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＜Brief Report＞

A pilot trial to evaluate feasibility of evidence-based group parenting program through videoconferencing technology

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Abstract

Due to the deterioration of mental health among parents and children during the coronavirus disease 2019 (COVID-19) pandemic, the remote delivery of a parent support program became essential for infection prevention. This pilot study was aimed to assess the acceptance of implementing the Triple P group program through videoconference technology among Japanese participants and to evaluate the feasibility of a well-designed comparative study for such implementation. In 2020, thirty-six program participants were recruited from the Japanese population and compared with 36 controls from a research company panel. The acceptance of the program was comparable to previous studies that utilized in-person implementation within the Japanese population. Although the effectiveness mirrored that of earlier Japanese studies, the improvement in scores and the significance of effectiveness were less pronounced. Despite the limitations related to sample size and study design, the present study suggests the feasibility of conducting a well-designed comparative study.

keywords: COVID-19 pandemic, information technology, parenting, program effectiveness, videoconferencing
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I. Introduction

Child development requires a stable environment where appropriate nurturing is offered, and health is both maintained and promoted [1,2]. The quality of parenting significantly influences the development of lifelong skills in children. A strong parent-child relationship during early childhood can shield children from various risk factors. Positive parent-child relationships fostered through support programs can enhance child development [3].

The recent trend toward nuclear families and the decline of community support have resulted in a growing number of parents raising their children with inadequate parenting skills. This situation has led to increased parental stress and a sense of isolation [4].

Parent support programs, which help parents develop essential parenting skills, are crucial in today's social context. Among the various parent support programs available, Triple P stands out due to its demonstrated effectiveness [5]. Additionally, it fosters not only a positive parent-child relationship but also enhances parents' problem-solving abilities, self-confidence, and a positive attitude toward life [6]. The effectiveness of Triple P has been validated across different cultures [6], not only in Australia, where it was developed [5], but also in Japan [7].

With changes in home environments due to the coronavirus disease 2019 (COVID-19) pandemic, such as remote work and restrictions on going out, the mental health of both parents and children has deteriorated. In countries outside of Japan, parental stress has been reported to negatively impact children's psychological and physical health [8, 9]. Furthermore, alterations in childcare and educational settings have led to an increase in children's behavioral problems, significantly affecting maternal and child health and development [10].

Online surveys conducted in Japan during the COVID-19 pandemic have revealed that poor parental mental health contributes to inadequate parenting and has a significant negative impact on family relationships [11,12]. Therefore, it is essential to provide remote parental support, and parenting programs should be implemented to address the severe parenting challenges exacerbated by the COVID-19

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pandemic.

Japanese individuals are often characterized by their adherence to rules, which can lead to increased family stress as they comply with stay-at-home policies and remain confined to their homes. The Triple P program, designed to empower each family member to take the initiative in problem-solving, is particularly well-suited for Japanese families during the pandemic.

To implement the parent support program during the pandemic, remote delivery became essential from multiple perspectives, including infection prevention. The original version of the Group Triple P program consists of five in-person group sessions and three individual man-to-man telephone sessions. For remote delivery of Group Triple P, the five in-person group sessions were replaced with video conferences, and the effectiveness of this approach was evaluated in Australia [14,15].

Among the Japanese population, there are few reports assessing the effectiveness of remotely implemented parenting programs during the pandemic, despite a significant demand for parent support initiatives, such as Triple P. It is essential to evaluate the effectiveness of these approaches by comparing them with control groups [16].

Prior to conducting a larger comparative study, we planned a pilot trial to assess the feasibility and acceptability of delivering the Triple P Group program remotely. We hypothesized that parents would accept remote delivery as well as they would in-person sessions, and that planning a well-designed evaluation study would be feasible.

II. Materials and methods

1. Ethics approval and consent to participate

The study protocol received approval from the Ethics Committee of Jumonji University (Approval No. 2020-001) on July 6, 2020. The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (2008). Written informed consent was obtained from all participants involved in the parenting program. Responses to the questionnaire were pseudonymized, and the videoconference was not recorded to protect personal information.

2. Study design

This study employed a non-randomized controlled design featuring a 2 (group intervention vs. web panel) × 2 (assessment time points: pre- and post-intervention) longitudinal framework.

3. Participants

(1) Sample size

The sample size was calculated as follows: [17].

$N=2(Z_{\alpha/2}-Z_{1-\beta})^2 \delta^2/(\mu_1-\mu_2)^2$

N stands for the sample size of each group. The standard deviation (δ) of the total difficulty score of the Strengths and Difficulties Questionnaire (SDQ) is estimated to be 4.5, based on findings from a previous study [18]. The statistical significance level is denoted as $\alpha = 0.05$. The probability of a type II error (β) is 0.2. The allowable pre-post change in the total difficulty score of SDQ, represented as $\mu_1 - \mu_2$, indicates that the difference in average scores was deemed significant in the previous study [19]. The value of $\mu_1 - \mu_2$ is 3.0. After inputting all the data into the formula, we obtained N = 35.3, which led to 36 participants in each group.

(2) Intervention group

Parents who experienced challenges with their children's behavior during their upbringing were included in the intervention group. These parents were recruited by distributing flyers at children and family services in cities where facilitators conducted their activities, as well as through a website that promoted Triple P to all Japanese parents. Parents and/or children diagnosed with pathological disorders were excluded based on the questionnaire. A total of 36 participants were included in this study, divided into four groups with participant numbers of 7, 7, 10, and 12, respectively. Recruitment was conducted from June to October 2020.

(3) Control group

The control group was organized as follows: Parents of children aged 1 to 12 years who experienced difficulties in certain aspects of parenting were selected from a survey company panel. A total of 36 individuals were included after matching the sexes of the parents and children with those in the intervention group, while limiting the age difference among the children to one year or less. According to the questionnaire, none of the parents or children in the control group had consulted mental health clinics.

4. Background of the participants

Between the intervention and control groups, there was no significant difference, as determined by Fisher's exact test, in the number of children, birth order of the target child, parental ages, or marital status. However, there was a significant difference ($p < 0.05$) in the educational levels of the participants. Seventy-five percent of the participants in the intervention group had graduated from university or graduate school, compared to 44% in the control group.

5. Methods of Intervention

We implemented an intervention based on the Level 4 Group Triple P Program. Participants attended four lectures, each lasting two hours, which included group sessions and role-playing activities. They practiced their newly

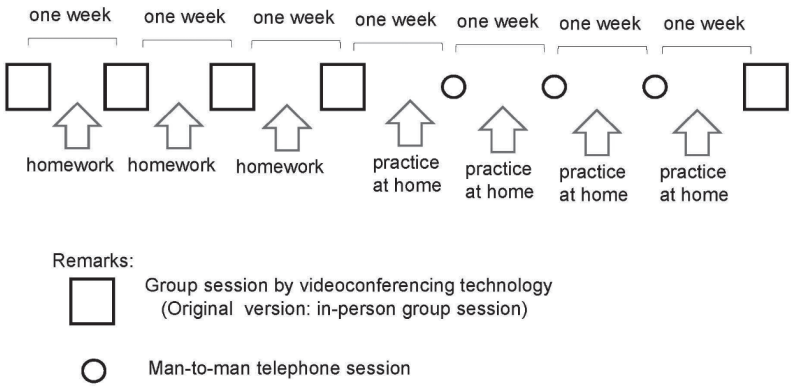

Figure 1 Remote implementation of Group Triple P program

acquired parenting skills at home while participating in three weekly telephone sessions, each lasting 20 minutes. Following these sessions, they engaged in a final lecture and group work session for an additional two hours. During the telephone sessions, participants applied their parenting skills in daily practice at home, and this practice was reviewed with the facilitators. The content of the group program is detailed elsewhere [20]. While the original version of the program was delivered in person, participants in the current study attended the lectures via videoconferencing technology. To maintain group dynamics, facilitators made a concerted effort to avoid looking down and utilized more facial expressions and a stronger voice compared to in-person sessions. In both the original program and the present study, facilitators communicated with each participant by telephone during the sessions (Figure 1).

The program was implemented by trained facilitators who had received accreditation and certification from Triple P International Pty, Ltd. (TPI). Each program was delivered by a pair of facilitators, one of whom was highly experienced and had an extensive background in facilitating Triple P. The program was conducted using a videoconferencing platform, adhering to the guidelines established by TPI for facilitators. Each facilitator provided parenting support through information technology (IT) via their Zoom Cloud Service accounts. A breakout session feature was utilized for small-group work sessions. Participants were permitted to engage in the group intervention using their smartphones. Facilitators reported that several participants utilized their smartphones during each session.

6. Survey Procedure

Participants in both the intervention and control groups completed the questionnaire twice: once before the intervention (Time 1) and again at the conclusion of the intervention (Time 2). Members of the intervention and matched control groups filled out the questionnaires nearly simultaneously. We mailed a questionnaire to the members of the intervention group and requested that they return their responses in a provided envelope. The control group completed web-based questionnaires.

7. Measurements

(1) Strengths and Difficulties Questionnaire (SDQ)

The Japanese version [21] of the SDQ [18] was utilized in this study. It comprises 25 statements that assess children's strengths and difficulties as perceived by their parents, classified into the following subscales: emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems. The total score for these four subscales reflects the difficulties experienced by the child as perceived by the parent, while prosocial behavior is assessed separately. Higher scores indicate greater levels of difficulty in all areas, except for prosocial behavior, where the scoring is reversed. In this study, Cronbach's alpha coefficients for each subscale were as follows: emotional symptoms, 0.78; conduct problems, 0.63; hyperactivity/inattention, 0.63; peer relationship problems, 0.60; total difficulties perceived by the parent, 0.67; and prosocial behavior, 0.71.

(2) Parenting Scale (PS)

The PS [22], specifically the Japanese version in the present study [23], is a 30-item measure of dysfunctional parenting in disciplinary situations developed by Arnold et al. In this study, laxness, over-reactivity, and hostility were utilized as subscales, based on the work of Rhoades et al. [24]. Each statement was rated on a scale from 1 to 7, with higher scores indicating greater levels of dysfunction. The Cronbach's alpha for each subscale was as follows: laxness, 0.55; over-reactivity, 0.75; hostility, 0.76; and for the entire scale, 0.61.

(3) Depression Anxiety Stress Scales (DASS)

The DASS [25], specifically the Japanese version in the present study [26], measures depression, anxiety, and stress. This study utilized the 42-item Japanese version of

the DASS (DASS-42). Each statement is rated on a scale from 0 to 3, with higher scores indicating more severe negative emotional states. The Cronbach's alpha for each subscale was as follows: depression, 0.91; anxiety, 0.95; stress, 0.97; and for the entire scale, 0.97.

(4) Participant satisfaction

We utilized 13 questions to assess participants' satisfaction with the program in terms of service quality, using a rating scale from 1 to 7 [20]. Higher scores indicated greater levels of satisfaction. The Cronbach's alpha coefficient was 0.84.

8. Statistical analysis

As the study was not randomized, it was essential to adjust for background differences. A repeated measures multiple analysis of variance (MANOVA) was conducted between the groups, adjusting for covariates that exhibited significant differences. The Box-Cox transformation was applied prior to the MANOVA analysis for the outcome measures, as most variables were not normally distributed. For the transformation, the parameters L, M, and S for each subscale (e.g., Emotional Problems of SDQ) were calculated from the pre- and post-data of both the intervention and control groups (N=144). The Box-Cox transformation has been utilized for neuropsychological indicators [27, 28]. Pairwise U-test comparisons were performed between the pre- and post-intervention variables. To assess the strength of the intervention effect, Cohen's d was calculated by dividing the difference in means by the standard deviation of the difference in means [29]. Statistical analyses were conducted using SPSS software (version 26.0.0.1; IBM, Chicago, IL, USA).

III. Results

1. Intervention effects

Table 1 presents the means and standard deviations of the outcome measures at Time 1 (pre-intervention) and Time 2 (post-intervention). Significance levels were determined using repeated measures MANOVA. Background factors, such as parental education, were included in the analysis as covariates.

Table 1 Comparison of changes in scores between intervention group (N=36) and control group (N=36)

Scale			Intervention group		Control group		Adjusted pre/post time × group effect §	effect size
		score range	Pre (Time1) Mean(SD)	Post (Time 2) Mean(SD)	Pre (Time1) Mean(SD)	Post (Time 2) Mean(SD)	p-value	Cohen's *d*
SDQ	emotional problem	0~10	3.25(2.82)	3.25(2.68)	2.22(2.32)	2.61(2.41)	0.685	0.10
	conduct problem	0~10	3.86(2.24)	3.53(1.92)	2.50(1.48)[c]	3.19(1.93)[c]	0.029*	0.38
	hyperactivity	0~10	4.75(2.31)	4.28(2.23)	4.11(2.34)	4.14(2.30)	0.254	0.20
	peer problem	0~10	2.22(1.64)	2.25(1.89)	2.94(2.24)	2.92(2.05)	0.571	0.03
	total difficulties	0~40	14.08(4.74)	13.31(5.64)	11.78(5.22)	12.86(6.04)	0.100	0.18
	prosocial #	0~10	5.86(2.44)	6.9(2.61)	5.81(2.47)	5.69(2.46)	0.508	0.05
PS	laxness	1~7	3.23(1.06)[b]	2.59(1.00)[b]	3.50(0.80)	3.46(0.76)	0.029*	0.44
	over-reactivity	1~7	3.89(1.73)	3.54(0.75)	3.82(1.05)	3.91(0.78)	0.073	0.28
	hostility	1~7	2.78(1.57)[b]	2.20(1.19)[b]	3.16(1.37)	3.28(1.28)	0.007**	0.51
	total score	1~7	4.15(0.58)[a]	3.71(0.56)[a]	4.17(0.41)	4.24(0.28)	<0.001***	0.63
DASS	depression	0~42	5.33(6.73)	4.94(8.27)	7.11(9.19)	7.61(8.50)	0.011*	0.37
	anxiety	0~42	3.61(3.51)	3.47(3.93)	5.53(7.30)	5.58(6.09)	0.330	0.17
	stress	0~42	10.86(8.62)	9.97(9.21)	9.78(9.86)	10.22(8.04)	0.052	0.26
	total score	0~126	19.81(17.13)	18.39(19.57)	22.42(25.30)	23.42(21.55)	0.055	0.26

* p<0.05 **p<0.01 *** p<0.001

Superscripts indicate the rank sums differ significantly according to pairwise comparisons (a, p<0.001; b, p<0.01; c, p<0.05)

reverse item

§ adjusted for parental education

SD: standard deviation SDQ: Strengths and Difficulties Questionnaire

PS: Parenting Scale DASS: Depression Anxiety Stress Scales

2. SDQ

The repeated measures MANOVA showed a significant time × group effect on the SDQ subscale of conduct problems ($p = 0.029$), with a small to moderate effect size (Cohen's $d = 0.38$). The control group exhibited a deterioration of 0.69 points ($p = 0.015$).

3. PS

Repeated measures MANOVA revealed a significant time × group effect on all subscales, except for over-reactivity. Cohen's d values ranged from 0.44 to 0.63, indicating a moderate effect size. Notably, only parents in the intervention group exhibited significantly improved scores. The total scores for the group decreased by 0.44 points ($p = 0.000$), the laxness subscale decreased by 0.64 points ($p = 0.003$), and the hostility subscale decreased by 0.58 points ($p = 0.002$).

4. DASS

According to the repeated measures MANOVA, there was a significant time × group effect ($p=0.011$) on the DASS depression subscale, with a small to moderate effect size (Cohen's $d = 0.37$). Parents in the intervention group exhibited a non-significant decrease of 0.39 points on the subscale, while those in the control group experienced a non-significant increase of 0.50 points.

5. Participant satisfaction

Table 2 displays the mean scores and standard deviations of the participants for each statement, rated on a scale from 1 to 7. The mean scores ranged from 4.58 to 6.36, with an overall mean score of 5.82. The statement "Do you think the program has improved your relationship with your partner?" received the lowest score, while "How would you rate the quality of the service you and your child received?" achieved the highest score.

IV. Discussion

Though the characteristics of program effectiveness were like those found in previous studies of in-person interventions among the Japanese population [7,30], the improvements in scores and the significance of effects were smaller. This may be attributed to the fact that the present study was conducted during the COVID-19 pandemic, a time when parenting challenges are heightened compared to earlier studies. Nevertheless, the study achieved sufficiently high levels of participant satisfaction. The mean satisfaction level for all items was not lower than that reported for the Japanese population in previous studies [30], Japanese parents in Queensland [31], and Chinese parents [32].

The effectiveness of telepsychology, including the implementation of remote parenting support programs, has been gradually demonstrated, despite the existence of environmental barriers such as inadequate equipment for remote participation [33]. Additionally, it has been observed that enhancing the capacity of facilitators presents challenges [34]. Concerns have also been raised regarding insufficient group dynamics in the execution of remote group programs [15]. Consequently, guidelines are necessary to ensure the quality of remotely implemented programs [33]. In addition to the general guidelines established at the national level [35], more specific guidelines are available for each program.

The primary limitation of this study was its small sam-

Table 2 Scores of client satisfaction (N=36)

questions	mean	SD
1. How would you rate the quality of the service you and your child received?	6.36	1.10
2. Did you receive the type of help you wanted from the program?	6.31	0.98
3. To what extent has the program met your child's need?	5.64	1.17
4. To what extent has the program met your needs?	6.19	1.09
5. How satisfied were you with the amount of help you and your child received?	6.14	1.13
6. Has the program helped you to deal more effectively with your child's behavior?	5.92	1.23
7. Has the program helped you to deal more effectively with problems that arise in your family?	5.58	1.38
8. Do you think your relationship with your partner has been improved by the program?	4.58	1.50
9. In an overall sense, how satisfied are you with the program you and your child received?	6.31	0.92
10. If you were to seek help again, would you come back to Triple P?	5.97	1.03
11. Has the program helped you to develop skills that can be applied to other family members?	5.14	1.68
12. In your opinion, how is your child's behavior at this point?	5.66	1.12
13. How would you describe your feelings at this point about your child's progress?	5.89	0.85
Total mean score	5.82	0.84

Clients scored from 1(poor) to 7(excellent)

SD: standard deviation

ple size. Additionally, the study design was constrained. Unlike standard controlled intervention studies that utilize a wait-list design, where participants are randomized into intervention and wait-list groups [36], we did not establish a control group or perform randomization when assigning participants. Consequently, the results could not be compared between the intervention and control groups, as the former was assessed using a questionnaire and analyzed through a web-based survey. The intervention group was primarily recruited through flyers distributed in city facilities, while the control group was sourced from a survey company panel. This recruitment method resulted in differences in background factors between the groups. Despite these limitations, the findings of the present pilot trial suggest the feasibility of planning a well-designed evaluation study with a larger sample size in the future.

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Disclosure

The authors declare no conflict of interest.

Trial Registration: This study was retrospectively registered with the UMIN Clinical Trials Registry (R000046396).

Author's contributions

All authors contributed substantially to the publication of this manuscript. NK contributed to the literature search, study design, data collection, analysis, and writing. MS contributed to the implementation of the parenting programs and data interpretation. TY contributed to data interpretation and writing. All the authors have reviewed the manuscript.

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＜短報＞

根拠に基づいたグループ育児プログラムをビデオ会議技術によって実施する実行可能性を評価するためのパイロット研究

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抄録

新型コロナウイルス感染症（COVID-19）の蔓延により，親子のメンタルヘルスが悪化していることから，感染予防を可能とする保護者支援プログラムの遠隔実施が必要となっている．本試験は，ビデオ会議技術を用いたトリプルPグループプログラムを日本人参加者に対し実施し，プログラムの満足度を明らかにするとともに，十分にデザインされた評価研究の実現可能性を明らかにすることを目的とした．2020年，日本人集団から36名のプログラム参加者を募集し，調査会社のパネルから36名の対照と比較した．その結果，プログラムの満足度は，日本人を対象とした対面式の先行研究と同様に良好であった．効果は日本の先行研究と類似していたが，スコアの改善や効果の有意性は小さかった．サンプルサイズと研究デザインの限界はあるものの，本研究は，十分にデザインされた比較研究の実行可能性を示唆している．

キーワード：新型コロナウイルス感染拡大，情報技術，養育，プログラムの効果，ビデオ会議