the Swedish government has specified that actions to improve children’s mental health should be prioritized, with special attention paid to prevention in early childhood. Schools are a good setting for detecting and preventing child mental health problems, as nearly all children attend full day school programs, and schools can support children by providing stable social environments, as well as developing children’s emotional and social skills.

An Economic Approach in Swedish Schools

Economic evaluations provide researchers, politicians, and practitioners with information regarding how to use their limited resources for public health benefits. For example, economic evaluations can be used to understand how preventive interventions decrease the level of mental health problems at a reasonable cost (inclusive of intervention costs and any cost savings).

In the case of Swedish schools, the local government is the budget-holder (and payer) for students who receive additional support in schools due to mental health problems. Local governments are one of the largest budget holders for children, spending around 138,700 Euro per student aged 0-18 per year in public health interventions, and therefore, they have incentives to ensure that these funds are being optimally spent. It is important to determine the financial burden of providing additional resources for students who have a mental health problem, and to determine if there are alternative ways of using those resources that may either improve the mental health of the children even more, and/or reduce the costs associated with providing that support.

The aim of this study is to estimate one school district’s costs for providing additional support for students with mental health problems, and the potential cost-offsets if two evidence-based school interventions targeting children with mental health problems were implemented in routine practice. The economic costing perspective of this study is the Swedish local government.

Methods

Data Collection and Study Design

The current study was based on data from one school district in Sweden, with students aged 6 to 16 years (the age most students graduate from high school in Sweden). Using the snowball sampling method, we contacted and received data on children who received additional support for their mental health problems from the local government officer who was responsible for coordinating the finances for these services. By contacting the department of education and social services, we received data on children receiving additional support due to their mental health problems.

Additional support in this study referred to students with mental health problems receiving extra support via: (i) a personal assistant who worked one-on-one with that student in the classroom; (ii) students who worked one-on-one with an extra teacher outside of the classroom setting; and/or (iii) being placed in a smaller class of eight students, called a special education class, which was led by one teacher (full-time) and one personal assistant (half-time).

Data was collected on the prevalence of students in need of additional support, as well as on the type and quantity of that support. Data collection primarily focused on students who had mental health problems, specifically externalizing and internalizing behavior problems, including ADHD, psychosocial problems, anxiety, and depression. The local government could not discriminate the costs for students with anxiety from those with depression; therefore, these two categories were grouped together. All data were collected at a group level, thus the anonymity of the student always remained secured.

School Interventions Evaluated

We performed a search of preventive interventions for child mental health problems based on a systematic review. The following criteria were used to select relevant interventions: (i) the intervention was implemented in Sweden; (ii) was evidence-based and had proven efficacy targeting one of the four mental health problems (or their risk factors) defined in this paper; (iii) had been evaluated in a school environment; and (iv) was led by a teacher in a real-world setting. We excluded interventions targeting students younger than 6 or older than 16 years of age, selective interventions targeting only boys or girls, and interventions targeting students with severe mental health problems who were placed into alternative schools. Few evidence-based school interventions had been tested in a Swedish setting, and only two met the inclusion criteria: Comet for Teachers and Social and Emotional Training (SET). Both interventions were evidence- and manual-based.

Comet for Teachers aimed to provide teachers with tools and methods to help them cope with students’ externalizing behavior and concentration problems. The teacher conducted exercises with a target student, and conducted other exercises that involved the whole class, which could improve the classroom environment and develop positive factors for every student’s mental health.

SET was a program that aimed to promote young children’s (6-11 years) and teenagers’ (12-16 years) mental health and positive development. Its goal was to strengthen protective factors at the individual, group, and school level, via an emphasis on problem solving and interaction ability. The program involved one to two 45-minute structured sessions per week and continued throughout the whole school year. In addition, teachers received 16 hours of training.
### Table 1: Effectiveness of Preventive School Interventions.

<table>
<thead>
<tr>
<th>Mental health problems</th>
<th>Outcome measure</th>
<th>Follow-up effect size (d)</th>
<th>Estimated reduction in clinical cases (five years follow-up)</th>
<th>Estimated reduction in clinical cases (one year follow-up)</th>
<th>Used in the estimation of reduction in students who need extra support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externalizing behavior</td>
<td>Observed externalizing behavior</td>
<td>0.62</td>
<td>24%</td>
<td>ADHD, personal assistant</td>
<td></td>
</tr>
<tr>
<td>Externalizing behavior</td>
<td>BREB(^a) externalizing behavior</td>
<td>0.83</td>
<td>31%</td>
<td>Psychosocial problem</td>
<td></td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>CTRS(^b) hyperactivity</td>
<td>0.57</td>
<td>22%</td>
<td>ADHD, special education class</td>
<td></td>
</tr>
</tbody>
</table>

| Internalizing problem | YSR\(^c\) internalizing behavior | 0.42 | 60% | 12% | Anxiety/depression |

\(^a\)BREB - Brief Rating of Externalizing Behavior  
\(^b\)CTRS – Canners Teaching Rating Scale  
\(^c\)YSR - Youth Self-Report Instrument

#### Effectiveness Estimates of the Interventions

We have used both available studies [18, 27] to determine the intervention effect estimates used in the analysis.

**Comet for Teachers**

The effectiveness estimate of Comet for Teachers was based on a Swedish randomized controlled trial (RCT)\(^{27}\) assessing the effects of Comet for Teachers on externalizing behavior and hyperactivity. One hundred students with externalizing behavior problems (the mean externalizing score was more than two standard deviations above average in Scandinavian normative samples,\(^{28}\)) were randomly assigned to either the Comet intervention (60 teachers/students) or a control group (40 teachers/students).

Outcomes were collected at pre-test, post-test (6 months after pre-test), and follow-up (14 months after pre-test). At post-test and follow-up, there were significant medium to large effects (Time × Group) for observed student externalizing behavior in favor of the intervention group (see Table 2 from\(^{27}\)). Using the effect sizes of three outcomes: one for hyperactivity and two for externalizing behavior, we calculated the proportion of students from the intervention group who moved from clinical to non-clinical levels compared to their respective control groups, yielding a reduction in clinical cases. Two different outcomes, externalizing behavior and hyperactivity, were used to calculate the reduction in the proportion of students with ADHD receiving additional support, as they could differ on having more (or less) problems with different tasks and social activities.\(^{29}\)

The observed externalizing behavior effects were chosen specifically for students with ADHD, because the definition of what type of externalizing behavior was observed is similar to the symptoms shown by children with ADHD.\(^{27,29}\) Hyperactivity is also a common feature in the diagnosis of ADHD;\(^{29}\) therefore, this outcome was also chosen for students with ADHD.

Different outcome measures were used for the different types of extra support children with mental health problems received. For example, we assumed that students in a special education class, compared to those in a regular class, would benefit more from a calmer environment, via having a smaller class size, which could therefore help to reduce the child’s hyperactivity. We further assumed that students would benefit more from having a personal assistant in their regular class compared to moving them to a special education class if they exhibited externalizing behavior problems, because they could receive individualized support.

We also assumed that children with psychosocial problems exhibit externalizing, but not hyperactivity problems; therefore, we only used the effects for externalizing behavior problems for these students. Students with psychosocial problems may need either a personal assistant or a special education class, as some may benefit more from individual coaching, while others from a smaller class size. These assumptions, and how they are used in the estimation of reduction in the proportion of children who need extra support, are summarized in Table 1.

**Social and Emotional Training (SET)**

The effectiveness estimate was sourced from a quasi-experimental longitudinal (5 year follow-up) study,\(^{18}\) which analyzed the impact of the duration of SET (i.e. over a number of years) on internalizing and externalizing mental health problems. School personnel, in a real-life setting, implemented the intervention. Youth self-reports (YSR)\(^{30}\) were used to measure internalizing and externalizing problems. These results showed significant differences between the intervention and the control groups using the YSR internalizing and externalizing scales.

To avoid overestimation, we used the effectiveness of Comet for Teachers to estimate the reduction in conduct problems, externalizing problems, and hyperactivity, as well...
as the effectiveness of SET to estimate the reduction in internalizing problems (see Table 3 from 18). To calculate the reduction in clinical cases of internalizing mental health problems, we assumed that 5% of the target population (95th percentile) was considered clinical, and the distributions of internalizing mental health problems were normal. We calculated the cut-off point \( z \) using the equation:

\[
F(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} \exp\left(-\frac{y^2}{2}\right) dy = 0.95
\]

The value of \( z \) can be found in standard statistical tables. An effect size of \( d = 0.42 \) was used to calculate the reduction in clinical cases (in percentage), as illustrated by the gray area between the two curves (see Figure 1).

We have adjusted the effectiveness estimate of the SET program, 18 to a one-year estimate by using Figure 1 and assumed that the reduction observed during a five year period was proportionally distributed (e.g. approximately 20% of the total reduction occurred per year).

A summary of the estimations of effectiveness of the SET program, as well as the calculation of the reduction of the proportion of clinical cases was summarized in Table 1. The effectiveness studies have shown sustainability of their effects from 14 months (Comet for Teachers) up to five years (SET).

**Costing Analysis**

**Intervention Costs**

The resources used by the interventions were identified and quantified based on the descriptions of each intervention in the published literature, official websites, and personal contact with researchers and coordinators. The costs for running the interventions were estimated from a scenario where the two programs would be implemented and run within the whole school district, with the local government as the payer. The costs included the time for educating supervisors, preparing and running the intervention (i.e. time in the classrooms), and rental of the venue. The number of teachers was estimated by assuming that there were 22 students in each class, 31 and then dividing the total number of students (\( n = 6,256 \)) by 22; yielding a total number of 286 teachers (personal correspondence with the local government officer could only advise us of the total number of students in the school district). We assumed that all teachers in the district (\( n = 286 \)) would be trained in and deliver both interventions, reaching all 6,256 students in the school district, while SET 6-11 and SET 12-16 would each reach half of the students, respectively. The reasoning behind this assumption was to show the full costs of implementing both interventions in the whole school district and to see if the interventions could improve children’s mental health, while reducing costs.

Training costs were calculated by estimating the costs of educating three supervisors for each intervention (\( n = 6 \)) who would train the teachers in the district, as well as the amount of hours that teachers were trained. Three supervisors for each intervention was thought to be reasonable, given that each supervisor would run 10 courses per year with around 10 members in each group for Comet for Teachers, and 35 for SET, according to each intervention’s coordinator (personal correspondence). It was assumed that training costs were a single time investment, and that the supervisor could run the interventions for approximately five years before reaccreditation; hence, training costs were divided into 20% per year.

Running costs for SET included the costs for the time it took teachers to prepare and run the seminars, as well as renting the venue. Comet for Teachers, however, included different exercises, which could entail different amounts of time to deliver the seminars. To estimate their costs, and also opportunity costs for teachers’ time in the classroom, we based the time needed to deliver the seminars on another school program called Good Behavior Game, 32 which had similar components to Comet for Teachers. 26
It is also important to note that the additional costs for extra teachers, personal assistants, and special education classes were calculated differently. For example, a student who received a personal assistant only had the added cost, relative to other students, of a personal assistant. This was added to those students who either had an extra teacher or were in special education classes, as these students were removed from their regular classroom, thus the costs of that regular class needed to be removed when calculating their costs for additional support. The cost of being in a regular classroom was calculated by dividing the teachers’ monthly salary by the average number of students in a classroom (n = 22). All costs were collected in 2013 Swedish krona (SEK) and converted into Euro (EUR) (1 Euro 2013 = SEK 8.65), based on official statistics from the Swedish Tax Agency. Special education classes comprised one full-time teacher and one half-time personal assistant for the class; thus, the current calculations were based on average monthly gross wages for teachers and personal assistants in Sweden including 40% overheads. The costs for extra teachers were based on average monthly gross wages for teachers with a special competence (special educators). Unit costs are shown in Table 2.

The total cost to provide additional support in schools to students with mental health problems was estimated by multiplying the unit cost for type of support (i.e. salary) by the number of students needing that support. The total cost for students in a special education class was calculated by dividing the unit costs (i.e. salary of a full-time teacher and a half-time personal assistant) of running a special education class by 8 (the number of students in one special education class), and then multiplied by the number of students receiving the support (e.g. 59 students with ADHD and 14 students with psychosocial problems). The total cost per month was then divided by the number of students receiving additional full-day support to estimate the average monthly cost per student. The total cost per school year was calculated by multiplying the total monthly cost by 10, since a school year in Sweden is 10 months. The total cost per school year was then divided by the total number of students receiving additional full-day support to obtain the average cost per student per school year.

Cost-offset Analysis

Base-case Analysis

We have estimated one school district’s costs for providing additional support for students with mental health problems, and the potential cost-offsets if two evidence-based school preventive interventions targeting child mental health, Comet for Teachers and SET, were fully implemented in routine practice and fulfilling their effectiveness estimates (as per the two included interventions—a proposed intervention scenario). Cost-offset analysis, from a payers’ perspective, was used to evaluate the economic consequences of the proposed intervention scenario.

| Table 2: Unit Costs. (Euro, 2013) |
|-------------------------------|------------------|
| Unit                          | Cost             |
| Teacher                       |                  |
| Teacher’s salary per month    | 4,208            |
| Teacher’s salary per hour     | 26               |
| Extra teacher’s salary per month | 5,341        |
| Personal assistant            |                  |
| Personal assistant’s salary per month | 3,040     |
| Personal assistant’s salary per hour | 19          |
| Special education class*      |                  |
| Special education class per month | 5,728        |
| Regular costs for one student per month | 191         |
| Additional costs calculations |                  |
| Additional costs for special education class* per month | 4,198 |
| Additional costs for one student in special education class | 525     |
| Additional costs for one extra teacher per month | 5,150 |
| Rent of the venue             | 12               |

*A special education class is held by one full-time teacher (4,210 Euro) and one half-time personal assistant (1,520 Euro), that includes 8 students.

Costs of Additional Support in School

According to Swedish school law (2010:800 3 kap. §6-12), all students with extra needs have the right to receive additional support, and the local governments are responsible for paying for and providing this support. Students receive additional support after an investigation by the school principal. Sometimes students require both an extra teacher/personal assistant and a special education class.

A local government officer determines whether a student receives additional support, and the decision is reviewed one to two times per semester. During these reviews, a student with a mental health problem can receive an increase, decrease, or continue with the current amount of additional support. Importantly, the data collected for the current study only included students who received full time support; therefore, students who received additional support, but not weekly full day support, were not included in the study. The local government officer further recognized that some students required additional support as they aged, such as being placed into a special education class; therefore, the amount of extra services a student received was individualized and differed from year-to-year. According to the local government officer, students who received additional support in one year could be eligible for ongoing support the following year. However, there was no data on the actual number of students who received support over time. Since the present study was limited to the three aforementioned types of additional support (personal assistant, extra teacher, and special education class), we did not include students with severe mental health problems who were placed into alternative schools.
We applied the reduction in percentage of clinical mental health problems to the number of students in need of additional support, assuming that the effectiveness of the interventions corresponded to the effectiveness estimates from the included interventions. By reducing the prevalence of mental health problems, we expected gains for the local government in terms of lower costs for additional support. In the current study, we compared the monetary costs of the proposed intervention scenario with the monetary value of potential cost savings due to a reduction in the prevalence of four mental health problems. A “positive” cost offset occurred when savings exceeded the costs of the preventive interventions, resulting in the interventions hypothetically paying for themselves.

### Sensitivity Analyses

Several one-way sensitivity analyses were conducted to test the robustness of the results. First, we examined the changes in the results when changing the assumptions of the effectiveness of the interventions: 1a) the effectiveness estimates of Comet and SET were changed to either one of them being only 50%; 1b) we assumed both interventions to have 50% of their effects; 2) we assumed that the intervention would only affect the students with ADHD; and 3) only running costs were included. A threshold analysis showing the percentage reduction in cases needed to break even was also completed.

### Results

#### School Interventions Evaluated

The two preventive school interventions tackled different types of mental health problems. Comet for Teachers showed...
a 24% reduction in clinical cases in externalizing behavior (observed behavior), a 31% reduction in cases of externalizing behavior (BREB), and a 22% reduction in cases of hyperactivity, while SET had an estimated reduction of 12% in clinical cases of internalizing problems (e.g. anxiety and depression) (Table 1). Using the effectiveness of these interventions and creating the proposed intervention scenario, we estimated a reduction of 25 students with ADHD, 8 students with psychosocial problems, and 1 student with anxiety/depression to no longer need additional support one year after the interventions were implemented.

Intervention Costs
Total training costs amounted to 210,038 Euro for Comet for Teachers and 120,545 Euro for SET. Total running costs amounted to 110,902 Euro for Comet for Teachers, 456,759 Euro for SET (aged 6-11), and 318,132 Euro for SET (aged 12-16). The cost per student was 18 Euro for Comet for Teachers, 146 Euro for SET aged 6-11, and 102 Euro for SET aged 12-16. When including 20% of the training costs in the running costs, the total costs for Comet for Teachers was 154,297 Euro, 481,215 Euro for SET aged 6-11, and 318,132 Euro for SET aged 12-16. The overall total cost including both training and running costs for the two interventions was 953,643 Euro for the whole school district (Table 3).

Cost of Additional Support in School
In the school district there were 6,256 students, 310 of which received additional support in school for mental health problems. Of these, 143 received additional support due to ADHD (n = 111), psychosocial problems (n = 26), anxiety or depression (n = 6) (Table 4). The monthly cost for students with anxiety/depression was 30,900 Euro. For students with ADHD benefitting from a personal assistant or attending a special education class, the monthly cost was 158,080 Euro and 30,975 Euro, respectively. Students with psychosocial problems benefitting from either a personal assistant or attending a special education class incurred a cost of 36,480 Euro and 7,350 Euro per month, respectively. The total additional monthly cost for the local government for additional support for these 143 students was 263,785 Euro.

<table>
<thead>
<tr>
<th>Mental health problems</th>
<th>Number of students</th>
<th>Type of additional support</th>
<th>Unit costs</th>
<th>Costs per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety/Depression</td>
<td>6</td>
<td>Extra teacher</td>
<td>5,150</td>
<td>30,900</td>
</tr>
<tr>
<td>ADHD</td>
<td>52</td>
<td>Personal assistant</td>
<td>3,040</td>
<td>158,080</td>
</tr>
<tr>
<td>ADHD</td>
<td>59</td>
<td>Special education class</td>
<td>525*</td>
<td>30,975</td>
</tr>
<tr>
<td>Psychosocial problems</td>
<td>12</td>
<td>Personal assistant</td>
<td>3,040</td>
<td>36,480</td>
</tr>
<tr>
<td>Psychosocial problems</td>
<td>14</td>
<td>Special education class</td>
<td>525*</td>
<td>7,350</td>
</tr>
<tr>
<td>Total costs</td>
<td></td>
<td></td>
<td></td>
<td>263,785</td>
</tr>
<tr>
<td>Per month</td>
<td></td>
<td></td>
<td></td>
<td>1,845</td>
</tr>
<tr>
<td>Per student and month</td>
<td></td>
<td></td>
<td></td>
<td>2,637,850</td>
</tr>
<tr>
<td>Per school year</td>
<td></td>
<td></td>
<td></td>
<td>18,447</td>
</tr>
</tbody>
</table>

*Cost per student in special education class

Table 4: Number of Students with Mental Health Problems, Additional Support and Additional Costs. (Euro, 2013)

<table>
<thead>
<tr>
<th>Mental health problems</th>
<th>Additional support</th>
<th>Number of students</th>
<th>Reduction in prevalence of mental health problems (%)</th>
<th>Reduction in cases</th>
<th>Costs per month after reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety/Depression</td>
<td>Extra teacher</td>
<td>6</td>
<td>12</td>
<td>30,900</td>
<td>25,750</td>
</tr>
<tr>
<td>ADHD</td>
<td>Personal assistant</td>
<td>52</td>
<td>24</td>
<td>158,080</td>
<td>121,600</td>
</tr>
<tr>
<td>ADHD</td>
<td>Special education class</td>
<td>59</td>
<td>22</td>
<td>30,975</td>
<td>24,150</td>
</tr>
<tr>
<td>Psychosocial problem</td>
<td>Personal assistant</td>
<td>12</td>
<td>31</td>
<td>36,480</td>
<td>24,320</td>
</tr>
<tr>
<td>Psychosocial problem</td>
<td>Special education class</td>
<td>14</td>
<td>31</td>
<td>7,350</td>
<td>5,250</td>
</tr>
<tr>
<td>Total cost</td>
<td></td>
<td></td>
<td></td>
<td>263,785</td>
<td>201,070</td>
</tr>
<tr>
<td>Cost-offset</td>
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<td></td>
<td></td>
<td></td>
<td>62,715</td>
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<tr>
<td>Difference per month</td>
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<td></td>
<td>627,150</td>
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<tr>
<td>Difference per school year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,236,050</td>
</tr>
</tbody>
</table>

Table 5. Economic Analysis. (Euro, 2013)
or 1,845 Euro per student. The total cost per school year was 2,637,850 Euro, or 18,447 Euro per student (Table 4).

Cost-offset Analysis

Base-case Analysis

The reduction in prevalence of mental health problems led to a decrease in costs by 62,715 Euro per month, which equated to 627,150 Euro for one school year (ten months) and 1,236,050 Euro for two school years, using a 3% discounting rate in the second year. As stated in Table 3, the interventions cost 953,643 Euro, which indicated that the local government would receive a return on their investment after less than two years (1.5 years) after implementing the interventions (627,150 Euro per year) (Table 5).

Sensitivity Analyses

Overall, the sensitivity analyses showed that variations in the assumptions had little impact on the outcomes. Larger savings were possible if Comet for Teachers maintained its full effect while SET only maintained half of its effect, than when the scenario was reversed. Further, if both intervention effects were reduced by 50%, the cost offsets would be halved. Moreover, if the interventions targeted only students with ADHD, the cost offsets would decrease by 200,000 Euro. The threshold analysis showed that if the effectiveness of both programs increased by 52%, the local government would get a return on their investment after less than two years (1.5 years) after implementing the interventions (627,150 Euro per year) (Table 6).

Discussion

The current study estimated the costs of schools’ additional support for students with mental health problems, and the potential costs of using two evidence-based school preventive interventions targeting children’s mental health problems. A cost-offset analysis was conducted to investigate if investing in these two evidence-based school prevention interventions could be financially cheaper than paying for extra teachers, personal assistants, and special education classes to work with students with mental health problems. The results show that the proposed intervention scenario could have limited, but effective outcomes that can both improve students’ mental health status and reduce the costs for the responsible payer, who could receive a return on their investment within two years (1.5 years). Although both interventions are effective at reducing mental health problems, they should be seen as examples of successful interventions that promote mental health; therefore, they are not the only preventive interventions available and should not be seen as the only solution to reduce mental health problems in school settings.

Implications for Health Policy

Currently, the Swedish National Agency of Education guidelines mandate local governments to use a reactive approach; that is, only to provide additional support to students with mental health problems via an extra teacher, personal assistant, or place the student in a special education class. Our study suggests the creation of an additional policy at the local government level that uses a proactive approach via the implementation of preventive interventions, which could improve the mental health status of a greater proportion of students, and thus lead to a decrease in the need for additional support. This proactive approach has the additional benefit of reallocating limited resources to other areas of education, thus possibly improving more child outcomes. Importantly, the implementation of a proactive policy is in line with the Swedish government’s statement on focusing on preventive actions, which provide students with protective factors for mental health problems.

Importance of Economic Evaluation

Our study provides the local government decision-makers with an indication of the costs and potential cost offsets associated with the use of preventive interventions. Furthermore, utilizing preventive interventions in schools may lead to other individual and societal benefits, such as improved school performance and longer term productivity.
impacts.10-13,41 To further expedite and help motivate policy changes, future research should continue looking at the possible benefits preventive interventions can bring to the community, especially in terms of health economic evaluations.

Local governments can further aid future economic evaluations if they collect more detailed data on how their budget is spent. For example, it is unknown for how many years a particular student receives additional support services (i.e. quantity) or the intensity of support they receive (i.e. quality). Further, data on all of the different mental health problems is not collected. For example, we cannot differentiate between those with anxiety and depression problems. Furthermore, the local government cannot disaggregate the salaries of additional support personnel, and therefore we have to use average salaries to estimate costs. Lastly, the local government does not collect data on how effective their current practices are at improving child mental health. This may be because these services are there to provide additional support to students, rather than having the explicit aim of working toward reducing child mental health problems. These data limitations reduce the types of analyses that can be performed.

**Strengths and Limitations**

One of the limitations to this study is that the results may not generalize to all students with mental health problems. The generalizability of these findings may be limited to those students who attend a regular school setting and limited to the four mental health problems studied. However, these are some of the most pervasive mental health problems in students,3,5 and therefore determining strategies to reduce them is important.44 A second limitation is that the overall costs may be underestimated, as administration costs were not calculated for the preventive interventions, for the additional support, or for teacher turnover. Future research should further explore the true costs of providing students with additional school-based services (from the time they start receiving additional support until they no longer require it) and compare those results with different preventive interventions’ benefits and costs. A third limitation is the calculation of the reduction in the number of students who needed additional support due to mental health problems, since the effect sizes are only based off of two effectiveness studies. While the effectiveness of Comet for Teachers was tested on a clinical population, we estimated clinical cases for SET, using the assumption that to receive additional support, the student had to be in the top 5% of clinical cases and that internalizing mental health problems were normally distributed. After this assumption was made, we estimated a reduction in the number of students needing additional support. If students only needed to be in the top 10% of clinical cases to receive additional support, then our results would show even more improvement from clinical to non-clinical cases. Lastly, the running cost for Comet for Teachers was estimated, because this information was not included in previously published reports. To do this, a similar school program, Good Behavior Game,32 running costs were used.

One of the main strengths of this study is that it uses real data; that is, it utilizes the actual costs of employing extra teachers, personal assistants, and those teachers who work in special education classrooms in Sweden. This in turn allows decision makers to understand the true costs of providing the current services. This data is important since there is a lack of quality data at the local level that hinders economic evaluations.7,41 A potential limitation to this type of data collection is that the cost calculations are from one school district in one local government, and therefore the costs may change when considering prevalence rates at a national level. The costs may further change as teacher turnover occurs, and new teachers need to subsequently be trained to use the preventive interventions. Also, the presented costs may have underestimated the costs of children living with mental health problems, because we only estimated the school-based costs for one year of services using the payers’ perspective. If we included additional societal costs of having mental health problems (e.g. services received outside of the school setting, but still provided and paid for by the local or the national government) or if we added in costs from the schools based on how many years each student received additional support services, then students’ costs of living with mental health problems would increase significantly. On the other hand, students who would still receive additional support after going through the preventive interventions may still benefit from these interventions, and therefore have a partial mental health improvement. This could thus reduce the number of hours the student needs additional support services. However, partial reduction benefits are beyond the scope of this paper. Despite these limitations, this study is one of the first to collect real costs of employing extra teachers and personal assistants to support students with mental health problems and calculate the costs for the responsible payer for an entire school year.

A second strength is that the study uses previous research findings in a way to highlight to decision makers how research can be used to inform policy decisions. We have used the effectiveness measures of interventions to estimate what resources from a local government perspective might be saved and have demonstrated that the potential savings may exceed the costs within two years. While such cost analyses are fairly easy to understand for many interventions, such demonstrable cost savings are not always possible. Therefore, the use of health indices, such as QALYs remains vitally important. A limitation to such potential cost-offset analyses is that this, and other such studies, tend to be theoretical in nature, as the proposed intervention scenario has not yet been tested in a real world setting. However, these interventions have been field tested in a Swedish school setting by teachers; thus the effect sizes should closely resemble real-life scenarios. The effects are estimated to last over one year, since the interventions are assumed to be continuously used after their implementation. The effect sizes taken from the studies were also shown to last over a year (14 months for Comet for Teachers and 5 years for SET).
Conclusions

The proposed intervention scenario has the potential to reduce the number of students who need additional support for their mental health problems (i.e. ADHD, psychosocial problems, and anxiety/depression) in school and thus require less additional support, potentially allowing the local governments to make a return on their investment within two years (1.5 years). Additionally, the interventions may also provide health benefits to other students in the class. However, preventive school interventions do not reduce all students’ mental health problems below the threshold of not needing additional support; thus these services will still be required for these students. Decision makers can use this study as evidence that there are alternative ways to improving students’ mental health statuses via utilizing a proactive approach in addition to the current reactive approach.

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References


34. The Swedish National Agency for Education. *Working with action programs for students needing extra support [Arbete med åtgärdsprogram för elever i behov av särskilt stöd], Stockholm: The Swedish National Agency for Education, 2013.*


