Radioprotection 2025, 60(4), 354–359
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https://doi.org/10.1051/radiopro/2025007

Available online at:
www.radioprotection.org

ARTICLE OPEN ACCESS

Participatory 'Creative Health' in Fukushima schools: implications of 'ACT' theatre component for children's responses

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Received: 9 October 2024 / Accepted: 4 February 2025

Abstract – Our group has developed a "Creative Health" project as a participatory educational approach after Japan's 2011 earthquake, tsunami, and nuclear disaster in Fukushima. The project engages elementary school children in three workshops: "ACT" was first, developed by a specialist in participatory theater, to empower children to express what they think about their community. "BODY" and "FOOD" came next, developed, respectively, by an academic pathologist specializing in blood transfusion and a university-based nurse-dietitian. Each workshop provides creative activities (e.g., drama and performance in ACT, storyboard presentation in BODY, and drawing in FOOD) for children to express their opinions. To assess the impact of Creative Health, attendees were asked about their feelings on health, food, and community. We compared responses between two groups: those involved in all three workshops (Group I) and those attending just BODY and FOOD (Group II). Group II showed increases in viewing their own health and the food in their community more positively. Similar increases were observed in Group I regarding views about their own health, the food in their community, and community overall. Text-mining analysis of children's free written opinions showed that "taking care of my health" and "communication" appeared only in Group I. ACT had positive impacts on facilitating children to communicate with their peers, become responsible for their own health, and have positive perspectives about themselves and their community.

Keywords: Creative Health / education / Fukushima / participatory theatre approach / BODY / FOOD / ACT

1 Introduction

Following the Great East Japan Earthquake and Fukushima nuclear disaster in 2011, we observed that many adults in Fukushima remained concerned about children's health and wellbeing (Ishii K, 2022) . While many studies among children conducted after the 2011 disaster focused on their physical and mental health, the Sendai Framework of Disaster Risk Reduction 2015–2030 stated that, "Children and youth are agents of change and should be given the space and modalities to contribute to disaster risk reduction, in accordance with legislation, national practice and educational curricula." (UNISDR, 2015). Therefore, children's ability to act and contribute to their community should be recognized and promoted. Inspired by the "Creative Health" report by the UK All-Party Parliamentary Group on Arts, Health and Wellbeing (All-Party Parliamentary Group on Arts, 2017), we created a participatory school health project called "Creative Health" (Goto A, 2022). The project began with the development and implementation of an "ACT" workshop, based on the participatory theatre approach piloted in Fukushima Prefecture

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by a UK-based researcher (Lloyd Williams A, 2022), in which children work in groups to exchange opinions about their community, select a topic and develop a short acting scene, and perform it in front of their peers and adults. An evaluation found that not only children but also teachers benefited from these sessions (Goto A, 2020a). Teachers learned how to enhance children's creativity and capacity to express opinions about their community and became more aware of the importance of children's voices in community development. Following the successful implementation of the ACT workshop, we added "BODY" and "FOOD" workshops to the program. In BODY, children learn about their own health through exchanging opinions with peers, presenting story-boards about historical figures in medicine, and measuring and graphing their pulse. In FOOD, children learn about the connection between health and food, discovering local foods, cooking and tasting them, and drawing their daily meals. In the ACT component of the three-workshop program, students have the opportunity to express their thoughts about the relationship between food, health, and more widely about their local community.

In 2017, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) released new guidelines for courses of study to be implemented in schools from 2020 to 2022. Using the slogan "Zest for life," the goal was to foster children's ability to think, make judgments, and express themselves (MEXT, n.d.-a). In other words, this promoted the idea that schooling should be less about what teachers teach students and more about what students can do and how they learn (Yamanaka S, 2020). The guidelines also included the development of skills for children to live and interact with others in the community. Our Creative Health project matches these national trends in education policy.

When implementing Creative Health in Fukushima, we valued the right of individual schools to have ownership of their teaching; thus, some schools decided to implement all three workshops, while others chose to conduct only two (in most cases, BODY and FOOD). In this report, we compare the learning outcomes for children in two school groups, participating in two and three workshops, respectively, to gain practical recommendations for future project management.

2 Method

The main activities of Creative Health are shown in Table 1. The project was implemented and evaluated as described above, and the details have been reported previously (Goto A, 2022b). Of note, the original FOOD workshop included a practical cooking activity, but this was substituted with a demonstration of cooking and sampling of cooked food owing to COVID-19-related restrictions (Goto A, 2020a, 2022b).

The workshops for analysis were held in elementary schools in Fukushima Prefecture between 2021 and 2022. Group I comprised 92 children in 5th grade (10-11 y.o.) at one school who participated in three workshops (BODY, FOOD, and ACT), and Group II comprised 125 children in 6th grade (11-12 y.o.) at two schools who participated in two workshops (BODY and FOOD). Of note, the Group I school was located in a municipality with Deliberate Evacuation Areas while the Group II schools were located in a municipality without such areas.

Before and after the workshops, participants were asked to respond to the following questions: "Are you satisfied with your health?" "How do you feel about the place you live?" "How do you feel about the food in your place?" and "Are you willing to help prepare meals at home?". Answer options used a face-scale adapted for children and ranging from 1 with a neutral expression to 5 with the happiest expression. Stata version 18 (Stata Corp LLC, Texas, USA) was used to perform a two-way mixed-design ANOVA. The between-subject effect was group, and the within-subject factor was time (before and after the workshops). We confirmed the interaction between the two variables.

After the workshops, text-mining analysis of qualitative data in Japanese was conducted to compare the two groups' learning outcomes, using KH Coder, version 3 (Higuchi K, n. d.). A co-occurrence network was performed to categorize frequently used words.

This study was approved by the Ethics Review Committee of Fukushima Medical University (Fukushima Medical University Ethics Committee Approval No. General 2020-060). This research was funded by the Japan Society for the Promotion of Science Grants in Aid for Scientific Research (No. 19KK0060). Parental written consent and children's informed assent were obtained for this study.

3 Result

For Group I (Table 2), the scores for two evaluation indicators increased following attendance at all three workshops: satisfaction with your own health (3.36 to 3.85) and feelings about your community (3.72 to 3.95). Likewise, in Group II, the scores of two evaluation indicators increased: satisfaction with your own health (3.52 to 3.83) and feelings about the food where you live (3.92 to 4.05). The interaction (group x time) was statistically significant ($p = 0.033$) for the feelings about your community. A simple effect test showed a significant difference between pre- and post-workshop scores for Group I ($p = 0.019$). There were no significant interactions for health, food in their community, and helping with meals ($p > 0.05$). Significant increases from pre- to post-workshops were found for health ($p < 0.001$) and food in their community ($p = 0.007$).

The results of the text mining of the children's free written opinions after participation are visualized in Figure 1. Words used among both groups were "anemia" and "vitamin C and iron." The words that appeared only in Group I were "taking care of my health," "communication," "move," and "movement." Those that appeared only in Group II were "blood, heart, and lungs."

4 Discussion

Children in Group II only became more positive about their own health and the food in their community, while children in Group I who experienced all three workshops became more positive about their community overall, as well as their own health and the food in their community. This is a marked observation, especially given the relatively younger age of

Table 1. Aims and major activities of three Creative Health workshops.

Workshop activities	Required skills
BODY	
AIM: To understand about your own body (heart, lungs, and blood), health, and underlying science.	
Presenting what you know	
• Write on sticky notes some knowledge, beliefs, or experience related to blood, heart, and/or lungs	• Think logically
• Post sticky notes on a Venn diagram (overlapping circles marked as blood, heart, and lungs)	• Share ideas
Presenting "*Kamishibai*" (storyboards)	
• Student groups examine storyboards and select a historical figure	• Work collaboratively
• Plan each person's role, practice, and present the storyboards to the whole class	• Public speaking
Measuring and graphing	
• Students in each group share a pulse oximeter to measure and record their heart rates	• Think scientifically and mathematically
• Plot heart rates on a Cartesian grid and study its shape	
FOOD	
AIM: To understand how your health is supported by others through learning about healthy foods (well balanced foods for anemia prevention).	
Quizzes	
• Learn about roles of iron in body from car cartoons (car seats represent iron)	• Make healthy choices
• Learn to pick foods rich in iron and vitamins from samples and pictures (including local foods)	
Drawing and presenting	
• Students draw what they ate for dinner the day before	• Apply learned knowledge in daily life
• Discuss what to add to make it more iron-rich	
• Present the iron-rich menu to others	
Sampling	
• Observe cooking demonstration and sample iron-rich food	• Learn how to prepare foods
ACT	
AIM: To explore how your life is connected with your environment and promote confidence to act (theater approach) in community development.	
Introductions and Warming-up	
• Active and concentration exercises	• Express oneself with actions and voice • Work collaboratively
Preparing for a performance	
• Make groups of 5–6 people	• Think and discuss about foods and how they are produced, prepared, and eaten in their community
• Students in each group think about and discuss their favorite foods and the reasons why. Groups choose one food and present reasons for choice	• Make choices
Performing	
• Groups create a short drama scene about the selected food (about 30 seconds-one minute) using actions and sounds	• Create a performance to explore and express ideas to others
• Practice and rehearse	
• Show back to each other and discuss	

Table 2. Change in score before and after workshop.

	Group	No. of students[a]	Pre-workshop	Post-workshop	P value[b]
Are you satisfied with your health?	I	81	3.36	3.85	Interaction: 0.238 Main effect: group 0.556, time <0.001
	II	115	3.52	3.83	
How do you feel about the community where you live?	I	83	3.72	3.95	Interaction: 0.033 Simple effect: group 0.364 at pre-workshop and 0.937 at post-workshop; time 0.019 for Group 1 and 0.596 for Group II
	II	114	3.83	3.78	
How do you feel about the food where you live?	I	78	3.72	3.91	Interaction: 0.620 Main effect: group 0.293, time 0.007
	II	113	3.92	4.05	
Are you willing to help prepare meals at home?	I	76	3.51	3.63	Interaction: 0.542 Main effect: group <0.001, time 0.254
	II	111	3.96	4.00	

[a] Total number of the participants were 92 in Group I (FOOD, BODY, and ACT) and 125 in Group II (FOOD and BODY). Only data for participants who gave responses both pre-workshop and post-workshop were analyzed.
[b] A two-way mixed-design ANOVA was used.

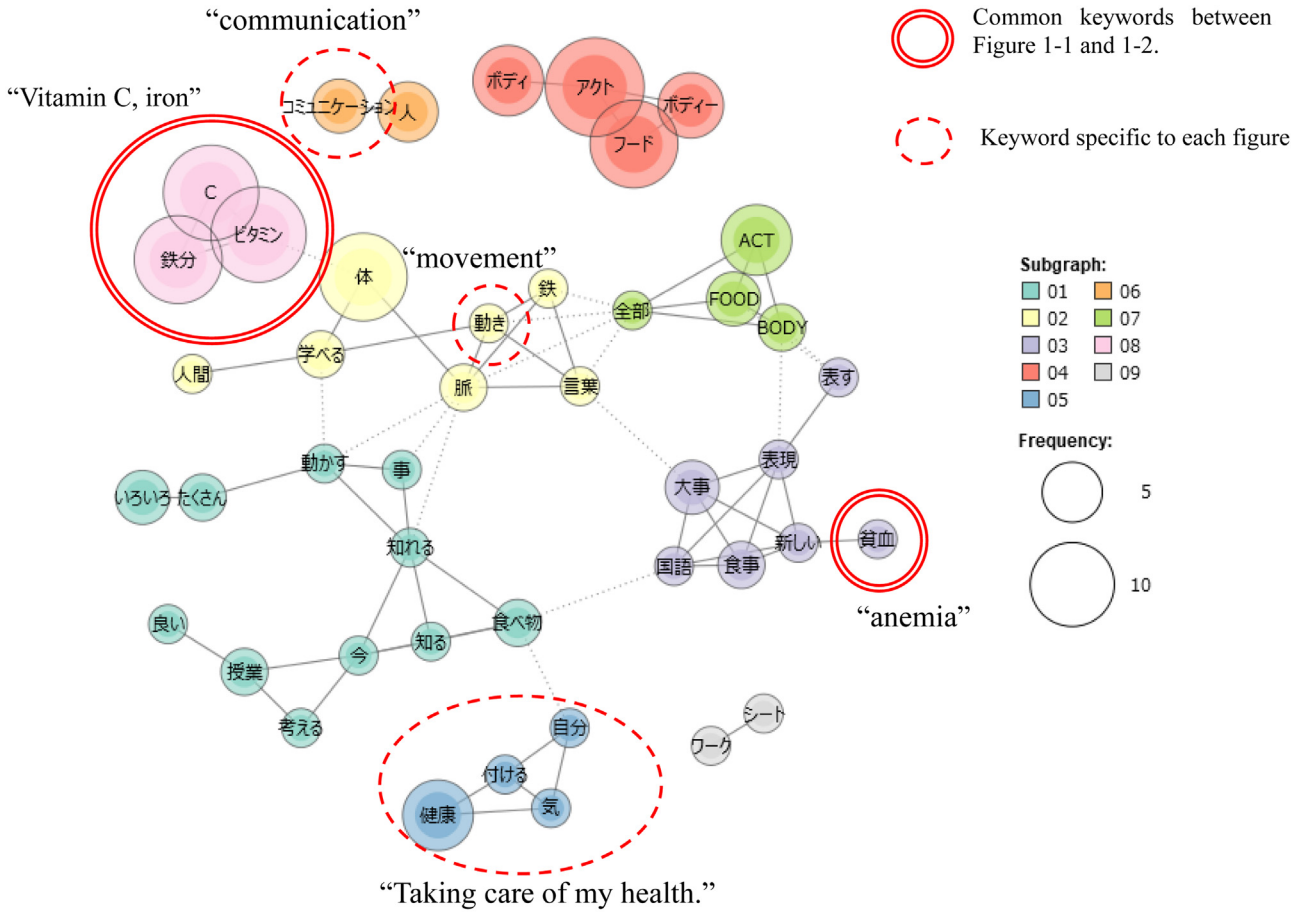

Fig. 1. (1-1) Cooccurrence Network after FOOD, BODY and ACT workshops.

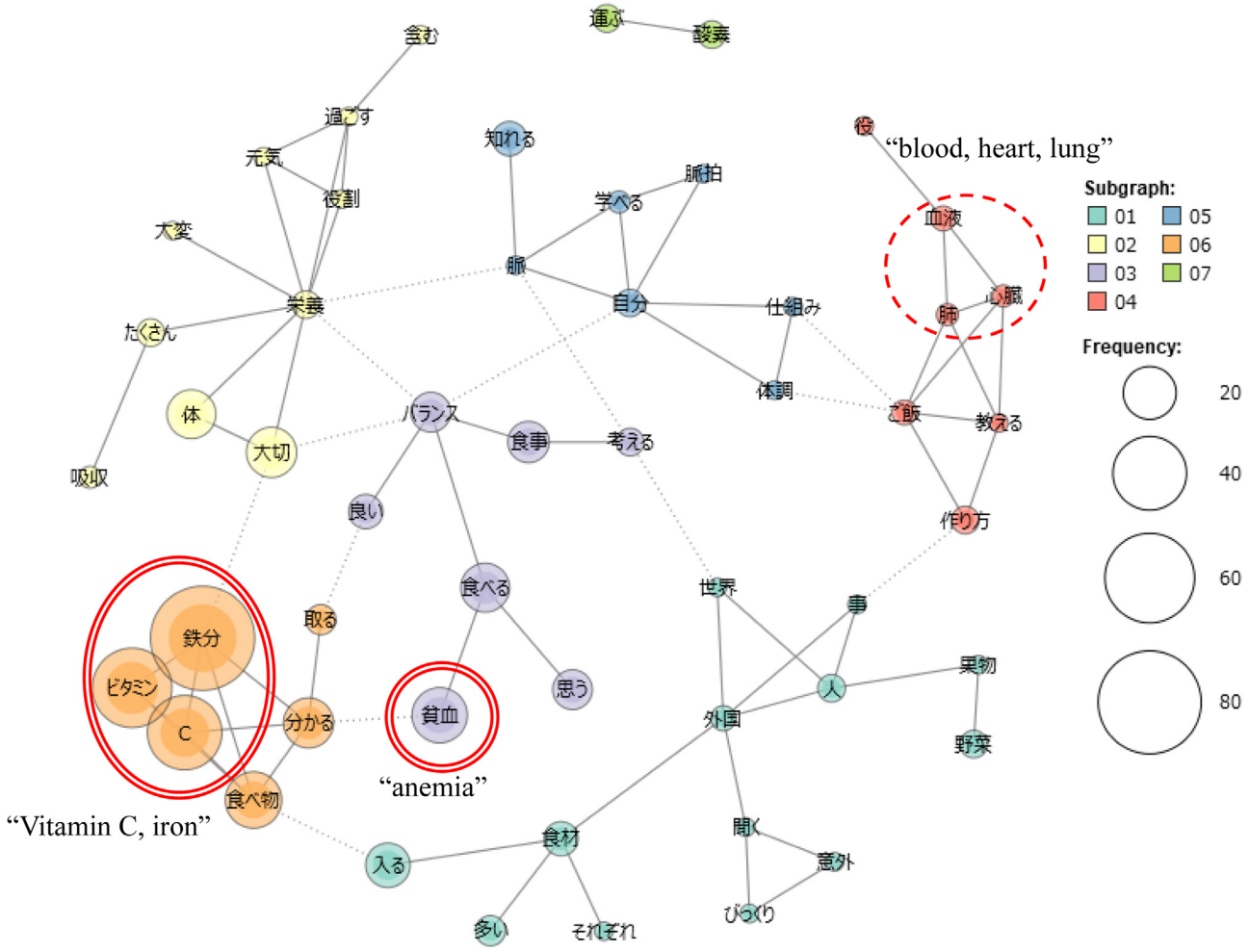

Fig. 1. (1-2) Cooccurrence Network after FOOD, BODY and ACT workshops.

Group I, who were presumed to have poorer comprehension of the same learning content. It is possible that ACT provided an opportunity for children to think more deeply about food and health in their community by discussing and performing among peers. Notably, there was no observed change in children's confidence in preparing meals at home; this might be due to COVID-19 restrictions for FOOD that resulted in cooking activities being replaced with tasting.

Regarding free written opinions, words related to communication, active movement, and taking responsibility for one's own health appeared only in Group I. This suggests that ACT was clearly linked with thepromotion of agency, and effective in empowering children in health promotion through promoted critical thinking by communicating and collaborating with their peers. For Group II, group-specific words were organ-related, indicating that the workshop was useful for knowledge retention.

The Creative Health workshops are conducted in collaboration with schoolteachers. As described above, ACT in particular makes teachers aware of their children's agency in the community. Since the school that conducted the ACT was located in a municipality with relatively higher levels of environmental radiation contamination and had deliberate evacuation areas, it is possible that the teachers were more interested in our project aimed at better community development with children. The teachers' enthusiasm may have created a positive iterative interaction with their students. Nevertheless, we observed similar effects of ACT in another project site outside Japan (Lloyd Williams A et al., 2023). ACT is potentially effective regardless of a disaster's impact, yet it plays an essential role in the recovery of disaster-affected areas, where its need has increased.

The new education guidelines in Japan[7] aim to develop children's active and interactive learning skills. The guidelines further state the importance of linking "play" with education: "ensure that the things developed through play as spontaneous activities in early childhood are smoothly connected to learning in all subjects" (MEXT, n.d.-b). Our Creative Health workshops provide children with a safe space and tools to explore and learn on their own. The skills of critical thinking, decision-making, and self-expression that are listed in the guidelines are included in the workshops, most explicitly in ACT. More than a decade after the Fukushima nuclear disaster, it is our hope that the implementation of Creative Health will promote creative and independent learning among schoolchildren, expand their capacity as independent citizens, and create resilience in their communities.

Acknowledgments

The authors thank Satsuki Katsumi and Shigeru Nakano (former school principals in Date City) for their contribution towards implementing the project.

Funding

This research was funded by the Japan Society for the Promotion of Science Grants in Aid for Scientific Research (No. 19KK0060 and 23KK0045).

Conflicts of interest

The authors declare no conflict of interest.

Data availability statement

The data are not publicly available due to the nature of this research that students and parents did not agree for their data to be publicly shared.

Author contribution statement

ALW, KEN, and SO developed the workshops and YY contributed to developing the teaching tools. AG obtained funding, developed the research plan, and supervised the implementation at schools. MM (first author) analyzed the data and drafted the manuscript, and MM (sixth author) contributed to data interpretation. All authors contributed to revising the manuscript.

Ethics approval

This study was approved by the Ethics Review Committee of Fukushima Medical University (Fukushima Medical University Ethics Committee Approval No. General 2020-060).

Informed Consent

Parental written consent and children's informed assent were obtained for this study.

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Cite this article as: Machida M, Goto A, Lloyd Williams A, Okabe S, Koriyama C, Murakami M, Yumiya Y, Nollet KE. 2025. Participatory 'Creative Health' in Fukushima schools: implications of 'ACT' theatre component for children's responses. *Radioprotection* 60(4): 354–359. https://doi.org/10.1051/radiopro/2025007