**Impact of a Single School-Based Intervention for COVID-19 on Improving Mental
Health**

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Abstract

An underlying concern about the COVID-19 pandemic is that the mental health of children will decline. The present study aimed to investigate whether a single school-based intervention, including self-monitoring and psychoeducation for COVID-19, effectively achieved its aim to promote children's mental health. The study was conducted in a junior high school. We assigned the third grade as the intervention group, second grade as the announcement group, and first grade, the control group. We hypothesized that the intervention group would experience improved mental health and reduced fear of COVID-19, when compared to the announcement and control groups. Interaction effects were observed only for depression, indicating a significant intervention effect in the intervention group. These findings suggest that a single school-based intervention that includes self-monitoring and psychoeducation for COVID-19 can help to improve children's mental health. It is suggested that school-based interventions that intend to raise children's awareness of COVID-19 promote healthy development and adaptation within the school.

Keywords: COVID-19, school-based, intervention, psychoeducation, mental health

Impact of a Single School-Based Intervention for COVID-19 on Improving Mental Health

According to the World Health Organization (WHO), COVID-19 is a pandemic. As of December 14, 2020, there were 70,461,926 confirmed cases of COVID-19 and 1,599,704 deaths including children, worldwide (WHO, 2020). The spread of infections has restricted our behavioral patterns and usual functioning. Moreover, these restrictions have hampered children's school life, depriving them of learning and communication with friends and teachers. Despite situational limitations, teachers have made massive efforts to conduct online lessons and prepared to reopen schools. Although the number of infected people decreased in Japan and most schools reopened, the fear of infection still demanded the practice of social distancing, using personal protective equipment and avoiding the “Three Cs” : 1. Closed spaces with insufficient ventilation, 2. Crowded conditions with people, 3. Conversations in short distance (Prime Minister’s Office of Japan & Ministry of Health, Labour and Welfare, 2020).

Although these restrictions helped mitigate the spread of this disease, people continued to experience fear, uncertainty, and physical distress. The infection is an invisible threat like chemical, biological, radiological, nuclear, and high-yield explosives, and causes various stresses adding to the fear of infection (Shigemura et al., 2020). Review has reported that longer quarantine duration, infection fears, frustration, boredom, inadequate supplies,

inadequate information, financial loss, and stigma cause negative psychological effects, including post-traumatic stress symptoms, confusion, and anger (Brooks et al., 2020). These stresses cause characteristic responses in children different from that in adult presentations, for example trauma expression in play and restless behavior at school (Roccella, 2020), which vary in their degree of severity. Furthermore, children and adolescents who experience disasters may suffer from greater stress and trauma because they are psychologically, physically, and educationally more vulnerable than adults (Peek, 2008; Roussos et al., 2005). Therefore, it is necessary to educate children under the pandemic to prevent their mental health from deteriorating.

The school system is increasingly being used as a locus to promote prevention efforts for mental health improvement, the underlying assumption being that adopting evidence-based programs will result in positive outcomes (Flaspohler et al., 2012). There is strong evidence that mental health promotion programs in schools lead to positive mental health and educational outcomes (Tennant et al., 2007; Weare & Nind, 2011). School-based intervention is cost-effective in that it can provide a school time for the prevention to a large number of students (Griffin & Botvin, 2010; Caulkins et al., 2002). These benefits have been estimated to exceed costs in most intervention aspects (Throuvala et al., 2019). Schools need to improve the mental health of children by helping them build resilience and minimize the risk of long-lasting trauma (Capurso et al., 2020). Importantly, it is highly effective to provide

psychological care concerning COVID-19 for children in a school system.

For school-based interventions, it is desirable to provide psychoeducation on the stress of the infection. Children may benefit from supportive interventions, such as psychoeducation or cognitive-behavioral techniques designed to promote wellness and enhance coping (Pfefferbaum & North, 2020). Psychoeducation can help individuals understand their own physical and emotional reactions and identify when to seek additional support (Marques et al., 2020). Psychoeducation is an evidence-based approach to enhance children's insight to reduce stigma and worries regarding infection (Halder, 2020). School-based psychoeducation will have a positive impact on children, enabling them to deal effectively with various stresses caused by diseases.

The present study aimed to investigate whether the single school-based intervention effectively achieved its aims of promoting children's mental health and reducing the fear of COVID-19. We hypothesized that the intervention group would improve mental health and reduce the fear of COVID-19 compared to the other groups. Consequently, we sought to find whether including psychoeducation for COVID-19 would be impactful (or highly effective) as this program imparted knowledge (or increased awareness) about the infection and ways to deal with stress.

Method

Participants

Participants were students from the first grade to third grade, all from a junior high school in Japan. The first grade consisted of 38 boys and 40 girls; the second grade, 50 boys and 35 girls and the third grade, 38 boys and 40 girls.

Procedure

Participants were divided into three groups for each grade: the first grade was the control group; the second grade, the announcement group; and the third grade, the intervention group. The intervention was performed on July 21, 2020, in a junior high school in Japan. All students completed outcome measures at baseline (Time 1) and endline (Time 2), before and after, nearly, a month of summer vacation. At Time 1, on July 17, there were approximately 23,029 people infected and 984 related deaths from COVID-19 in Japan; at Time 2, on August 25, there were approximately 63,121 people infected and 1,196 related deaths from COVID-19 in Japan. The intervention was conducted per class for third grade students as a lesson in the school curriculum. On the same day, an announcement about COVID-19 was made for the entire second grade at a term-end rally. First grade students did not receive the intervention at that time. However, after this study, the first and second grade students received a program equivalent to the intervention. This study was conducted in cooperation with the Board of Education and the School Principal, and approved by the Ethics Committee of Iryo Sosei University (# 20–02).

140 Intervention

141 The intervention program for third grade students consisted of 50-min session, delivered
142 as a whole-class intervention to limit disrupting the curriculum. The therapist was the first
143 author, who is a licensed clinical psychologist to administer psychological assessment and
144 cognitive behavioral therapy in school.

145 The intervention consisted of a 15-min self-monitoring session and a 35-min
146 psychoeducation session. In the self-monitoring session, the students learned about the effects
147 of stress on mental health and how to identify their thoughts, feelings, physical responses,
148 and actions under the COVID-19 pandemic. They wrote these psychological responses on a
149 paper and shared them with their classmates in as much detail as possible. During the
150 psychoeducation session, using teaching materials provided by the Japanese Red Cross
151 Society (Japanese Red Cross Society, 2020), the students learned about three different “faces
152 (sickness, stigma, fear)” of COVID-19, which have adversely affected our lives, and how to
153 cope with each of these.

154 An announcement for second grade students informed them that stress associated with
155 this pandemic affects mental health. This announcement was included in the 50-min lecture
156 on how to spend their summer vacation at school, which was made by the therapist in 15 out
157 of the 50 min.

158 Measures

DSRS-C

The Birleson Depression Self-Rating Scale for Children (DSRS-C; Birleson, 1981) was used to assess depressive symptoms. In this study, we used the Japanese version of the DSRS-C, validated by Murata et al. (1996), with sufficient reliability. The DSRS-C consists of 18 items for evaluating depression in children designed as a self-report questionnaire about their state during the past week using a 3-point scale ranging from 0 (*never*) to 2 (*always*); higher scores on the DSRS-C indicated more depressive symptoms. All items showed high internal consistency at Time 1 ($\alpha = .852$, $\omega = .852$) and Time 2 ($\alpha = .870$, $\omega = .862$).

Fear of COVID-19 Scale

The Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) was used to assess the fear of COVID-19 among the students. In this study, we used the Japanese version of FCV-19S (FCV-19S-J), validated by Masuyama et al. (2020), with sufficient reliability. The FCV-19S-J consists of seven items. Participants responded to each item on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). A higher score indicated a greater fear of COVID-19. In this study, the total score of all items was used in the analysis. All items showed high internal consistency at Time 1 ($\alpha = .836$, $\omega = .856$) and Time 2 ($\alpha = .859$, $\omega = .884$).

The State-Trait Anxiety Inventory for Children-Trait

The State-Trait Anxiety Inventory for Children-Trait (STAI-CH-T; Spielberger et al.,

1973) questionnaire was used to assess trait anxiety. In this study, we used the Japanese version of the STAI-CH-T, as its validity has previously been verified in children (Soga et al., 1983). Trait anxiety is defined as an individual's tendency to react in an anxious way, regardless of the situation (Guinot et al., 2011; Jimeno et al., 2011). The STAI-CH-T scale consists of 20 statements, and the participants responded to the STAI-CH-T statements using a 3-point rating scale (1 = *hardly ever* to 3 = *often*); higher scores indicated greater trait anxiety. All items showed high internal consistency at Time 1 ($\alpha = .914$, $\omega = .917$) and Time 2 ($\alpha = .916$, $\omega = .919$).

Data Analysis

We first studied whether there was any significant baseline difference among the three groups, using a separate ANOVA for continuous variables. Next, we compared differences in changes of outcome scores among the three groups, using repeated-measures ANOVA (Time 1 vs. Time 2). The software used for the analyses was HAD (Shimizu, 2016). Statistical significance was determined at $p < .05$.

Results

Preliminary analysis

Means, standard deviations, and range of scores for the variables at T1 and T2 are shown in Table 1. Comparisons across a series of one-way ANOVAs revealed no significant differences in pre-intervention means across conditions on the FCV-19S-J, $F(2,237) = 2.00$, p

= .137. There were, however, significant differences for DSRS-C, $F(2,233) = 8.11$, $p = .000$, in the lower baseline scores for the control group than for the intervention and announcement group, and for STAI-CH-T, $F(2,232) = 4.19$, $p = .016$, in the higher baseline scores for the announcement group than for the controlled group.

Main analysis

Figure 1 illustrates the changes over time in the DSRS-C among the three groups. A repeated-measures ANOVA for DSRS-C indicated a significant main effect of group ($F(2,228) = 6.375$, $p = .002$), but not time ($F(2,228) = 0.870$, $p = .352$), and a significant group $\times$ time interaction ($F(2,228) = 3.195$, $p = .043$). The results of multiple comparisons demonstrated that the students in the intervention group showed significantly fewer depressive symptoms than either the announcement group or the control group between Time 1 and Time 2.

Figure 2 illustrates the changes over time in FCV-19S-J among the three groups. A repeated-measures ANOVA for FCV-19S-J indicated a significant main effect of time ($F(1,231) = 13.902$, $p = .000$), but not group ($F(2,231) = 2.805$, $p = .063$), and no significant group $\times$ time interaction ($F(2,231) = 0.227$, $p = .797$).

Figure 3 illustrates the changes over time in STAI-CH-T among the three groups. A repeated-measures ANOVA for STAI-CH-T indicated a significant main effect of group ($F(2,216) = 5.081$, $p = .007$), but not time ($F(1,216) = .000$, $p = .991$), and no significant group $\times$ time interaction ($F(2,216) = 0.014$, $p = .986$).

Discussion

The present study aimed to investigate whether the single school-based intervention effectively achieved its aims to promote children's mental health and reduce the fear of COVID-19. It was hypothesized that the intervention group would improve mental health and experience reduced fear of COVID-19 compared to the announcement and control group. As a result, the intervention was effective in preventing depression. Consistent with previous studies of school-based intervention (Tennant et al., 2007; Weare & Nind, 2011), our intervention at the school resulted in mental health promotion. We considered that self-monitoring and psychoeducation allowed students to re-examine their mental state and develop the confidence to attend school, based on their newly acquired knowledge of coping with COVID-19, which led to desired results. The school-based intervention on COVID-19 is particularly novel for interventions aimed at improving mental health. These results suggest that a single school-based intervention for COVID-19 can have some short-term benefits under real-school conditions.

The lack of a significant effect on trait anxiety, however, was inconsistent with our hypotheses. This could be because this simple intervention was limited by time constraints, to improve trait anxiety. Previous studies on interventions for trait anxiety with a higher number of sessions showed its significant reduction (Muris et al., 2001; Muris et al., 2002; Pedro-Carroll & Cowen, 1985). Therefore, it is expected that significant changes will be obtained

by increasing the number of sessions.

In our study, a significant intervention effect on fear of COVID-19 was unobtained, even though psychoeducation was expected to increase awareness of coping with the stress of COVID-19. Contrarily, all groups showed a significant reduction in fear of COVID-19 after approximately one month of summer vacation. In Japan, there were many restrictions on attending school until May 2020, following which it became possible to go to school, as before, by paying attention to infection prevention. Reasonably, it is assumed that as a result of adapting to fear over time, rather than the efficacy of the intervention, there was no significant observable effect of the intervention.

Limitations

This study had several limitations. First, we did not use randomization sampling, which is useful to devise measurements so that variables, including age, are not different at the baseline. Second, we measured only fear as COVID-19-related stress. It is necessary to investigate the effects of interventions on specific stresses, such as refraining from being outdoors and limiting physical distance to clarify COVID-19-related stress for children. Third, this study examined the effect of a single intervention. Further research is needed to understand how this effect can be strengthened and maintained at follow-up.

Conclusion

The present study aimed to investigate whether the single school-based intervention

255 effectively achieved its aims of promoting children's mental health and reducing fear of
256 COVID-19. As a result, the intervention proved effective in preventing depression, though
257 not for trait anxiety and fear of COVID-19. This study suggests that school-based
258 intervention on COVID-19 improves children's health promotion by allowing them the
259 opportunity to re-examine their mental state and develop the confidence to live a regular
260 school life based on their awareness of COVID-19.
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Table 1*Means and standard deviations of variables of three groups of Time 1 and Time 2*

		Intervention (<i>n</i> = 72)		Announcement (<i>n</i> = 92)		Control (<i>n</i> = 84)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
DSRS-C	Time 1	11.59	5.93	10.92	6.00	7.94	5.98
	Time 2	10.79	6.06	10.61	6.13	8.45	6.11
FCV-19S	Time 1	16.64	5.91	18.54	5.99	17.40	6.09
	Time 2	15.51	6.18	17.80	6.27	16.34	6.36
STAIC-T	Time 1	31.96	8.75	36.17	9.39	33.66	10.02
	Time 2	31.88	8.54	36.20	9.17	33.71	9.78

Note. DSRS-C = Birleson Depression Self-Rating Scale for Children, FCV-19S = Fear of COVID-19 Scale, STAIC-T = State-Trait Anxiety Inventory for Children-Trait

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351

Figure 1*Mean differences in DSRS-C among three groups at Time 1 and Time 2*

Figure 2

Mean differences in fear of COVID-19 among three groups at Time 1 and Time 2

358 **Figure 3**
Mean differences in STAIC-T among three groups at Time 1 and Time 2

359