



Return on Investment: Prevention in mental health

School based psychological interventions to prevent depression in young people

Background

Major depression is a common mental illness characterised by persistent feelings of sadness, hopelessness and/or the inability to feel pleasure from normally enjoyable activities. It is among the top five leading causes of disability among youth aged 10-24 years in Australia and across the globe (1). The 12 month prevalence of depression among young people aged 4-17 years is 2.8% in Australia (2). Mental health influences student engagement and learning outcomes. Young Australians with a diagnosis of depression have the lowest rates of school attendance and reduced academic performance at school relative to other mental illnesses in childhood and adolescence (2). Poorer academic outcomes at school can result in lower potential career earnings for affected students as they transition into adulthood. Psychological distress, self-harm, suicidal behaviours, smoking and alcohol consumption are also markedly higher among adolescents with depression relative to those who are not depressed (2). In adulthood, a diagnosis of depression can lead to substantive healthcare costs and productivity losses. For instance, it has been estimated that depression resulted in total healthcare costs of \$392 million and productivity losses of \$4,350 million among adults in Australia during 2013-14 (3). The widespread impacts of depression highlight the need for intervention. Research shows that people who have previously experienced an episode of depression are more likely to develop a repeat episode in the future (4). Intervening early in the life course of an individual could have follow on benefits in both preventing a first episode of depression and subsequently reducing the risk of recurrence later in life (5).

Intervention modelled

Schools have been recognised as an important platform for the delivery of interventions to prevent the onset of depression in young people (6). Universal psychological interventions have been found to be effective in preventing depression when delivered to students in school settings (7,8). Universal school interventions target all students regardless of their underlying risk of developing depression and typically involve a trained facilitator (e.g. a teacher or psychologist) delivering a series of psychotherapy modules (e.g. cognitive behavioural therapy) to a classroom of students.

The current study modelled the cost effectiveness of delivering universal school interventions to Australian school students in Years 6 to 12. The intervention chosen was based on eight trials which have demonstrated that universal school interventions are able to reduce the risk of developing major depression in the near future (9-16). Teachers were trained in the face to face delivery of psychotherapeutic intervention materials by a visiting psychologist. These teachers then delivered a series of intervention modules to students in the classroom. The risk of developing major depression was reduced by 53% immediately after receiving the intervention and 38% around 6 months after receiving the intervention. Intervention effectiveness was only modelled in the first year as intervention effects greatly diminished one year after the intervention. No evidence was available to estimate the impact of providing additional booster sessions to maintain the intervention effect after the first year. Additionally, intervention effects were assumed to apply equally across all ages in the model.

The primary outcome of this evaluation is the return on investment (ROI) ratio. This ratio includes the cost of the intervention in relation to any cost savings (i.e. healthcare cost savings and productivity gains). For an intervention to be considered cost effective, it would need to have a

ROI ratio greater than 1. This means that the cost savings are greater than the costs of the intervention (e.g. a ROI ratio of 1.5 means that for every \$1 invested, there will be a gain of \$1.50).

Assumptions

The costs of the universal school intervention include the costs of training and intervention delivery. All salary costs described below include 30% on costs, such as annual leave loading and superannuation.

Training. Psychologists spent 9.5 hours training five teachers at each participating school to deliver the intervention. The rate of participation among schools was assumed to be 55% or 1,466 schools (17). The hourly rate for a psychologist was \$57 per hour and teacher's time was valued at \$54 per hour (18). Travel costs incurred by psychologists were valued at \$8.62 per training session (19).

Intervention delivery. Teachers delivered 11 sessions lasting 1.2 hours each to classrooms with an average size of 23 students (9-16). The rate of participation among students was 76% or 840,431 students (9-16). Teacher's time was again valued at \$54 per hour (18).

Cost savings. Healthcare cost savings were calculated by assuming that the cost of treating depression in young people was equal to a previous estimate of the cost of treating depression in adults (no comparable estimate was available for young people) (3). Productivity gains comprised two components: 1) productivity gains among parents who take less time off work to care for their children (aged <18 years) due to school absence days attributable to depression; and 2) productivity gains among former students (aged ≥18 years) who enter the adult workforce and experience reductions in lost work days due to fewer cases of depression. The average wage foregone by parents (after

adjustment for the average employment rate) was estimated to be \$224 per school absence day (18), while the average wage foregone by students who enter the adult workforce was also estimated to be \$224 per lost work day (18).

Alternative scenarios

Scenario 1. This scenario modelled the long term effectiveness of the intervention by assuming that the intervention effect lasted for five years and decreases by 50% in each successive year.

Scenario 2. This scenario only models either the youngest or oldest age group – i.e. students in Year 6 or Year 12 respectively. This was done to compare the cost effectiveness of delivering the intervention to younger students who have a lower incidence of depression (Year 6) and older students who have a higher incidence of depression (Year 12). Data used in the model suggested that the incidence of depression was highest at 21 years of age (i.e. four years after graduating from Year 12).

Scenario 3. This scenario tested what would happen if the intervention was made compulsory as part of the education curriculum, i.e. that the rate of participation among students was 100%.

Scenario 4. This scenario tested what would happen if the intervention was delivered over a shorter timeframe, i.e. in 6 sessions instead of 11.

Results

Cost effectiveness findings

The universal school intervention to prevent depression produced a favourable ROI ratio of 1.19 after ten years (see Table 1).

This means that for every \$1 invested in the intervention, there is a return of \$1.19 within ten years of the intervention. The intervention cost approximately \$31 million or \$37 per student. A small time lag was observed between the application of the intervention in the first year and the occurrence of improved health outcomes and cost savings in later years. It follows that a medium to long term perspective should be adopted when considering the cost effectiveness of the universal school intervention.

When analysing health outcomes, the universal school intervention resulted in **10,604 fewer depression cases** and a total of **3.8 million depression free days** over ten years.

Results from alternative scenarios

Scenario 1 assumed that the intervention continued to be effective over the long term. This led to an increased ROI ratio of 2.21 after ten years. Scenario 2 tested the impact of only modelling students in Year 6 and Year 12. Only modelling students in Year 6 led to a lower ROI ratio of 0.63, while only modelling students in Year 12 produced a higher ROI ratio of 1.51. These differences were primarily driven by the smaller number of depression cases averted among Year 6 students when compared to Year 12 students (795 and 2,260 respectively). Scenario 3 tested the impact of assuming that 100% of students participated in the intervention. This led to a similar ROI ratio of 1.21. Scenario 4 assumed that the intervention was delivered over 6 sessions. This produced a higher ROI ratio of 2.00.

Table 1. Summary of results for the universal school intervention to prevent depression in young people

	Year 1	Year 2	Year 3	Year 4	Year 5-10	Total
Intervention costs	\$31.14M	-	-	-	-	\$31.14M
Cost to government	\$31.14	-	-	-	-	\$31.14M
Cost savings	-\$16.41M	-\$17.41M	-\$2.60M	-\$0.50M	-\$0.14M	-\$37.06M
Healthcare cost savings	-\$3.77M	-\$4.24M	-\$0.68M	-\$0.14M	-\$0.04M	-\$8.87M
Productivity gains	-\$12.64M	-\$13.17M	-\$1.92M	-\$0.36M	-\$0.10	-\$28.19M
Net intervention costs (saving if negative)	\$14.73M	-\$17.41M	-\$2.60M	-\$0.50M	-\$0.14M	-\$5.92M
Cumulative ROI	0.53	1.09	1.17	1.19	1.19	1.19
Depression free days	1,622,363	1,816,014	282,184	56,635	18,187	3,795,383
Depression cases averted	4,442	5,123	819	169	51	10,604
Cumulative cost per depression case averted (saving if negative)	\$3,316	-\$280	-\$508	-\$548	-\$558	-\$558

Notes: ROI: return on investment per \$1 invested

Implementation considerations

While evidence on cost effectiveness is the focus of this project, there are other criteria apart from cost effectiveness that can influence whether and to what degree interventions are likely to be rolled out in routine practice. These criteria are not captured in the technical cost effectiveness results but are potentially very important from a decision making context. Some of these considerations are summarised in the Table below. The colour coding of each criterion is an attempt to visually summarise whether these secondary considerations impact on the results in a positive or negative way (red = negative, amber = uncertain, green = positive). A code of 'green' implies that the secondary consideration strengthens the case for investing in the intervention. A code of 'amber' means that the secondary consideration reduces certainty in the case for investing and a code of 'red' means that these considerations do not support investment in the intervention.

Implementation considerations		Overall Rating
Potential secondary effects	Other impacts such as improvements in academic achievement and the long term impact on career related opportunities in adulthood were not analysed. This represents a conservative approach that is likely to underestimate the benefits resulting from the intervention.	Positive
Equity	Potential to reduce inequities of access to this type of intervention due to the intervention being delivered universally to all students.	Positive
Strength of evidence	The quantity and quality of evidence supporting the effectiveness of universal interventions to prevent depression in schools was moderately strong. However, the intervention effect was observed to deteriorate after one year of follow up. Furthermore, previous intervention studies did not exclude participants who had previously experienced depression. This may overstate intervention effectiveness due to the additional benefit of relapse prevention among those who have previously been diagnosed with depression.	Uncertain
Acceptability	The intervention has a reasonable likelihood of being acceptable to parents and students, especially if integrated as part of the broader school curriculum. However, the willingness of teachers to be directly involved in delivering the intervention in the classroom is uncertain. It is also unclear whether a majority of schools would be willing to participate in the intervention if it were rolled out on a voluntary basis. Extensive uptake of intervention materials by schools and their students is vital if it is to produce the intended benefits.	Uncertain
Feasibility	Implementing the intervention will require significant commitments and time from teachers and schools. Any prospective roll out of this intervention should be undertaken as part of 'Be You' – a national initiative led by Beyond Blue to support young people's mental health in schools (20).	Negative
Sustainability	It is questionable whether schools/the government would be willing to support the program over the long term, particularly since there are overlapping programs currently implemented within schools.	Uncertain

Recommendations

At present, universal psychological interventions to prevent depression are not widely implemented across schools in Australia. The ROI findings produced by this study indicate that universal psychological interventions should be considered for implementation in Australian schools, subject to ongoing evaluation to ensure the effectiveness is replicated in the real world setting. Any foreseeable implementation of universal prevention in schools needs to be sensitive to the burden placed on teachers who would be required to take on an additional workload in order to deliver the intervention. The 'Aussie Optimism Program' and 'Check it Out!' resources on the 'Be You' website (www.beyou.edu.au) are both psychological interventions to prevent depression that are suitable for universal delivery [20].

Take home messages

Universal school interventions are likely to produce net cost savings over the medium to long term and could be considered for adoption in Australian schools, subject to ongoing evaluation. However, any prospective implementation will need to be sensitive to the additional burden placed on teachers who are responsible for delivering the intervention. Alternative modes of delivery, such as online e-Health modules disseminated via mobile apps or the use of a dedicated intervention facilitator employed by the school or an external organisation, should be explored.

References

1. Institute for Health Metrics and Evaluation (IHME). GBD Compare Data Visualization (Online). IHME. 2018 (cited 26 Feb 2019); Available from: <http://vizhub.healthdata.org/gbd-compare>
2. Lawrence D, Johnson S, Hafekost J, Boterhoven de Haan K, Sawyer MG, Ainley J, et al. The Mental Health of Children and Adolescents: Report on the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. Canberra: Department of Health; 2015.
3. Lee YC, Chatterton ML, Magnus A, Mohebbi M, Le LK, Mihalopoulos C. Cost of high prevalence mental disorders: Findings from the 2007 Australian National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry* 2017;51(12):1198-211.
4. Burcusa SL, Iacono WG. Risk for recurrence in depression. *Clin Psychol Rev* 2007;27(8):959-85.
5. Allen NB, Hetrick SE, Simmons JG, Hickie IB. Early intervention for depressive disorders in young people: the opportunity and the (lack of) evidence. *Med J Aust* 2007;187(7 Suppl):S15-7.
6. Fazel M, Hoagwood K, Stephan S, Ford T. Mental health interventions in schools 1: Mental health interventions in schools in high-income countries. *Lancet Psychiatry* 2014;1(5):377-87.
7. Hetrick SE, Cox GR, Witt KG, Bir JJ, Merry SN. Cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in

children and adolescents. *Cochrane Database Syst Rev* 2016(8):CD003380.

8. Stockings EA, Degenhardt L, Dobbins T, Lee YY, Erskine HE, Whiteford HA, et al. Preventing depression and anxiety in young people: a review of the joint efficacy of universal, selective and indicated prevention. *Psychol Med* 2016;46(1):11-26.
9. Cardemil E, Reivich K, Seligman M. The prevention of depressive symptoms in low-income minority middle school students. *Prev Treat* 2002;5(8):1-31.
10. Gillham JE, Reivich KJ, Brunwasser SM, Freres DR, Chajon ND, Kash-Macdonald VM, et al. Evaluation of a group cognitive-behavioral depression prevention program for young adolescents: a randomized effectiveness trial. *J Clin Child Adolesc Psychol* 2012;41(5):621-39.
11. Quayle D, Dziurawiec S, Roberts C, Kane R, Ebsworthy G. The effect of an optimism and lifeskills program on depressive symptoms in preadolescence. *Behav Change* 2001;18(4):194-203.
12. Rivet-Duval E, Heriot S, Hunt C. Preventing adolescent depression in Mauritius: a universal school-based program. *Child Adol Ment Health* 2011;16(2):86-91.
13. Rooney R, Hassan S, Kane R, Roberts CM, Nesa M. Reducing depression in 9-10 year old children in low SES schools: a longitudinal universal randomized controlled trial. *Behav Res Ther* 2013;51(12):845-54.
14. Rooney R, Roberts C, Kane R, Pike L, Winsor A, White J, et al. The prevention of depression in 8- to 9-year-old children: a pilot study. *Aust J Guid Counsell* 2006;16(1):76-90.
15. Rose K, Hawes DJ, Hunt CJ. Randomized controlled trial of a friendship skills intervention on adolescent depressive symptoms. *J Consult Clin Psychol* 2014;82(3):510-20.
16. Shatte A. Prevention of depressive symptoms in adolescents: issues of dissemination and mechanisms of change (PhD thesis). Philadelphia, PA: University of Pennsylvania; 1997.
17. MindMatters. MindMatters (Online). beyondblue. 2018 (cited 6 October 2018); Available from: <https://www.mindmatters.edu.au/>
18. Australian Bureau of Statistics. 6306.0 - Employee Earnings and Hours, Australia, May 2016 (Online). ABS. 2017 (cited 20 Jan 2019); Available from: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/6306.0/>
19. Vos T, Carter R, Barendregt JJ, Mihalopoulos C, Veerman JL, Magnus A, et al. Assessing Cost-Effectiveness in Prevention (ACE-Prevention): Final Report. Brisbane: University of Queensland; 2010.
20. Beyond Blue. Be You (Online). Australian Government. 2019 (cited 17 Apr 2019); Available from: <https://beyou.edu.au/>