Behaviour Research and Therapy 75 (2015) 1–10

Contents lists available at ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

Moderators of the effects of indicated group and bibliotherapy cognitive behavioral depression prevention programs on adolescents' depressive symptoms and depressive disorder onset

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ARTICLE INFO

Article history:
Received 3 April 2015
Received in revised form
24 August 2015
Accepted 5 October 2015
Available online 9 October 2015

Keywords:
Depression
Prevention
Adolescence
Cognitive-behavioral
Moderators

ABSTRACT

We investigated factors hypothesized to moderate the effects of cognitive behavioral group-based (CB group) and bibliotherapy depression prevention programs. Using data from two trials ($N = 631$) wherein adolescents (M age = 15.5, 62% female, 61% Caucasian) with depressive symptoms were randomized into CB group, CB bibliotherapy, or an educational brochure control condition, we evaluated the moderating effects of individual, demographic, and environmental factors on depressive symptom reductions and major depressive disorder (MDD) onset over 2-year follow-up. CB group and bibliotherapy participants had lower depressive symptoms than controls at posttest but these effects did not persist. No MDD prevention effects were present in the merged data. Relative to controls, elevated depressive symptoms and motivation to reduce depression amplified posttest depressive symptom reduction for CB group, and elevated baseline symptoms amplified posttest symptom reduction effects of CB bibliotherapy. Conversely, elevated substance use mitigated the effectiveness of CB group relative to controls on MDD onset over follow-up. Findings suggest that both CB prevention programs are more beneficial for youth with at least moderate depressive symptoms, and that CB group is more effective for youth motivated to reduce their symptoms. Results also imply that substance use reduces the effectiveness of CB group-based depression prevention.

Depression is one of the most prevalent psychiatric disorders experienced by adolescents and often recurs during adulthood (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Adolescent depression is associated with suicidal behavior, substance abuse, interpersonal problems, academic failure, and comorbid psychopathology (e.g., Klein, Torpey, & Bufferd, 2008). Despite the significance of depressive disorders, less than 50% of depressed adolescents receive treatment (Kessler, Avenevoli, & Ries Merikangas, 2001), suggesting the need for effective depression prevention programs that could be widely implemented.

Various cognitive-behavioral (CB) depression prevention programs have reduced depressive symptoms and future depressive disorder onset in adolescents, but the average magnitudes of effect have been small to moderate, with smaller average effects for universal versus selective or indicated programs (Horowitz & Garber, 2006; Stice, Shaw, Bohon, Marti, & Rohde, 2009). However, the effectiveness of such programs can vary considerably depending on individual, environmental, and demographic factors, highlighting the need to investigate potential moderators of depression prevention program effects, a central concept in personalized medicine. Moderational analyses are important for several reasons. First, knowledge about moderators provides information regarding the conditions under which optimal prevention effects occur. Second, neglecting potential moderators of prevention effects can lead to misinterpretation of results (Tram & Cole, 2000). Third, determining which individuals are most or least likely to benefit from an intervention can inform optimum inclusion and exclusion criteria. For instance, through moderation analyses youth that are unlikely to benefit from a specific prevention program or even experience iatrogenic effects can be identified, and this may provide direction regarding alternative intervention for those individuals. Fourth, moderation analyses may also lead to program refinement because important aspects that contribute to the effectiveness of a program for a specific population can be

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http://dx.doi.org/10.1016/j.brat.2015.10.002
0005-7967/

discovered. Conversely, documenting that there are few moderators for an intervention in an adequately powered evaluation would suggest that the intervention is effective for a broad range of individuals and could be widely implemented. Information about all of these aspects helps to maximize economical and cost-effective program dissemination. Thus, moderators can serve to provide specific, novel, and valuable information which guides future modification of intervention decision making and program development.

We examine potential moderators of the effects of a 6-h CB depression prevention group program and an individual CB bibliotherapy program relative to an educational brochure control condition and to each other among adolescents with elevated depressive symptoms. The approach taken has several strengths that allow us to extend previous literature. First, by examining two active interventions relative to each other and a control condition, it is possible to directly compare which of the two active interventions works best for participants with certain characteristics. Second, the availability of data through 2-year follow-up makes it possible to identify moderators that affect program effects on a long-term basis. Third, by focusing on two outcomes – depressive symptom severity and major depressive disorder (MDD) onset – we evaluate potential subgroup effects on two critical prevention outcomes. Whereas depressive symptom severity as an outcome has been investigated in several moderation studies (e.g., Curry et al., 2006; Garber et al., 2009; Gau, Stice, Rohde, & Seeley, 2012), to our knowledge, only one previous study has examined moderators of the effect of depression prevention programs on depressive disorder onset (Garber et al., 2009); these investigators examined whether current parental depression, current adolescent depressive symptoms and adolescent history of mood disorder moderated the impact of CB prevention on depressive disorder onset, finding that current parental depression reduced the efficacy of CB group, a moderating effect that persisted over follow-up (Beardslee et al., 2013). Although reduction of depressive symptoms is an important objective of depression prevention programs especially in selective and indicated programs, the ultimate goal of depression prevention efforts is the prevention of depressive disorder onset. Therefore, it is vital to extend previous literature examining moderators of depressive symptom reductions by also investigating moderators of depression onset. Fourth, as previous moderation analyses have generally been conducted with data from a single trial and subsequently had limited power to identify moderators, we created a merged data set from a large efficacy trial (Stice, Rohde, Seeley, & Gau, 2008) and a large effectiveness trial (Rohde, Stice, Shaw, & Brière, 2014). Merging data sets provides us with the opportunity to investigate moderating effects of the depression prevention programs on MDD onset in a more adequately powered sample. Merging data results in higher statistical power from larger sample size and a greater representation of specific subgroups and risk factors. This maximizes sensitivity to detect moderating effects. Furthermore, pooling data from multiple trials provides a cost- and resource-effective alternative to gather information prior to collecting new data on the effectiveness of a specific program.

The efficacy trial investigated a 6-h CB depression prevention group program, an individual CB bibliotherapy program, and a supportive-expressive group intervention versus an educational brochure control condition in 341 adolescents with elevated depressive symptoms (Stice, Rohde et al., 2008). At posttest, CB group participants showed significantly greater depressive symptom reductions than participants in all other conditions. All three interventions led to significantly greater symptom reductions versus controls at 6-month follow-up. By 1-year follow-up, participants in the CB group showed significantly greater symptom reductions than controls and by 1- and 2-year follow-up also compared to CB bibliotherapy but not to supportive-expressive group participants. By 2-year follow-up, CB group and CB bibliotherapy participants showed significantly lower rates of major/minor depressive disorder onset than controls (Stice, Rohde, Gau, & Wade, 2010). The effectiveness trial tested whether the effects of these two CB prevention programs remained, relative to educational brochure controls, when school clinicians recruit adolescents with depressive symptoms and deliver the interventions under ecologically valid conditions with 378 adolescents with elevated depressive symptoms (Rohde et al., 2014). CB group participants scored lower on depressive symptoms than controls at posttest. By 6-month follow-up CB group participants showed a significantly lower MDD onset relative to bibliotherapy and control participants; this effect was maintained by 2-year follow-up comparing CB group to CB bibliotherapy, though the difference compared to controls did not reach significance (Rohde, Stice, Shaw, & Gau, 2015).

The combined sample for this study included data from 631 participants assigned to three conditions (we did not include those randomized to supportive-expressive group because that condition was not included in the effectiveness trial) from 11 high schools in 2 regions of the US. We examine eight potential moderators of the effects of CB interventions on depressive symptoms: four individual factors (depressive symptom severity, substance use, motivation to reduce depression, attributional style), two sociodemographic factors (sex, age), and two environmental factors (social support from friends and family, negative life events).

Individual factors. First, we hypothesized stronger intervention effects for youth with higher initial depressive symptoms. Meta-analyses indicate that programs targeting participants with high initial symptoms typically produce stronger depressive symptom reductions than universal programs (Horowitz & Garber, 2006; Stice et al., 2009). Individual trials have also found that symptom reductions in prevention trials are stronger for participants with high versus low baseline symptoms (e.g., Jaycox, Reivich, Gillham, & Seligman, 1994; Spence, Sheffield, & Donovan, 2003; Tandon et al., 2015; Wilksch & Wade, 2014). Theoretically, those with elevated symptoms have greater potential to show symptom reductions. Moreover, those youth who already suffer from high depressive symptoms at baseline are able to apply the skills taught in the CB programs to their current negative mood state and cognitions, and are also more likely to experience a higher level of suffering which should lead to greater motivation to work on reducing their symptoms. Second, we anticipated stronger effects for participants with more initial motivation to reduce depressive symptoms. Readiness to change should provide motivation to participate in the program exercises and homework assignments, which should promote skill acquisition (Stice, Marti, Shaw, & O'Neil, 2008). Trials with various psychiatric disorders in adults have found that high motivation to reduce initial symptoms predicts participants' treatment response (Keijsers, Schaap, Hoogduin, Hoogsteyns, & de Kemp, 1999) and that adolescents with higher motivation during participation in a depression prevention program experienced greater depressive symptom reductions at follow-up (Kindt, Kleinjan, Janssens, & Scholte, 2014). In our efficacy prevention trial, motivation to reduce depressive symptoms did not moderate program effects (Gau et al., 2012), but we expect that the larger data set used for this report will provide a more sensitive test of this potential moderator. Third, we hypothesized that substance use would moderate CB intervention effects with concurrent substance users benefitting less from the CB intervention than non-users. Depressive symptoms and substance use are correlated in youth (O'Neil, Conner, & Kendall, 2011) and substance use may contribute to depression onset and maintenance, possibly reducing participants' motivation to apply the skills taught in the