

ORIGINAL**Changes of levels of depression and quality of life after short-term cognitive behavioral educational program for adolescent students in health class**Atsuko Aki¹ and Masahito Tomotake²¹Graduate School of Health Sciences, Tokushima University, Tokushima Japan, ²Department of Mental Health, Institute of Biomedical Sciences, Tokushima University Graduate School, Tokushima Japan

Abstract : **Aims :** The purpose of the present study was to evaluate the changes of levels of depression and quality of life in adolescent students after receiving short-term cognitive behavioral educational program in health class for stress management. **Methods :** Subjects were 176 middle school students aged 12 to 14 years. They completed the Depression Self-Rating Scale for Children (DSRS-C) and the Revised Children Quality of Life Questionnaire (Kiddo-KINDL^R) before, after and 6-months after the program. The three-session program consisted of psychoeducation and learning skills of cognitive restructuring and problem solving. **Results :** The total scores of the DSRS-C and the Kiddo-KINDL^R in all subjects did not significantly change after the completion of program. However, as for the high risk group (score of the DSRS-C ≥ 16), significant improvement in the two scales was found after the program. Especially, depression level in the high risk group significantly decreased and the improvement was maintained 6-months later. **Conclusion :** These results suggest that this type of approach may be effective for adolescents with high risk of depression in terms of improving not only depressive symptom but also quality of life. *J. Med. Invest.* 62 : 204-208, August, 2015

Keywords : adolescent, cognitive behavioral approach, health class, depression, quality of life

INTRODUCTION

Recently, various psychiatric problem in adolescents have been reported and much more attention has been paid to intervention to improve mental health problems of adolescents (1-3). As it was considered that early intervention or preventive approach might be useful, researchers conducted a variety of approaches to prevent mental health problems or greater difficulties that might lead to school refusal or dropout (4). As for the treatment modality, cognitive behavioral approach has been reported to be promising in treating diverse mental disorders in adolescents (5, 6). Therefore, some researchers have developed school-based intervention measures based on cognitive behavioral theory (7).

Depressive symptoms have been found to be common in adolescents (8, 9) and several psychosocial risk factors have been identified so far. Some of them are negative life events, relationship difficulties, interpersonal skill deficits and cognitive distortion. (10-13) Considering these factors, intervention aiming at enhancing skills of problem-solving and cognitive restructuring seems to be crucial in decreasing the risk of depression (14, 15).

As for the type of intervention, there are three main ways, namely universal type approach involving whole populations, selective type approach doing certain group with high risk of mental problems, and indicated type approach focusing on individuals showing signs or symptoms of a disorder (16). Among the three, universal type approach has been reported to be associated with lower dropout and greater participation rates than the other two (5, 17). Universal type approach also has some additional advantages such as avoiding participant stigma and labeling effects of being singled out, and

treating individuals with a wide range of risk factors (18). Some researchers have suggested that universal type program based on cognitive behavior theory would be effective for depressive and anxiety symptoms of adolescents (7, 19, 20).

Although cognitive behavioral approach has been reported to enhance subjective well-being and self-esteem as well as to decrease depression and anxiety (4, 21, 22), as far as we know, there is no study investigating changes of levels of depression and quality of life (QOL) of adolescents after short-term cognitive behavioral educational program in health class. Therefore, the purpose of this study is to evaluate the changes of the two indices by implementation of the program.

METHOD*Subjects and procedure*

Subjects were 176 adolescent students aged 12 to 14 years from three middle schools in a rural town in Japan. 73 were male and 103 female, and 128 were in the first grade and 48 in the second grade. In each school, they received educational program based on cognitive behavioral approach as part of the school curriculum in health class for stress management. After getting the consent from headmasters of the three schools and students' guardians, students received the explanation of the purpose and procedure of this study. They were handed a set of questionnaires including the Depression Self-Rating Scale for Children (DSRS-C) and the Revised Children Quality of Life Questionnaire (Kiddo-KINDL^R) at three different points (pre-program, post-program and 6-months after program) and were told to complete the questionnaires if they would agree to participate in the study. Finally, 176 out of 178 students completed the questionnaires. In the present study, subjects did not write their names in the questionnaires, but different numbers were assigned to all subjects so that only one of the researchers could identify who was the respondent on the submitted

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questionnaires afterwards.

To investigate the effect of the program, first, we studied the changes of the scores of the two questionnaires in all subjects. After that, based on the DSRS-C cut-off score, subjects were divided into two groups that were high risk group (scores ≥ 16) and healthy group (scores < 16) and the changes of the scores of the two scales were investigated in each group.

This study was approved by the Ethics Committee of Tokushima University Hospital (number 1663).

Short-term educational program

With reference to the previous studies (15, 34), we developed the short-term cognitive behavioral educational program that can be reasonably used in health class for stress management (Table 1). As shown in Table 1, the program consisted of three components that were psychoeducation, cognitive restructuring and problem solving. In this program, we used cognitive restructuring and problem solving skills as a core skill to promote students' mental health because the two components have been regarded as an important skill and contained in many health care programs (7, 17, 19, 23, 24).

Table 1 Content of program

	Content of each session
Session 1 (50 minutes)	Introduction to the program Education about the relationship between thought, emotion, physical reaction and behavior through five areas assessment model
Session 2 (50 minutes)	Introduction to cognitive restructuring Exercise in identifying negative thoughts Learning cognitive restructuring skill through dysfunctional thought record Encouraging use of the skill in daily life
Session 3 (50 minutes)	Introduction to problem solving Exercise in identifying problems Learning problem solving skill through seven steps approach Encouraging use of the skill in daily life

School teachers who provided the program in health class were well trained for the implementation of the program. Three sessions were delivered over three weeks and each session was implemented using the originally designed workbook that could help students to learn the skills well.

Questionnaire

The DSRS-C (25, 26) is a 18-item self-report measure to assess depressive symptoms. Each item is rated on a 3-point scale from 0 (never) to 2 (always). The Japanese version (Sankyobo, 2011) is reported to have good reliability and validity. The clinical cut-off score of the Japanese version is set at 16 (27).

The Kiddo-KINDL^R (28, 29) is a 24-item self-report questionnaire. It is composed of six domains; school, emotion, self-esteem, family, friends, and physical. Each item is scored from 1 (never) to 5 (always) and the scores of each domain and total score are transformed linearly to a metric scale from 0 to 100. The Japanese version has been verified to have good reliability (29).

Statistical analysis

Because data were not normal continuous variables, Friedman test was used to compare the results across time (pre-program,

post-program, 6-months after program). If there was a significant effect of time, post hoc comparisons were performed using Wilcoxon signed-rank test. A significant level was set at $p < 0.05$ in Friedman test and at $p < 0.017$ in Wilcoxon signed-rank test (Bonferroni correction). Statistical analysis was performed with SPSS version 22.0 J (SPSS, Chicago, IL, USA).

RESULTS

The mean scores of the DSRS-C in all subjects ($n=176$), high risk group ($n=27$, 15.3%) and healthy group ($n=149$) at baseline (pre-program) were 9.61 ± 5.81 (range, 0-28), 19.81 ± 3.72 (range, 16.7-28.0) and 7.76 ± 3.87 (range, 0-15), respectively. And the mean total scores of the Kiddo-KINDOL^R in all subjects, high risk group and healthy group at baseline were 65.62 ± 14.51 (range, 22.92-97.92), 47.57 ± 11.26 (range, 22.91-69.79) and 68.89 ± 12.51 (range, 30.21-97.92), respectively.

Table 2 shows the changes of scores of the DSRS-C and the Kiddo-KINDOL^R after implementation of the program in all subjects. No significant difference was found in the two scales over time except that there was a significant difference in emotion domain of the Kiddo-KINDOL^R (Friedman test, $p=0.015$). As for the emotion domain, however, post hoc test could not reveal any significant difference between certain two pairs.

Table 3 shows the changes of scores of the DSRS-C and the Kiddo-KINDOL^R after the program in high risk group. There was a significant difference in the score of the DSRS-C at three time points (Friedman test, $p < 0.001$). The mean score of the DSRS-C significantly decreased from 19.81 ± 3.72 at pre-program to 15.00 ± 5.23 at post-program (Wilcoxon signed-rank test, $p < 0.001$) and to 13.19 ± 5.84 at 6-months after program (Wilcoxon signed-rank test, $p=0.005$). As for the score of the Kiddo-KINDL^R in high risk group, there were significant differences in the total score ($p=0.001$), emotion domain score ($p=0.002$) and family domain score ($p=0.046$) between three time points. As shown in the results of post hoc analysis, the mean total score of the Kiddo-KINDL^R did not significantly increase from pre-program to post-program. However, there were significant differences in the total score between pre-program and 6-months after program (Wilcoxon signed-rank test, $p < 0.001$) and between post-program and 6-months after program (Wilcoxon signed-rank test, $p=0.005$). Moreover, significant differences in emotion domain score were also found between pre-program and 6-months after program (Wilcoxon signed-rank test, $p < 0.001$) and between post-program and 6-months after program (Wilcoxon signed-rank test, $p=0.015$). As for family domain score, a significant difference was found only between post-program and 6-months after program (Wilcoxon signed-rank test, $p=0.011$).

As for the changes of the scores of the two scales in healthy group, there was no significant difference between three time points.

DISCUSSION

In this study, the mean score of the DSRS-C in all subjects was 9.61 ± 5.81 . Denda *et al.* (36) previously reported that the mean score of the DSRS-C in the first grade students and the second grade students in middle school were 10.17 ± 6.44 and 10.68 ± 6.46 , respectively. Therefore, the level of depression in the subjects in the present study seems to be almost the same as that of Denda *et al.* (36) study. The percentage of the subjects who scored 16 or more was 15.3% in the present study and it is also compatible with the previous findings (30, 31).

Universal type intervention to improve mental state of adolescents is an important subject requiring further investigation. Shochet *et al.*

Table 2 Scores from baseline to 6-months after program in all subjects (N=176)

	Scores a)			P values (Friedman) b)	P values (Wilcoxon) b)		
	pre	post	6-months		pre-post	pre-6-months	post-6-months
DSRS-C	9.61± 5.81	9.31± 5.57	9.91± 5.45	NS			
Kiddo-KINDL ^R							
Total	65.62± 14.51	64.76± 14.29	66.42± 14.07	NS			
School	55.04± 15.48	53.80± 15.65	55.40± 16.67	NS			
Emotion	80.65± 18.01	78.98± 18.39	81.61± 16.50	0.015	NS	NS	NS
Self-esteem	43.08± 26.31	44.11± 25.48	45.00± 24.99	NS			
Family	72.23± 21.83	70.03± 20.78	73.69± 19.74	NS			
Friends	73.86± 17.63	72.87± 19.01	74.29± 17.29	NS			
Physical	68.86± 21.52	68.79± 20.94	68.57± 22.26	NS			

a) Scores are presented as the mean± standard deviation. DSRS-C=Depression Self-Rating Scale for Children ; Kiddo-KINDL^R=Revised Children Quality of Life Questionnaire ; NS=nonsignificant.

b) Friedman test was used to analyze differences between three time points. If significant differences were detected ($P < 0.05$), Wilcoxon signed-rank test was performed for comparison between two separate time points with $P < 0.017$ regarded as significant (Bonferroni correction).

Table 3 Scores from baseline to 6-months after program in high risk group (N=27)

	Scores a)			P values (Friedman) b)	P values (Wilcoxon) b)		
	pre	post	6-months		pre-post	pre-6-months	post-6-months
DSRS-C	19.81± 3.72	15.00± 5.23	13.19± 5.84	< 0.001	< 0.001	0.005	NS
Kiddo-KINDL ^R							
Total	47.57± 11.26	49.23± 11.90	56.67± 12.06	0.001	NS	< 0.001	0.005
School	42.82± 15.95	45.37± 16.77	47.92± 18.75	NS			
Emotion	59.26± 16.30	61.57± 18.73	70.60± 19.67	0.002	NS	< 0.001	0.015
Self-esteem	25.69± 17.96	27.55± 19.78	31.71± 25.00	NS			
Family	53.47± 23.60	46.76± 23.73	64.12± 22.90	0.046	NS	NS	0.011
Friends	56.71± 18.74	59.95± 22.35	66.20± 20.82	NS			
Physical	47.45± 21.04	54.17± 21.02	59.49± 23.02	NS			

a) Scores are presented as the mean± standard deviation. DSRS-C=Depression Self-Rating Scale for Children ; Kiddo-KINDL^R=Revised Children Quality of Life Questionnaire ; NS=nonsignificant.

b) Friedman test was used to analyze differences between three time points. If significant differences were detected ($P < 0.05$), Wilcoxon signed-rank test was performed for comparison between two separate time points with $P < 0.017$ regarded as significant (Bonferroni correction).

(17) studied whether school-based universal type program designed to prevent depression in adolescents could be effectively implemented within the constraints of school environment and reported that this kind of intervention was useful. Their program is known as Resourceful Adolescent Program-Adolescents (RAP-A) that consists of 11 sessions and can be done as part of the school curriculum. The result of implementation of the RAP-A showed a significant improvement of levels of depression and hopelessness at the assessment of post-intervention and 10-month follow-up (17).

Spence *et al.* (15) conducted the research to evaluate the long time effectiveness of the Problem Solving for Life (PSFL) program that is a universal type approach for prevention of adolescent depression. The PSFL program integrates two components of cognitive restructuring and problem solving skills (32, 33) and consists of 8 self-contained sessions. In their study, subjects aged 12 to 14 years participated and the result was that participants with initially elevated depression score showed a significant improvement in depressive symptom and a significant increase in life problem solving score after the program. However, they also reported that the positive results were not maintained at 12-month, 2-year, 3-year and 4-year follow-up assessments (15, 34).

This study aimed to investigate effects of health class using short-term cognitive behavioral educational program for stress management on levels of depression and QOL. The results seem

to be encouraging in terms of improving mental condition of high risk group. Similar to the previous results (15), depression level in adolescent students with high depression score at baseline significantly decreased promptly after the three-session program and improvement was maintained 6-months later. In addition, the level of QOL was found to be significantly improved at the point of 6-month follow-up. The finding indicates that positive change of QOL came later than improvement of depression level. And overall, it was suggested that cognitive behavioral educational program could have a positive impact on adolescent mental health even when provided in a short-term form. This is the new finding we discovered in the present study.

As for the domains of the QOL scale, however, there were four domains (school, self-esteem, friends, and physical) showing no significant changes over time. Especially, self-esteem has been reported to be a very important factor related to mental condition in children and adolescents (35). Therefore, there may be room for improvement of the content of the program in order to enhance adolescents' self-esteem. On the other hand, it is also important to discuss the strength of the program. Spence *et al.* (15) pointed out that this kind of program should be a real-world intervention that requires minimal training for teachers and be easy to administer. Since our program is a very short-term one and consists of cognitive restructuring and problem solving skills, it seems to be

acceptable as part of health class curriculum.

There are some limitations. As we did not assess how much subjects could learn the skills, different levels of understanding may have influenced the results. In addition, we could not set control group due to restraints of school setting. Therefore, although the results are promising, the precise effect of the program remains unclear. However, from the findings that level of depression in adolescents rises in relation to age (30, 36) and significant improvement of depression level was found shortly after the program in the present study, the successful results in high risk group can be considered to come from the effect of the program.

CONCLUSION

In conclusion, it is suggested that short-term cognitive behavioral educational program in health class would be effective for adolescent students with high risk of depression in improving levels of depression and QOL.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

- Goodyer I, Dubicka B, Wilkinson P, Kelvin R, Roberts C, Byford S, Breens S, Ford C, Barrett B, Leech A, Rothwell J, White L, Harrington R : Selective serotonin reuptake inhibitors (SSRIS) and routine specialist care with and without cognitive behavior therapy in adolescents with major depression, randomized controlled trial. *BMJ* 335 : 142, 2007
- March J, Silva S, Curry J, Wells K, Fairbank J, Burns B, Domino M, Vitiello B, Severe J, Riedal K, Goldman M, Feeny N, Finding R, Stull S, Baab S, Weller EB, Robbins M, Weller RA, Jessani N, Waslick B, Sweeney M, Dublin R, Walkup J, Ginsburg G, Kastelic E, Koo H, Kratochvil C, May D, LaGron R, Vaughan B, Albano AM, Hirsch GS, Podniesiki E, Chu A, Reincechke M, Leventhal B, Rogers G, Jacobs R, Pathak S, Wells J, Lavanier SA, Danielyan A, Rohde P, Simons A, Grimm J, Frank S, Emslie G, Kennard B, Hughes C, Mayes TL, Rosenberg D, Benazon N, Butkus M, Bartoi M : The treatment for adolescents with depression study (TADS), outcome over 1 year of naturalistic follow-up. *Am J Psychiatry* 166 : 114-9, 2009
- Brent D, Emslie G, Clarke G, Wagner KD, Asarnow JR, Keller M, Vitiello B, Ritz L, Iyengar S, Abebe K, Bimaher B, Ryan N, Kennard B, Hughes C, DeBar L, McCracken J, Strober M, Suddath R, Spirito A, Leonard H, Porta G, Onorato M, Zelazny J : Switching to another SSRI or to venlafaxine with or without cognitive behavior therapy for adolescents with SSRI-resistant depression : the TORDIA randomized controlled trial. *JAMA* 299 : 901-13, 2008
- Christner RW, Forrest E, Morley J, Weinstein E : Taking cognitive-behavior therapy to school : a school-based mental health approach. *J Contemp Psychother* 37 : 175-183, 2007
- Clark GN, Hawkins W, Murphy M, Sheeber LB, Lewinsohn PM, Seeley JR : Targeted prevention of unipolar depressive disorder in an at-risk sample of high school adolescents. A randomized trial of group cognitive intervention. *J Am Acad Child Adolesc Psychiatry* 34 : 312-321, 1995
- Jaycox LH, Reivich KJ, Gillham J, Seligman ME : Prevention of depressive symptoms in school children. *Behav Res Ther* 32 : 801-816, 1994
- Lowry-Webster HM, Barrett PM, Daddas MR : A universal prevention trial of anxiety and depressive Symptomatology in childhood : preliminary data from an Australian study. *Behav Change* 18 : 36-50, 2001
- Keller MB, Lavori PW, Beardslee WR, Wunder J, Ryan N : Depression in children and adolescents. new data on "undertreatment" and a literature review on the efficacy of available treatments. *J Affect Disord* 21 : 163-171, 1991
- Petersen AC, Compas BE, Brooks-Gunn J, Stemmler M, Ey S, Grant KE : Depression in adolescents. *Am Psychol* 48 : 155-168, 1993
- Adams J, Adams M : Effects of a negative life event and negative perceived problem-solving alternatives on depression in adolescents. A prospective study. *J Child Psychol Psychiatry* 34 : 743-747, 1993
- Garber J, Weiss B, Shanley N : Cognitions, depressive symptoms, and development in adolescents. *J Abnorm Psychol* 102 : 47-57, 1993
- Lewinsohn P, Clarke GN, Rohde P : Psychological approaches to the treatment of depression in adolescents. In WM Reynolds, HE Johnston (Eds.). *Handbook of depression in children and adolescents*. Plenum Press, New York, 1994, pp.3-17
- Puig-Antich J, Kaufman J, Ryan ND, Williamson DE, Dahl RE, Lukens E, Todak G, Ambrosini P, Rabinovich H, Nelson B : The psychosocial functioning and family environment of depressed adolescents. *J Am Acad Child Adolesc Psychiatry* 32 : 244-253, 1993
- Hains AA, Ellman SW : Stress inoculation training as a preventative intervention for high school youths. *J Cogn Psychother* 8 : 219-232, 1994
- Spence SH, Sheffield JK, Donovan CL : Preventing adolescent depression. an evaluation of the problem solving for life program. *J Consult Clin Psychol* 71 : 3-13, 2003
- Mrazek PJ, Haggerty RJ (Eds.) : *Reducing risks for mental disorders : Frontiers for preventive intervention research*. Committee on Prevention of Mental Disorders. Institute of Medicine. National Academy Press, Washington, DC, 1994
- Shochet IM, Dadds MR, Holland D, Whitefield K, Harnett PH, Osgarby SM : The efficacy of a universal school-based program to prevent adolescent depression. *J Clin Child Psychol* 30 : 303-315, 2001
- Offord DR : Selection of levels of prevention. *J Addict Behav Ther Rehabil* 25 : 833-842, 2000
- Lock S, Barrett PM : A longitudinal study of developmental difference in universal preventive intervention for child anxiety. *Behav Change* 20 : 183-199, 2003
- Barrett PM, Farrell LJ, Ollendick TH, Dadds M : Long-term outcome of an Australian universal prevention trial of anxiety and depression symptoms in children and youth. an Evaluation of the friends program. *J Clin Child Adolesc Psychol* 35 : 403-411, 2006
- Shure MB : How to think, not what to think. A problem solving approach to prevention of high risk behaviors in children. In D Stipek (Ed.), *Constructive and destructive behavior : Implications for family, school, and society*. American Psychological Association, Washington, DC, 2001, pp.271-290
- Kelly B, Longbottom J, Potts F, Williamson J : Applying emotional intelligence : exploring the promoting alternative thinking strategies curriculum. *Educ Psychol Pract* 20 : 221-240,

- 2004
23. Merry S, McDowell H, Wild CJ, Bir J, Cunliffe R : A randomized placebo-controlled trial of a school-based depression prevention program. *J Am Acad Child Adolesc Psychiatry* 43 : 538-47, 2004
 24. Stallard P, Buck R : Preventing depression and promoting resilience, feasibility study of a school-based cognitive-behavioural intervention. *Br J Psychiatry* 202 : s18-s23, 2013
 25. Birlson P, Hudson I, Buchanan DG, Walff S : Clinical evaluation of a self-rating scale for depressive disorder in childhood (Depression Self-rating Scale). *J Child Psychol Psychiatry* 28 : 43-60, 1987
 26. Birlson P : Japanese version DSRS-C. Depression Self-Rating Scale for Children. Sankyobo, Kyoto, 2011 (in Japanese)
 27. Murata T, Shimizu A, Mori Y, Oshima S : Childhood depressive state in the school situation. Consideration from the Birlson's Scale. *Jpn J Psychiatry* 1 : 131-138, 1996 (in Japanese)
 28. Ravens SU, Bullinger M : Assessing health-related quality of life in chronically ill children with the German KINDL. first psychometric and content analytical results. *Qual Life Pes* 7 : 399-407, 2000
 29. Matsuzaki K, Nemoto Y, Shibata R, Morita K, Sato H, Furusho J, Watanabe S, Okuyama M, Kubagawa T, Maekawa K : A Study of the Kiddo-KINDL^R (Questionnaire for Measuring Health-Related Quality of Life in Children, Revised Version. For 13 to 16-year-olds) in Japan. *Pediatr Int* 111 : 1404-1410, 2007 (in Japanese)
 30. Denda K, Kako Y, Kitagawa N, Koyama T : Assessment of depressive symptoms in Japanese school children and adolescents using the Birlson depression Self-Rating Scale. *Int L J Psychiatry Med* 36 : 231-41, 2006
 31. Satou F, Ichii M : An investigation related to depression in Junior High School students. Social skill and automatic thought and school maladjustment. *J Hum Dev clin Psychol* 16 : 29-36, 2010
 32. Beck AT, Rush AJ, Shaw BF, Emery G : Cognitive therapy of depression. Wiley, New York, 1979
 33. D'Zurilla TJ, Nezu A : A study of the generation-of-alternatives process in social problem solving. *Cognit Ther Res* 4 : 67-72, 1980
 34. Spence SH, Sheffield JK, Donovan CL : Long-term outcome of a school-based universal approach to prevention of depression in adolescents. *J Consult Clin Psychol* 73 : 160-167, 2005
 35. Alice WP, Susan M, Mchale W, Edward C : Self-esteem enhancement with children and adolescents. Japanese translation rights arranged with pergamon Press Inc. through japan UNI Agency. Inc. Tokyo, 1988
 36. Denda K, Kako Y, Sasaki Y, Ito K, Kitagawa N, Koyama T : Depressive symptoms in a school sample of children and adolescents ; using the Birlson depression self-rating scale for children (DSRS-C) . *J Clin Child Adolesc Psychol* 45 : 14-26, 2004 (in Japanese)