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(SHORT REPORT

Evaluation of a peer support intervention to improve the breakfast habits of Japanese college students

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Abstract

Objectives: This study investigated the impact of peer support interventions on the improvement of breakfast habits of university students. Both breakfast frequency and breakfast composition were assessed.

Design: A combination of convergent and intervention designs using a mixed-methods approach.

Setting: College-based peer-support interventions taking place in Sapporo, Hokkaido, Japan.

Method: Questionnaires on demographic characteristics and breakfast habits were administered to participants (n = 27) before the online workshop, immediately afterwards, and 3 and 6 months after the peer support intervention, coupled with a 4-week breakfast status report. Semi-structured interviews were then conducted with 17 participants to gain an in-depth understanding of the impact of the intervention.

Results: Quantitative results showed that immediately after the intervention, breakfast intake frequency and breakfast composition both improved significantly; however, post-intervention, there was a difference in the persistence between frequency and composition. In the qualitative element of the study, “peer stimulation” and “coercion” were identified as drivers of the changes identified. In addition, “changes in awareness and behaviour” and “realisation of the need for breakfast” were occurred among participants due to the intervention.

Conclusion: Peer support interventions can improve the breakfast habits of university students. A follow-up intervention within 6 months for the frequency and within 3 months for the composition after the intervention may help sustain the observed beneficial effects.

Keywords: Breakfast skipping, breakfast habit, peer support, behaviour change, college students

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Introduction

Breakfast skipping has been linked to lifestyle-related diseases (Ballon et al., 2019), obesity (Ma et al., 2020) and mental health problems (e.g., depression, lower happiness, posttraumatic stress disorder, loneliness) (Pengpid and Peltzer, 2020). However, skipping breakfast is common among young people worldwide. In the USA, the skipping rate among men and women aged 12-19 years was 27.1% (Terry et al., 2020). In a previous study involving 10 European countries, the overall skipping rate among 12-17 years old was 40.3% (Barrett et al., 2018). In a study of university students in South Africa, the skipping rate was 19.5% (Seedat and Pillay, 2020). The skipping rate among university students in a study of three universities in Bangladesh was 53.8% (Biswas et al., 2020). In a study of junior and senior high school students in Korea, the skipping rate was 31.5% (Lee et al., 2019), and in a study of university students in 28 countries in Asia, Africa, and America, the overall breakfast skipping rate was 48% (Pengpid and Peltzer, 2020). In Japan, the breakfast skipping rate among men aged 20-29 years was 27.9%, and 18.1% among women aged 20–29 years (Ministry of Health, Labour and Welfare of Japan, 2019). Thus, it is clear that substantial numbers of young people tend to skip breakfast, and university students may be especially prone to disruptive eating habits as they become more independent after transitioning from secondary school and are required to make healthy food choices on an independent basis (Deliens et al., 2014).

Breakfast is also considered important for meeting daily nutrient intake requirements (Gibney et al., 2018). For example, breakfast-deprived individuals have a lower total energy intake, with a significantly lower percentage of them meeting the required and adequate intake of folate, calcium, iron and vitamins A, B1, B2, B3, C, and D (Deshmukh-Taskar et al., 2010), and a significantly lower overall dietary quality than those who consumed breakfast (Fanelli et al., 2021). Previous studies have shown that even if breakfast is consumed, it will not provide the necessary nutrition if it is of low quality (Morgan et al., 1986). Thus, along with eating breakfast, it is important to aim for a balanced and high-quality breakfast, as a low-quality breakfast will not provide the necessary nutrition.

As noted above, skipping breakfast among young populations is globally problematic and its improvement remains a challenge. Japan is no exception in this respect. Traditionally, dishes have been categorised as main meals (e.g., rice, bread) main dishes (e.g., meat, fish), and side dishes (e.g., salad, soup), which have been valued in the Japanese diet. This is what Japanese people have been accustomed to in their traditional diets, and it has been reported that a diet combining these elements leads to a nutritionally balanced diet (Kurotani et al., 2018). Indeed, Government Dietary Guidelines (Ministry of Education, Culture, Sports, Science and Technology et al., 2016) recommend a diet that combines staple foods, main dishes, and side dishes. As a result, Japanese people are familiar with the standard of staple food, main dishes, and side dishes and using the combination of staple, main, and side dishes as an indicator for breakfast composition may help people eat a high-quality meal and consume the necessary nutrients at breakfast.

However, it is not easy to change health behaviours general (Gochman, 1997) and behaviours to improve the frequency and composition of breakfast intake in particular. In this regard, peer support may offer an effective way to promote behavioural change. Peer education has been defined as the provision of emotional, evaluative, and informational support by members of a created social network who have experiential knowledge of specific behaviours or stressors and characteristics similar to those of the target population to address health-related problems (Dennis, 2003). The significance of peer support has been identified in previous research on diverse health behaviours including smoking cessation (Stead et al., 2017), weight loss (Borek et al., 2018), and support for people with HIV (Harris et al., 2015). Hence, peer support interventions may be effective in improving breakfast habits and other health behaviours.

Objectives

Based on the above, the purpose of this study was to determine how a peer support intervention might improve the breakfast habits of university students in terms of two ways: frequency and composition of breakfast.

Methods

Study design

This study employed a combination of convergent and intervention designs. In a convergent design, qualitative and quantitative data were collected and analysed over a similar timeframe (Fetters et al., 2013). An intervention design adds the perspective of the individuals participating in an study in traditional experimental research and can reveal how an intervention programme is experienced by research subjects (Creswell and Plano Clark, 2017). This kind of dual design goes beyond simple hypothesis testing to provide a more in-depth understanding of the processes and outcomes of peer support interventions.

Participants

This study was conducted with a convenience sample of 27 undergraduate and graduate students (13 men and 14 women, with a mean age of 21.4 ± 1.3 years) living and studying in Sapporo, Japan. Convenience sampling was used to target those who lived by themselves. The study was conducted between July 2020 and March 2021 during the COVID-19 epidemic in Japan.

Research process

This study was conducted as detailed in Figure below. 27 participants completed an online questionnaire survey using Google Forms before and after the intervention. The 27 participants then participated in a peer support intervention. The first step in the intervention was to

participate in an online workshop. In the workshop, the participants learned about the significance of breakfast intake and participated in a variety of group work activities. After the workshop, participants in each group used a social networking site for 4 weeks to report on their breakfast using photos. One of the authors (CO) participated in all the groups and observed them. After completing the post-intervention questionnaire surveys, 17 participants completed an online interview survey with an aim to more fully understand the change in their thoughts towards breakfast intake and in its process through qualitative approach.

[Figure 1 about here]

Data collection

Quantitative phase (Online questionnaire survey)

Survey items assessed demographic characteristics, awareness and reality of breakfast consumption, breakfast composition, and stage of behaviour change related to eating habits. For demographic characteristics, we surveyed the participants' sex, age, grade, faculty, and residential status. For breakfast awareness and reality, we surveyed breakfast intake frequency and reasons for skipping breakfast. The choices (sample question: "Do you usually eat breakfast?", sample responses: "eat almost everyday", "eat 4-5 times a week", "eat 2-3 times a week", "rarely eat") were based on an earlier Internet survey of Japanese university students nationwide (Office of Dietary Education, Cabinet Office of Japan, 2009).

Breakfast composition was assessed by means of steps based on the quality and quantity of food intake: "Step 0 (nothing to eat)," "Step 1 (* only foods such as sweets, fruit, dairy products, nutritional supplements, and nutritional drinks)," "Step 2 (a single food)," "Step 3 (a combination of single food)," "Step 4 (a main meal and a main dish or side dish)," and "Step 5 (a main meal, a main dish and a side dish)." Each step was converted into a score, with step 5 equating to a score of 5 and being the highest possible score, and step 0 equating to a score of 0, being the lowest possible score under this variable.

Stages of change as defined by the Transtheoretical Model (TTM) (Prochaska and DiClemente, 1983) were assessed – pre-contemplation, contemplation, preparation, action, and maintenance – with participants being asked to select one of the above following five stages in terms of the change in breakfast habits (DiClemente et al., 1991; Prochaska et al., 1992) .

Qualitative phase (Semi-structured interview)

Following the post-intervention questionnaire survey, semi-structured interviews were conducted with 17 participants. The survey items included reflections on the peer support interventions and thoughts about breakfast. Participants were also asked to provide pictures of food they ate for breakfast. Each interview lasted approximately 30 minutes and was conducted using Zoom. Audio recordings were made with the consent of the participants.

Data analysis

Quantitative data analysis

A comparison of pre- and post-intervention means was conducted for 19 participants, excluding the 8 participants who were consistently in the “eat almost every day” category from pre-intervention to 6 months after the intervention. We employed multiple comparison methods: Steel's test for breakfast intake frequency and Dunnett's test for breakfast composition score and the mean values immediately after the intervention, 3 and 6 months after the intervention were compared to pre-intervention. JMP14.0.0 aided the analysis, and the significance level was set at 5%.

Qualitative data analysis

All the interviews were recorded and transcribed verbatim. A thematic analysis was then undertaken (Braun and Clarke, 2021). First, verbatim transcripts were read several times to obtain an overall picture of the data. We then extracted and coded parts of the verbatim transcripts that were related to the effects of the intervention and changes in participants due to the intervention. We identified the meaning of each code, collected similar statements together, and categorised them. The similarities and differences within each category are discussed. Qualitative analyses were facilitated by the use of MAXQDA2020 software.

Ethics

The study protocol was approved by the research ethics committee of the Graduate School of Health Sciences, Hokkaido University. Participants were provided verbal and written explanations regarding the study and participated voluntarily with guarantees of anonymity and confidentiality during data analysis and in the publication of the results. Written informed consent was obtained from all participants.

Results

Demographic characteristics

Findings in relation to demographic variables are contained in Table 1.

[Table 1 about here]

Changes in breakfast habits

Table 2 shows the mean values of breakfast intake frequency before and after the intervention. There was a significant increase in the breakfast intake frequency immediately and 3 months after

the intervention. Six months after the intervention, however, no significant increase was observed. Table 3 shows the comparison of the mean values of breakfast composition scores before and after the intervention. There was a significant increase in the intervention scores immediately after the intervention. There was no significant increase at 3 or 6 months following the intervention.

[Tables 2 and 3 about here]

Results of the interviews

The interviews were analysed to identify perceived drivers of the intervention's effects. Findings are shown in Table 4. Participants identified two main kinds of drivers: peer stimulation and coercion.

Table 4 about here please

Peer stimulation

This main theme consisted of three sub-themes: referencing peers' meals, reviewing my own breakfast, and maintaining motivation. In the peer support intervention, participants stated that they were stimulated by knowing more about how their peers were doing stayed motivated by comparing themselves with others.

"I found it helpful to see how others were doing it"

"It was nice to be able to see other people's meals and compare them, like, 'Oh, he is so tired that he only ate pudding, and No, I am going to eat vegetables and stuff', I cannot keep going if I only have my own will, so I thought this kind of [thing] would allow me to keep going with the help of information about others.'

Coercion

This main theme consists of three sub-themes: daily reporting, monitoring by other group members, and triggers for initiating behaviour change. Participants said, "The best part of the intervention was that we could make breakfast a habit because of the need to report the status of breakfast every day", and "Everyone knows that breakfast is important, but I think it's a big hassle to do it alone. So, it was nice to have a group to enforce it." Participants said that group coercion helped them work on improving their breakfast habits.

"I think that creating opportunities like this will help improve breakfast", and

"I think that participating in the intervention has improved my awareness because I

definitely feel that I need to eat properly more than when I am not participating.”

Table 5 shows changes in participants’ awareness. Two types of change were identified: changes in overall awareness and behaviour, and realisation of the need for breakfast

Change in awareness and behaviour

This main theme consisted of four sub-themes: preparation for breakfast, awareness of breakfast, awareness of nutritional balance and number of foods consumed, and successful experience of breakfast intake.” Participants said that the peer support intervention had changed their awareness of breakfast intake and composition. One said, “I used to think that I should just eat, but I have changed my mind about [that] and recognise] the importance of eating a balanced diet.” Participants also said that the intervention helped them accumulate successful experience. One of them stated, “I used to not have food at home before because I did not want to eat breakfast in the first place, but when I participated in the intervention, I started to keep food for breakfast at home.” Another said: “I realised that I can do it surprisingly well if I try.”

[Table 5 near here]

Realisation of the need for breakfast

This main theme consisted of three sub-themes: positive impact on body and mind, improvement of lifestyle rhythm, and reaffirmation of the need for breakfast.” Participants came to understand the necessity of breakfast making comments such as: “I felt that I had more energy the day I ate breakfast”, “I realised that my mind was totally different when I ate breakfast and when I did not”, “By being conscious of having breakfast, I could get my daily rhythm in order”, “I feel my life cycle is better when I eat breakfast”, and “I thought I should eat breakfast, even if it is just a little bit.” Based on such experiences, participants who had originally considered breakfast important said it made them more aware of the importance of having breakfast again, saying that “I knew that breakfast was important, but it made a stronger impression on me again,” and “I had always thought it was important, but now I am more aware of its importance.”

Integration of quantitative and qualitative results

We examined the similarities and differences between the quantitative and qualitative results to determine whether they converged or otherwise. Ultimately, the quantitative and qualitative results largely supported each other. One exception related to the breakfast composition score post-intervention, which showed no sustained improvement in the quantitative results. However, in the interviews, some participants expressed becoming more conscious of the need to balance

their nutrition and increase the number of food consumed .

Discussion

In this study, we examined improvements in students' breakfast habits in two ways: breakfast intake frequency and breakfast composition. Immediately following the intervention, both breakfast intake frequency and breakfast composition score improved significantly, but post-intervention, the breakfast composition score showed a downward trend after 3 months, and breakfast intake frequency showed a downward trend after 6 months (Tables 2 and 3). In the interview survey, peer stimulation and coercion" were the effects of the intervention felt by participants (Table 4). Change in awareness and behaviour and realisation of the need for breakfast" were changes seen as brought about by the intervention (Table 5). The results indicate that a peer support intervention can bring about improvements in both frequency and composition.

The Transtheoretical model (TTM) offers insight into how the study's peer support intervention may have helped improve breakfast habits with a focus on the process of change (Prochaska and Velicer, 1997). Applied to this study, participants experienced three processes of change via the peer support intervention: self-liberation, self re-evaluation, and the use of helping relationships to effect change (Burbank et al., 2000). Self-liberation led to the choice to participate in a peer support intervention with a fixed start date and a clear group membership. Self-re-evaluation in this study took place during the intervention as participants created a new image of themselves as people who were "able to eat breakfast" Peer support provided access to a helping relationship with like minded others. Together, these three processes have been shown to be effective in people who are beginning a new health behaviour (Prochaska and DiClemente, 1983), and the peer support provided in this study may have helped participants embark on a process of change.

On the other hand, looking at breakfast habits post-intervention, breakfast intake frequency showed a downward trend 6 months later, and the breakfast composition score showed a downward trend 3 months after the intervention (Tables 2 and 3), indicating that there was a difference in the duration of improvement between breakfast intake frequency and breakfast composition. This suggests that a follow-up intervention delivered within 6 months of the intervention for frequency, and within 3 months of the intervention for composition, would be helpful to sustain progress. The lack of persistence of this intervention effect may be related to decisional balance. In decision making, two main factors are involved: those related to the benefits of the behaviour (pros), and the costs of changing the behaviour (cons), and behaviour change occurs when the perception of benefits exceeds the perception of burdens (Velicer et al., 1985). For the theme realisation of the need of breakfast identified in the interview survey, positive impact on body and mind and improvement of lifestyle rhythm were identified as subthemes (Table 5), suggesting that participants recognised the benefits (pros) of breakfast intake and a sustained improvement in frequency after the intervention. In contrast, there was no mention of

improvement in breakfast composition in the interviews, which may indicate that awareness of the cons was higher than that of the pros, and improvement was difficult to sustain.

Other priorities may have lowered the priority given to improving breakfast composition. In the questionnaire survey, top reasons for skipping breakfast were: "I want to sleep more," "I am busy getting ready," and "It is troublesome to prepare breakfast" A survey targeting university students (Office of Dietary Education, Cabinet Office of Japan, 2009) and previous studies (Moy et al, 2009; Ackuaku-Dogbe and Abaidoo, 2014) showed that the reasons given for skipping breakfast were similar. Previous studies have also shown that breakfast intake is lower on busy weekdays than on weekends (Alexy et al., 2010). In this study, breakfast intake frequency continued to improve even after 3 months of intervention, suggesting that eating breakfast itself became a higher priority as a result of the intervention. However, improving composition requires more time and effort than simply eating breakfast, so it is of lesser priority, and the effects of improvement may have been more difficult to sustain than improving breakfast intake frequency.

Limitations

This study has some limitations which need to be addressed in future research. First, the small sample size and convenience sampling reduces the generalisability of the results. However, the mixed methods design allowed us to collect both quantitative and qualitative data from participants, potentially enhancing reliability and other forms of validity (Creswell, 2015). Second, the study was conducted during the COVID-19 epidemic, which may have affected the results obtained. Third, the study lacked a comparison group, making it impossible to infer causation.

Conclusion

To the best of our knowledge, this study is the first attempt to conduct an online intervention study on the breakfast habits of university students during the COVID-19 pandemic. The study investigated the impact of a peer-support intervention to improve university students' breakfast habits using a mixed research approach. Evaluation of the peer support intervention revealed that participants improved their breakfast frequency and composition. Peer stimulation and coercion have a significant impact on this improvement. The results also revealed a difference in the persistence of the improvement effect between frequency and composition, with frequency showing a greater effect after the intervention than composition. To sustain the effect, it is suggested that a follow-up interventions should be conducted within 6 months for the frequency, and within 3 months after the intervention for the composition. Despite its limitations, this study offers a promising starting point for understanding the impact of peer support interventions on improving the breakfast habits of university students in Japan.

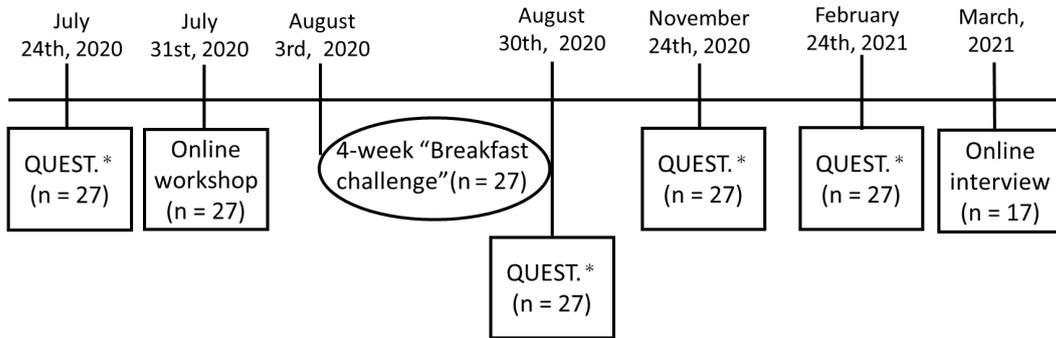
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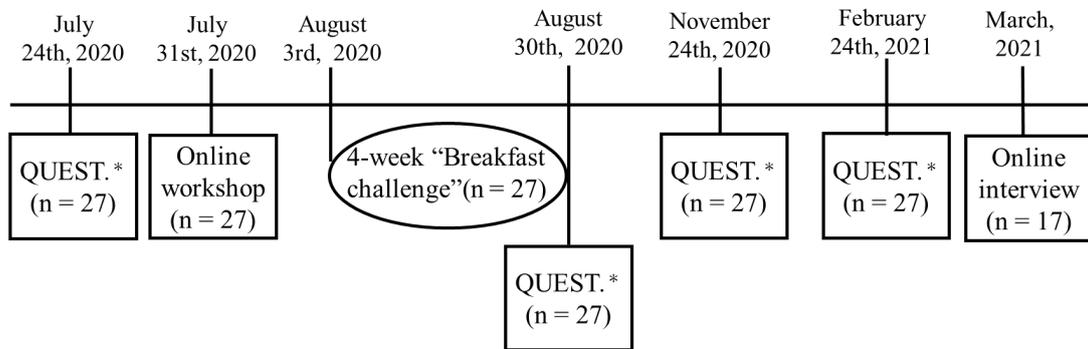
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Figure 1. Research Process



*Questionnaire: Same questionnaires were administered before, immediately, 3months and 6 months after the intervention.



*Questionnaire: Same questionnaires were administered before, immediately, 3months and 6 months after the intervention.

Table 1. Sample demographic characteristics (n = 27)

		N	M (%)
Gender	Male	13	48
	Female	14	52
Age		27	21.3
Grade	Freshman	1	4
	Sophomores	8	30
	Juniors	7	26
	Fourth year	4	15
	Graduate	7	26
Breakfast frequency	Eat almost everyday	8	26
	Eat 4-5 times a week	6	22
	Eat 2-3 times a week	4	19
	Rarely eat	9	33
Reasons for skipping breakfast	I want to sleep more	9	27
	I'm busy getting ready	8	24
	It's troublesome to prepare and clean up breakfast	6	18
	It's troublesome to eat breakfast	6	18
	No appetite	4	12
Stage of behaviour change related to dietary improvement prior to the intervention	Improving dietary habits: Not interested, no plans	0	0
	Improving dietary habits: Interested, no immediate plan	15	56
	Improving dietary habits: Interested, preparing to start	10	37
	Healthy diet: < 6 months	2	6
	Healthy diet: > 6 months	0	0

Table 2. Change in the frequency of breakfast intake compared to pre-intervention

	Before (control) (n = 19)	Immediately after		3 months after		6 months after	
	Mean	Mean	<i>P</i>	Mean	<i>P</i>	Mean	<i>P</i>
Breakfast frequency	1.789	3.053	<i>0.04</i>	3.000	<i>0.039</i>	3.000	<i>0.087</i>

Table 3. Change in breakfast composition score compared to pre-intervention

	Before (control) (n = 27)	Immediately after		3 months after		6 months after	
	Mean	Mean	<i>P</i>	Mean	<i>P</i>	Mean	<i>P</i>
Breakfast composition score	1.777	3.023	<i>0.002</i>	1.963	<i>0.914</i>	2.222	<i>0.447</i>

Table 4. Effects felt by the participants during the intervention

Main theme	Sub-theme	Sample quotations
Peer stimulation	Referencing peers' meals	<i>When I saw other people's proper breakfast, I thought it was nice, so that really motivated me.</i>
	Reviewing my own breakfast	<i>I did not know much about what people around my age ate, so I learned how they differed from me, and it gave me a chance to reconsider my own breakfast.</i>
	Maintaining motivation	<i>Everyone was working hard, which motivated me to keep going.</i>
Coercion	Daily reporting	<i>I felt compelled to report it, and it made me feel like I had to eat something.</i>
	Monitoring by group members	<i>Being in a group and having other people look at it helped me get into the habit of reporting it, and it became a habit I did not even know I had.</i>
	Triggers for initiating behaviour change	<i>I think that creating opportunities that are like a trigger will help improve breakfast.</i>

Table 5. Awareness and change of the participants due to the intervention

Main theme	Sub-theme	Sample quotations
Change in awareness and behaviour	Preparation for breakfast	<i>I have started keeping breakfast food in my house.</i>
	Awareness of breakfast	<i>I have changed my image to one of trying my best to eat, even if it's a hassle.</i>
	Awareness of nutritional balance and number of foods	<i>I have been trying to eat a more balanced breakfast, including more dishes.</i>
	Successful experience of breakfast intake	<i>I have realised that if I try, I can do it.</i>
Realisation of the need for breakfast	Positive impact on body and mind	<i>I become more physically and mentally active when I eat breakfast.</i>
	Improvement of lifestyle rhythm	<i>The rhythm of my life has been improved by being aware of having breakfast.</i>
	Reaffirmation of the need for it	<i>I had always thought it was important, but now I am more aware of its importance.</i>