

Feasibility of a Smartphone-Based Home Cooking Intervention to Enhance Healthy Eating in Children Aged 7–9 Years

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Abstract

This study aimed to design and evaluate the feasibility of a mobile application within Swiss households and examine its effects on dietary intake and food acceptance among children who participated in cooking with minimal parental guidance (intervention group) versus children who did not engage in cooking (control group). An online ten-week randomized controlled trial was conducted in 2020. Parents received access to a mobile application containing ten recipes. Each recipe incorporated one of two commonly disliked foods (Brussels sprouts or whole-meal pasta). Parents weighed and photographed the food portions on their child's plate and recorded whether the child enjoyed the meal and the target food. The primary outcomes were target food intake and acceptability, assessed using descriptive analysis comparing pre- and post-intervention data. Of 24 parents completing baseline questionnaires, 18 parents and their children (median age: 8 years) finished the evaluation phase. Mean baseline intakes for children were 19.0 ± 24.2 g for Brussels sprouts and 86.0 ± 69.7 g for whole-meal pasta per meal. Post-intervention, no significant differences were observed in intake within or between groups. However, a higher proportion of children in the intervention group reported neutral or positive liking for whole-meal pasta compared to the control group. No changes were observed in the liking of Brussels sprouts. The intervention proved feasible, but further studies with larger samples are necessary to confirm these findings. Incorporating digital tools into home cooking activities may enhance children's acceptance of certain healthy foods, reduce parental time burden, and encourage family engagement in preparing nutritious meals.

Keywords: Mobile application, Nutritious meals, Food acceptance, Home cooking intervention

Introduction

In Switzerland, children aged 5–12 years do not meet national dietary guidelines for six food groups, with only 46% and 5% meeting fruit and vegetable recommendations, respectively [1]. Early establishment of healthy dietary habits is critical, as eating behaviors developed during childhood often persist into adulthood [2].

The family environment is essential in shaping children's healthy dietary practices [3] through parental modeling

of healthy behaviors, availability and accessibility of diverse nutritious foods [4-6], and early exposure to various tastes and flavors [7]. A systematic review and meta-analysis of parent-focused home interventions demonstrated that early taste exposure significantly increases vegetable intake [8]. Participation in meal preparation may also enhance children's food preferences and intake of healthy foods [9-13].

While reviews on children's cooking interventions often suggest prioritizing school-based programs [14-16], parents act as the primary gatekeepers of the home, influencing the environment in which children develop their eating behaviors [8]. School-based nutrition programs frequently combine multiple components such as tasting sessions, gardening, and cooking activities [17]. Evidence indicates that interventions delivered in school settings may be less effective in promoting fruit and vegetable consumption than those in home

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environments, underscoring the importance of family-focused approaches [3].

Extending interventions beyond school settings to incorporate home-based strategies is therefore recommended. Factors linked to improved fruit and vegetable intake in school settings include experiential learning, such as engaging children in gardening and cooking activities [6, 18, 19]. Additionally, visual, hands-on, and sensory learning approaches have been shown to foster positive parent–child interactions and bonding [20]. These experiential learning methods can be adapted for implementation in home-based interventions.

Parent–child cooking programs have predominantly been delivered through workshops or community-based initiatives [9, 10, 21, 22]. Nevertheless, in today’s fast-paced environment, limited time often hinders the adoption of healthier behaviors [23]. Digital solutions, such as mobile applications, offer a convenient alternative that can be applied across diverse research contexts and potentially reach a wider audience than traditional approaches [24, 25]. Furthermore, both children and parents frequently prefer e- and m-Health interventions over paper-based formats [26]. The practical, interactive, and customizable features of digital technologies, as well as the flexibility in location and the ability for both caregivers to participate, enhance their appeal [27]. Despite the proliferation of nutrition-related apps, their scientific validity and reliability for use in research or interventions may be limited, as many lack evidence-based foundations [28]. High-quality studies are therefore required to evaluate the feasibility and effectiveness of such apps and digital tools [29].

Although numerous digital interventions have been published [30, 31], research specifically targeting children’s eating behaviors remains limited [31]. Critical gaps persist, including the need to explore interventions in real-world home settings with extended follow-up periods. Additionally, most studies investigating cooking involvement have focused on fruit and vegetable intake, despite children failing to meet recommendations for other food groups [1]. Investigating the effects of cooking involvement on a broader range of foods, such as whole grains and pulses, is warranted [32, 33].

Accordingly, the present study aimed to develop and assess the feasibility of a novel mobile application for German-speaking Swiss households and examine its effects on dietary behaviors and liking of two target foods, comparing children who cooked with minimal

parental assistance with those who were not involved in meal preparation.

Materials and Methods

This feasibility study was conducted as a 10-week randomized controlled trial (RCT), comprising three phases: (i) development of intervention content (recipes, target food selection) and the smartphone application interface, (ii) implementation of the intervention, and (iii) evaluation. The Cantonal Ethics Committee of Bern, Switzerland, exempted the study from full ethical review (BASEC-Nr: Req-2020-00127).

Intervention: content and application development

- *Target food selection and recipe development:*

The two target foods for this intervention were whole-meal pasta and Brussels sprouts. A convenience sample of 40 parents from the Bern University of Applied Sciences’ Nutrition and Dietetics department was asked to identify foods their children disliked. Reported “unpopular” items included whole-meal pasta and rice, butternut squash, celery, radish, Romanesco, cauliflower, eggplant, Brussels sprouts, fish, and lentils. Parents noted a preference among children for refined carbohydrate products and aversion to whole-grain alternatives, such as whole-meal pasta, while Brussels sprouts were cited as the least favored vegetable. These subjective reports were corroborated by literature, confirming whole-meal pasta as less preferred than refined-grain products [34, 35] and lower whole-grain intake among children [36, 37]. Brussels sprouts were also recognized for their bitter flavor, which reduces acceptability in children.

Seasonal recipes were developed, tested, and refined to simplify complex steps, ensuring they were manageable for children [38]. Recipes were standardized between intervention and control groups regarding cooking methods and ingredients, and photographed for app integration.

- *Application development and its process:*

The study utilized the *Kids Cooking@Home* mobile application [39] and a hosted backend, developed collaboratively using an agile methodology. The system supported three core functions:

1. **Backend preparation (administrators/nutrition team):** Creating recipes, assigning participants to groups, and scheduling recipe access.

2. **Participant interaction (mobile app):** Completing recipes, filling questionnaires, with data automatically uploaded to the backend.
3. **Data evaluation (administrators/nutrition team):** Reviewing participant data collected through the app.

Screenshots of the mobile application are presented in **Figure 1**.

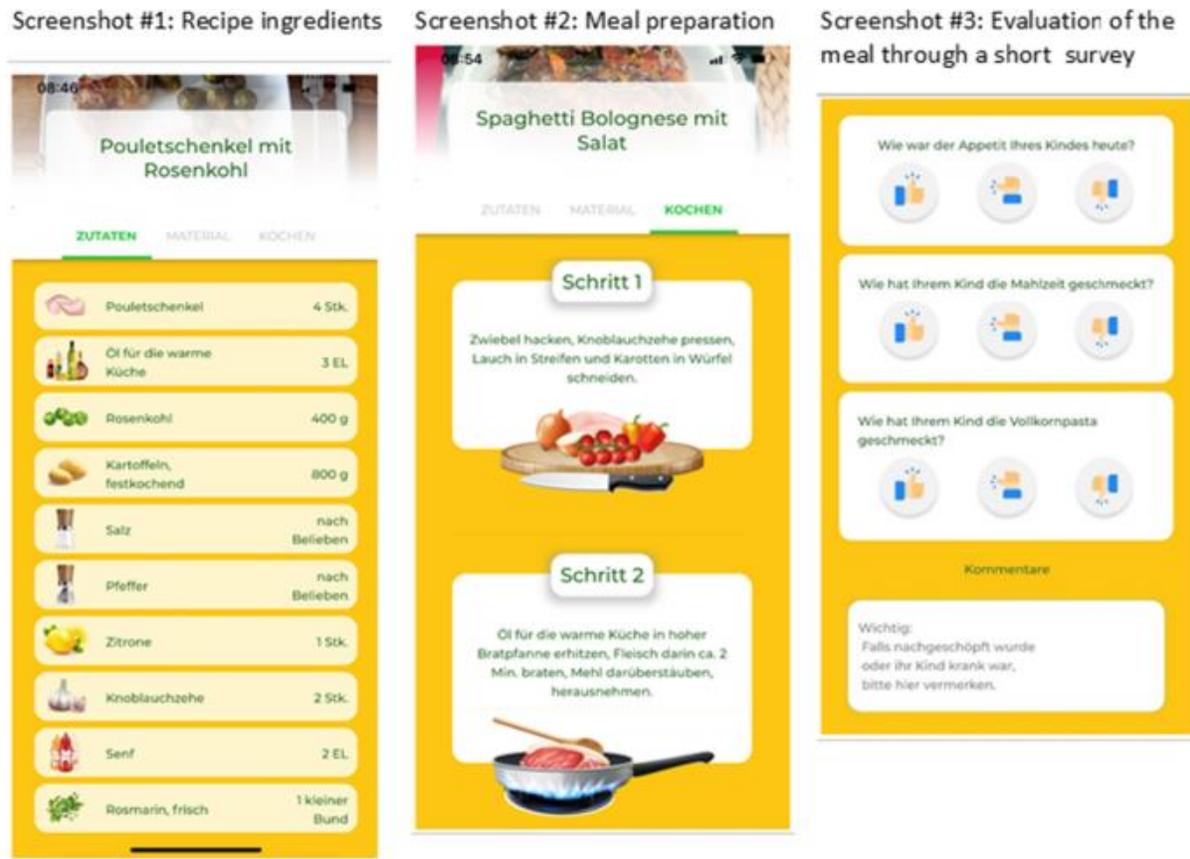


Figure 1. Example screenshots from the *Kids Cooking@Home* app, showing the list of ingredients required, stepwise cooking instructions, and the brief survey used to evaluate children’s meal liking.

The backend was hosted on Infomaniak [40], Switzerland’s largest web hosting provider. The app’s frontend was developed with Google Flutter [41], while the backend relied on Java Spring [42]/Spring Boot [43] with a MySQL [44] database. Security and privacy were prioritized throughout the project, with encrypted data transfers and authenticated connections implemented at all times.

Participants

- *Recruitment*

Recruitment took place between July and October 2020 among children and their parents residing in the German-speaking region of Switzerland. The study was advertised via the Bern University of Applied Sciences (BFH)

Facebook page. Parents who expressed interest completed an online form collecting information such as: child’s age and sex, dietary restrictions, baseline liking for Brussels sprouts and whole-meal pasta, general eating habits, willingness to cook with parents, relevant diseases/allergies/intolerances, interest in a 10-week cooking program, and contact information.

The research team conducted follow-up phone calls with all respondents to verify eligibility and explain study procedures. During these calls, additional demographic details necessary for app registration and personalized access were obtained, including name, age, sex, highest educational level, email, and phone number.

Eligible parents were sent a cover letter detailing the study and a consent form to complete and return. Upon

receipt of consent, participants were randomly assigned to one of the two intervention groups. Instructions for app installation, study procedures, and contact information for technical support were provided.

- *Inclusion and exclusion criteria*

Parent-child pairs were included if they were Swiss residents speaking German. Children had to be between 7 and 9 years old, cook for the family no more than once per month on their own, and not follow any restrictive diet. Children were required to dislike Brussels sprouts and whole-meal pasta at baseline. Parents were eligible if they could commit to the 10-week intervention and owned a smartphone compatible with Android version 7.0 or iOS version 8.0.

- *Intervention implementation*

At the outset, parents in both study arms were instructed to independently prepare the first two recipes during weeks 1 and 2 (**Figure 2**). The recipe titles are listed in **Table 1**. Each recipe contained one of the designated target foods—either whole-meal pasta or Brussels sprouts—and these ingredients alternated across the weeks. After completing each recipe, parents documented the meal by taking photographs of the child's plate and recording the weight of each component

(vegetables, proteins, and carbohydrates) before and after eating. These measurements were collected only in weeks 1, 2, 9, and 10 and entered in grams into the mobile application.

During weeks 3 through 8, children in the intervention group assumed primary responsibility for meal preparation, while parents offered minimal assistance only for tasks that were unsafe or too complex for young children, such as draining pasta. Parents were not asked to weigh the food during this period, in order to create a more natural eating environment. Instead, intake was estimated using the before-and-after plate photos uploaded to the app at baseline and evaluation. In the control group, parents continued to prepare the recipes alone, following comparable instructions.

For the evaluation phase in weeks 9 and 10, all families were asked to cook the initial recipes from weeks 1 and 2 again on their own, and to weigh the components of the meals before and after consumption. The two meals selected for measurement were: (1) whole-meal pasta with pesto, meatballs, and grilled tomato, and (2) chicken thighs with Brussels sprouts. These particular meals were chosen to simplify separation of the target ingredients and allow direct comparison of children's intake between baseline and post-intervention.

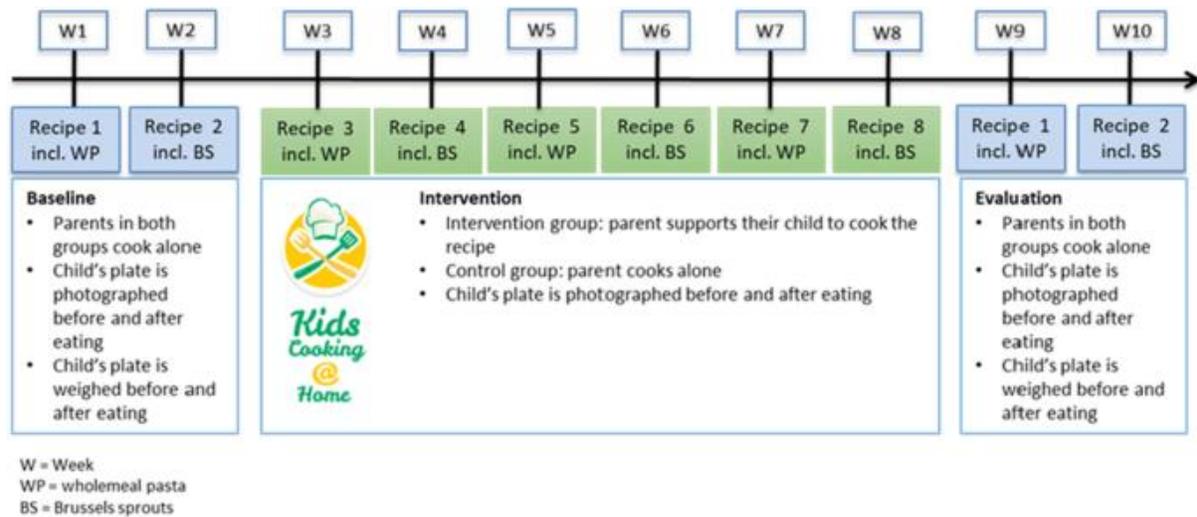


Figure 2. Schematic of the 10-week randomized study design.

Table 1. Summary of recipes provided in the Kids Cooking@Home app for each group across weeks 1–10, showing the target ingredient for each recipe.

Phase	Week	Recipe Provided	Target Ingredient	Cooking Instructions
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Baseline	1	Whole-meal pasta with pesto, meatballs, and grilled tomato	Whole-meal pasta	Parents in both intervention and control groups prepare the meal independently
	2	Chicken thighs with Brussels sprouts	Brussels sprouts	Parents in both intervention and control groups prepare the meal independently
Intervention	3	Spaghetti bolognese with salad	Whole-meal pasta	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
	4	Noodle soup with Brussels sprouts	Brussels sprouts	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
	5	Pasta with peas and ham	Whole-meal pasta	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
	6	Toast with egg and Brussels sprouts	Brussels sprouts	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
	7	Chicken sesame pasta	Whole-meal pasta	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
	8	Brussels sprouts and chestnut pasta	Brussels sprouts	Intervention group: parent provides minimal guidance while child cooks; Control group: parent cooks alone
Evaluation	9	Whole-meal pasta with pesto, meatballs, and grilled tomato	Whole-meal pasta	Parents in both groups prepare the meal independently
	10	Chicken thighs with Brussels sprouts	Brussels sprouts	Parents in both groups prepare the meal independently

Following each cooking session, parents completed a brief in-app survey indicating whether their child enjoyed the meal, their preference for the target ingredient (Brussels sprouts or whole-meal pasta), and the child's appetite on that day. A 3-point Likert scale was used: "no" indicated by a thumbs-down/red icon, "neutral" by a neutral/amber icon, and "yes" by a thumbs-up/green icon (screenshot #3 in **Figure 1**).

At the end of the intervention, qualitative interviews were conducted with four families via telephone. Topics included time spent, experiences cooking with children, enjoyable and challenging aspects, clarity of instructions, app usability, and perceptions of the recipes. Additional feedback was collected via email. To incentivize participation, families completing the 10-week program received a children's cookbook.

Statistical methods

Descriptive statistics were used to summarize data. Means and standard deviations were calculated for food intake, while frequencies were reported for participant characteristics and liking responses. No formal sample size calculation was conducted; the study aimed to recruit 30 participants. Due to the small sample size,

significance testing was not performed. Analyses were carried out using Microsoft Excel and SPSS (Version 28, SPSS Inc., Chicago, IL, USA).

Results and Discussion

Participant flow

A visual summary of participant enrollment is shown in **Figure 3**. After the study announcement, 330 parents opened the online questionnaire; however, 288 either did not meet eligibility criteria or were lost to follow-up. Of the 42 parents remaining, all were contacted by phone for screening. Following this process, 28 parents consented to participate, met all inclusion criteria, and returned signed consent forms. These 28 parent-child dyads were randomly assigned to either the intervention or control group.

In the intervention group ($n = 14$), two participants dropped out without accessing the app, and one did not prepare the initial recipe. In the control group ($n = 14$), two participants were lost to follow-up. After completing baseline recipes, seven children in the intervention group prepared whole-meal pasta recipes, and seven prepared Brussels sprouts recipes. In the control group, 11 children

cooked whole-meal pasta recipes, and 10 prepared Brussels sprouts recipes. Ultimately, seven participants completed the intervention in the intervention group, and 11 completed it in the control group.

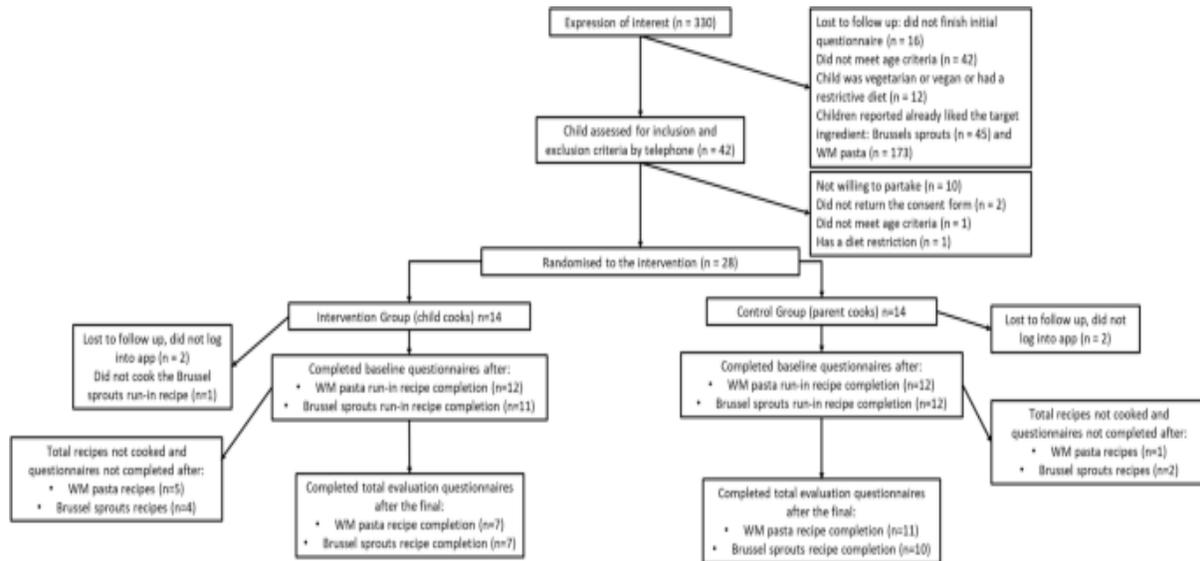


Figure 3. Flow diagram showing participant recruitment, attrition, and reasons for non-completion. WM: whole-meal.

Table 2 provides demographic details of both parents and children who began and completed the study. There were no major differences in age between intervention and control groups for either parents or children. One male participant completed the evaluation questionnaire on behalf of his female partner, explaining the minor sex

discrepancy at evaluation. Among parents completing the study, most were female ($n = 17$), and ten held undergraduate university degrees. Children had a median age of 8 years, with equal numbers of boys ($n = 9$) and girls ($n = 9$).

Table 2. Demographic characteristics of parents and children at baseline and completion, including age, sex, and educational attainment.

Characteristic	Baseline Intervention (n = 12)	Baseline Control (n = 12)	Evaluation Intervention (n = 7)	Evaluation Control (n = 11)
Parents' Characteristics				
Age (median, range)	42 (34–46)	39 (30–50)	41 (37–44)	40 (30–50)
Sex (n)				
Female	12	12	6	11
Male	0	0	1	0
Education Level (n)				
Secondary school	2	6	0	6
University student	0	1	0	1
University undergraduate	9	5	6	4
University postgraduate	1	0	1	0
Children's Characteristics				
Age (median, range)	8 (7–9)	8 (7–9)	8 (7–9)	8 (7–9)
Sex (n)				

Female	7	5	4	5
Male	5	7	3	6

Food consumption

Descriptive analyses of target food intake (whole-meal pasta and Brussels sprouts) did not reveal a consistent trend. However, whole-meal pasta consumption

increased in the intervention group and slightly decreased in the control group, noting that baseline intake was higher in the control group. No significant change was observed for Brussels sprouts consumption (**Table 3**).

Table 3. Average intake of target foods (grams) at baseline and evaluation, reported by group and for participants completing the questionnaires at baseline (n = 24) and evaluation (n = 18).

Recipe & Group	Baseline Intake (g, SD)	n	Evaluation Intake (g, SD)	n
Whole-meal pasta – questionnaire completers				
Total sample	86 (69.7)	24	86 (62.8)	18
Intervention group	66 (56.1)	12	88 (62.6)	7
Control group	106 (78.4)	12	84 (64.4)	11
Brussels sprouts – questionnaire completers				
Total sample	19 (24.2)	23	19 (23.9)	17
Intervention group	20 (23.3)	11	17 (25.5)	7
Control group	19 (26.1)	12	20 (24.1)	10

Food liking

Overall, the proportion of children reporting liking the target foods remained largely unchanged, though neutral ratings slightly decreased. In the control group, fewer

children rated Brussels sprouts negatively at evaluation, while in the intervention group, the proportion rating them positively increased (**Figure 4**).

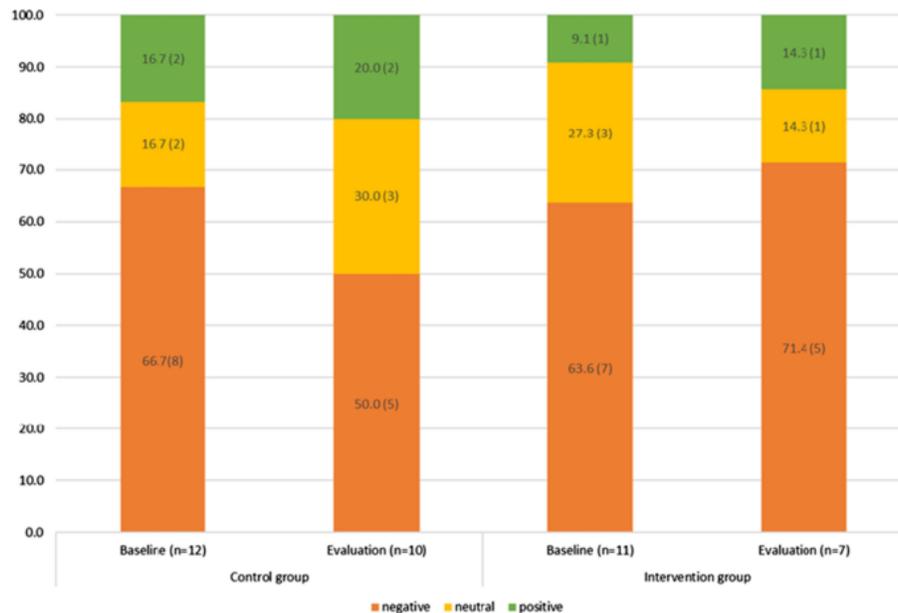


Figure 4. Percentage of children indicating negative, neutral, or positive liking of Brussels sprouts at baseline and evaluation, by group.

For whole-meal pasta, more children rated the food positively at evaluation across both groups. In the

intervention group, no negative ratings were recorded at evaluation (**Figure 5**).

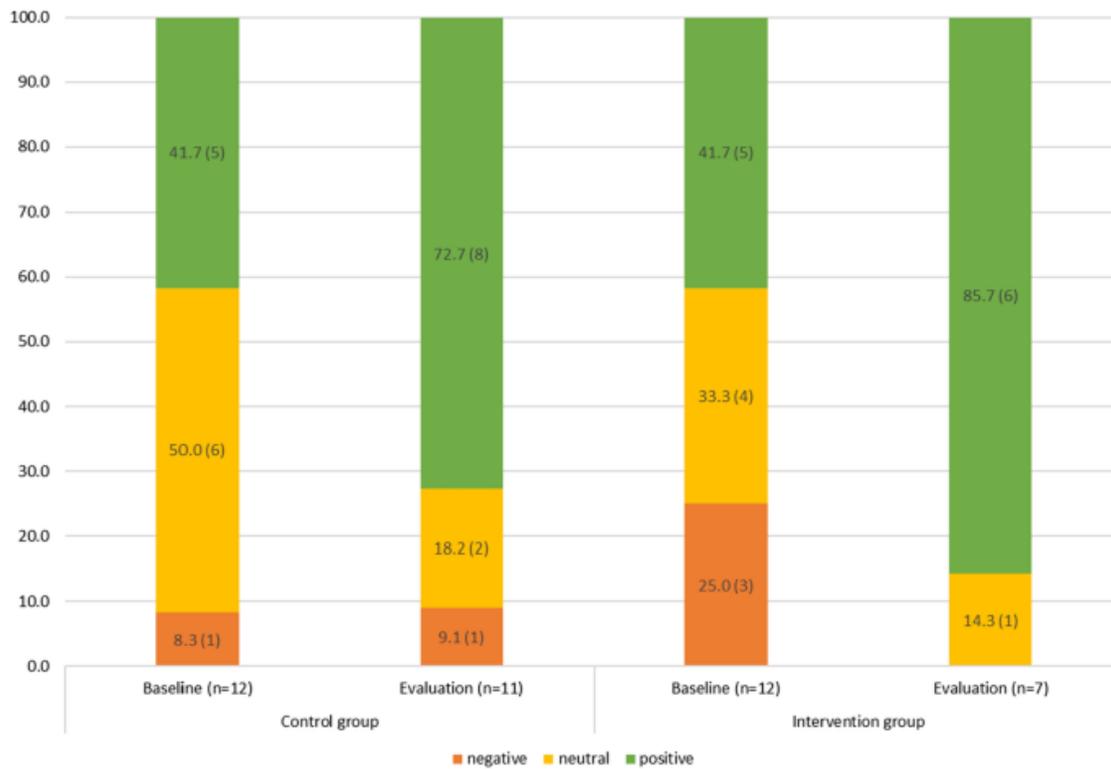


Figure 5. Percentage of children reporting negative, neutral, or positive liking for whole-meal pasta at baseline and evaluation, by group.

Analyses restricted to participants who completed the study did not reveal meaningful differences between intervention and control groups.

Participant feedback

Participants generally responded favorably to the app. The images and instructions were considered easy to follow, and app-based support was appreciated. Families reported that they continued using the new recipes after the study due to their simplicity and time-saving nature. In the intervention group, children expressed enjoyment in eating whole-meal pasta after the study. Families appreciated cooking together as a structured, enjoyable activity, and children reported pride in participating. Parents in the control group noted that children were more willing to try unfamiliar foods, which positively affected family mealtimes.

- *Suggestions for improvement*

Some children felt the study was long and missed familiar dishes, and younger siblings expressed interest in participating. Parents indicated that organizing cooking sessions and keeping children motivated could

be challenging, especially for recipes containing Brussels sprouts, which were less favored. Control group parents noted difficulties in explaining the study to their children and determining how much detail to share.

Several participants reported forgetting or struggling to photograph meals and complete the in-app survey. Measuring portions sometimes led to cold food. Suggestions for improvement included making the app available on tablets, displaying estimated recipe preparation times, and providing reminders for task completion.

The primary objective of this study was to investigate the feasibility of a mobile application promoting home-based cooking and to examine its impact on dietary habits and food acceptance among children who prepared meals with minimal parental support versus those not involved in cooking. A total of 18 parent-child dyads completed the randomized controlled trial. Overall, there were no notable differences in consumption of Brussels sprouts or whole-meal pasta either within groups over time or between intervention and control groups. Nonetheless, a slight increase in positive ratings for whole-meal pasta was observed among children in the intervention group

after the study. This modest improvement aligns with literature indicating that repeated exposure to foods can enhance acceptance [45]. Allowing children to take part in meal preparation also shows promise for positively influencing dietary behaviors. For instance, a cross-sectional survey of 305 Swiss parents of 6–12-year-old children demonstrated that higher enjoyment in cooking (e.g., “my child enjoys cooking” or “likes trying new recipes”) correlated with greater eating enjoyment and fewer picky-eating behaviors [46].

The limited change in liking for Brussels sprouts between baseline and evaluation may be attributed to the vegetable’s strong unpopularity among children, reflected in feedback indicating reduced motivation when preparing Brussels sprouts recipes. Additionally, fewer families in the intervention group completed the study, potentially due to the challenge of cooking a weekly meal. Parents reported that organizing cooking sessions and keeping children motivated was demanding. Future interventions might benefit from greater flexibility, such as allowing families to complete a set number of recipes over a 10-week period, choosing the frequency themselves.

International evidence supports similar findings. In the United States, adolescents who prepared dinner more frequently at home consumed healthier diets compared to peers with little involvement in meal preparation [12]. Adolescents who helped with dinner seven times in the preceding week reported, on average, at least one-half serving more of fruits and one-half serving more of vegetables daily than peers who never assisted. Additionally, frequent dinner preparation was associated with lower soft drink intake in girls and reduced fried food consumption in boys, with all differences statistically significant ($p < 0.01$) [12]. Similarly, a Canadian study of 10–11-year-old children found that participating in home food preparation was linked to an increase of one serving of fruits and vegetables ($p < 0.001$) and greater confidence in selecting and consuming healthy foods compared with non-involved children [9]. Previous cooking workshops and experimental sessions have also demonstrated immediate improvements in liking, willingness to taste, and intake of foods [10, 46–48]. Our study extended these observations by evaluating effects over a longer period within a home-based, real-life context rather than in a novel workshop environment. Family-focused interventions using digital tools have been increasingly tested and have shown potential to enhance healthy cooking habits. For example, a 5-week

virtual cooking program involving 60 children and 43 families (ages 8–18 years) improved children’s cooking self-efficacy ($p < 0.001$), nutrition knowledge ($p = 0.005$), and confidence in consuming fruits and vegetables ($p = 0.02$) [49]. While that study demonstrated the potential of digital platforms for family cooking, it did not directly measure food intake. Although our feasibility study showed limited behavioral changes, future interventions with additional resources and more comprehensive designs are recommended. The home environment may provide greater opportunities to influence dietary behavior than school-based programs [3], and integrating digital interventions could also enhance parental engagement in school-based nutrition initiatives.

Dietary intake assessment remains challenging, which may explain why some previous digital studies did not report consumption outcomes. Current digital tools with automated food recognition have not fully resolved this issue and often lack validation [50]. In our study, participants reported difficulties in weighing food and sometimes forgot to take before/after photos. Future app development could leverage AI-based image recognition to automatically estimate portion size and food type, reducing burden on participants and researchers [51]. Such tools should be co-designed by multidisciplinary teams including end-users [25]. A global survey recommends validated, user-friendly, free apps with local food databases [52], and future applications could incorporate reminders aligned with typical meal schedules to prompt participants to capture images before and after eating.

Moreover, including siblings in the cooking process may prevent feelings of exclusion or imbalance. Clearer guidance and education for parents on how to explain study procedures and set achievable goals could also enhance engagement and adherence in future trials.

Strengths and limitations

A major strength of this study is that it was implemented in actual home environments, providing insights into the real-world challenges and benefits of conducting such interventions. This practical setting can inform the development and evaluation of larger-scale, more effective digital cooking programs.

However, several limitations need to be acknowledged. The study was conducted during the peak of the COVID-19 pandemic, which likely contributed to a small and non-representative sample size and necessitated reducing

the intervention period from 12 to 10 weeks by removing two recipes. Recruitment had to be conducted entirely online, for example via social media, instead of in-person through schools or community centers, limiting reach and diversity of participants. Due to funding constraints, only one recruitment period was feasible, as IT support for the app was limited to a single year, restricting management of the app beyond the study timeframe. The sample was confined to Swiss residents, and participants were likely self-selected families already motivated to adopt healthier behaviors, limiting generalizability.

The inclusion and exclusion criteria may have been overly restrictive, contributing to low participant uptake. In hindsight, expanding the age range of children and including those already liking the target foods could have been considered, with analyses adjusted accordingly. Scheduling challenges were compounded by participants completing their grocery shopping prior to the intervention, which may have been further affected by COVID-19 restrictions reducing shopping frequency. Future studies could improve flexibility by delivering weekly recipes more frequently and accommodating participants' shopping schedules.

Additionally, the convenience sample of 40 parents used to select "unpopular" foods may not represent broader populations; future studies should rely on validated methods for selecting target foods. Whole-meal pasta is generally not strongly disliked by children, which may have influenced outcomes. Parental perceptions may also bias assessments of children's food acceptance [35]. It is unknown whether other ingredients in the recipes affected children's willingness to eat meals. Some participants perceived portions of target foods, particularly Brussels sprouts, as large, and other family members occasionally expressed dissatisfaction, highlighting the need for flexibility in ingredient amounts and portion sizes in future interventions.

Conducting the study during COVID-19 introduced additional challenges. Social distancing limited recruitment methods, and government guidelines encouraged minimal grocery trips, making weekly recipe preparation more difficult. Despite these constraints, the study demonstrates the potential of digital interventions for delivering personalized home-based programs.

This feasibility study provides useful guidance for future family cooking app development. Digital tools could be designed to reach diverse age groups and languages, offering multiple recipes tailored to different food types, ingredient combinations, preparation methods, and

presentation styles. Educational components could include child-friendly nutritional information to increase awareness of nutrients and health benefits. Recipes could incorporate gamification elements to engage children and promote healthy eating habits. Finally, recruitment strategies should be enhanced, as larger samples are needed to evaluate behavioral changes, although evidence on the scalability of real-life eHealth interventions remains limited [30].

Conclusion

This study tested the feasibility and preliminary impact of a home-based cooking program delivered via a smartphone application. Overall, no statistically significant changes were observed between groups or across time points. However, children in the intervention group reported a slight increase in liking for initially disliked whole-meal pasta, whereas no change was seen for Brussels sprouts.

This pilot work provides a foundation for larger trials aimed at improving children's dietary behaviors through digital tools. Innovative technologies have the potential to support healthier family meals by increasing engagement, saving parental time, and promoting practical strategies for home cooking and nutrition.

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Conflict of Interest: None

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Ethics Statement: None

References

1. Rangelov N, Avelar e Silva RN, Suggs LS. Policy and food consumption: what nutrition guidelines are swiss children meeting and what determines adherence? *Front Nutr.* 2021;8:641799. <https://doi.org/10.3389/fnut.2021.641799>.
2. Craigie A, Lake AA, Kelly SA, Adamson AJ, Mathers JC. Tracking of obesity-related behaviours from childhood to adulthood: a systematic review. *Maturitas.* 2011;70(3):266–84. <https://doi.org/10.1016/j.maturitas.2011.08.005>.
3. Haddad J, Ullah S, Bell LK, Leslie E, Magarey A. The influence of home and school environments on children's diet and physical activity, and body mass

- index: a structural equation modelling approach. *Matern Child Health J.* 2018;22(3):364–75. <https://doi.org/10.1007/s10995-017-2386-9>.
4. van der Horst K, Oenema A, Ferreira I, et al. A systematic review of environmental correlates of obesity-related dietary behaviors in youth. *Health Educ Res.* 2006;22(2):203–26. <https://doi.org/10.1093/her/cyl069>.
 5. Evans CE, Christian MS, Cleghorn CL, Greenwood DC, Cade JE. Systematic review and meta-analysis of school-based interventions to improve daily fruit and vegetable intake in children aged 5 to 12 y. *Am J Clin Nutr.* 2012;96(4):889–901. <https://doi.org/10.3945/ajcn.111.030270>.
 6. DeCosta P, Møller P, Frøst MB, Olsen A. Changing children's eating behaviour—a review of experimental research. *Appetite.* 2017;113:327–57. <https://doi.org/10.1016/j.appet.2017.03.004>.
 7. Scaglioni S, de Cosmi V, Ciappolino V, Parazzini F, Brambilla P, Agostoni C. Factors influencing children's eating behaviours. *Nutrients.* 2018;10(6):706. <https://doi.org/10.3390/nu10060706>.
 8. Birch L, Savage JS, Ventura A. Influences on the development of children's eating behaviours: from infancy to adolescence. *Can J Diet Pract Res.* 2007;68(1):s1–56.
 9. Chu YL, Storey KE, Veugelers PJ. Involvement in meal preparation at home is associated with better diet quality among Canadian children. *J Nutr Educ Behav.* 2014;46(4):304–8. <https://doi.org/10.1016/j.jneb.2013.10.003>.
 10. Nozue M, Ishida H, Hazano S, et al. Associations between Japanese schoolchildren's involvement in at-home meal preparation, their food intakes, and cooking skills. *Nurs Res Pract.* 2016;10(3):359. <https://doi.org/10.4162/nrp.2016.10.3.359>.
 11. van der Horst K. Overcoming picky eating. Eating enjoyment as a central aspect of children's eating behaviors. *Appetite.* 2012;58(2):567–74. <https://doi.org/10.1016/j.appet.2011.12.019>.
 12. Larson NI, Perry CL, Story M, Neumark-Sztainer D. Food preparation by young adults is associated with better diet quality. *J Am Diet Assoc.* 2006;106(12):2001–7. <https://doi.org/10.1016/j.jada.2006.09.008>.
 13. Radtke T, Liszewska N, Horodyska K, Boberska M, Schenkel K, Luszczynska A. Cooking together: the IKEA effect on family vegetable intake. *Br J Health Psychol.* 2019;24(4):896–912. <https://doi.org/10.1111/bjhp.12385>.
 14. Seeley A, Wu M, Caraher M. Should we teach cooking in schools? A systematic review of the literature of school-based cooking interventions. *J Home Econ Inst Aust.* 2010;17(1):10–8. Google Scholar
 15. Markow K, Coveney J, Booth S. Enhancing food literacy through school-based cooking programs—what's working and what's not? *J Home Econ Inst Aust.* 2012;19(2):2–11.
 16. Ng CM, Kaur S, Koo HC, Mukhtar F. Involvement of children in hands-on meal preparation and the associated nutrition outcomes: a scoping review. *J Hum Nutr Diet.* 2022;35(2):350–62. <https://doi.org/10.1111/jhn.12911>.
 17. Jaime PC, Lock K. Do school based food and nutrition policies improve diet and reduce obesity? *Prev Med.* 2009;48(1):45–53. <https://doi.org/10.1016/j.ypmed.2008.10.018>.
 18. Dudley DA, Cotton WG, Peralta LR. Teaching approaches and strategies that promote healthy eating in primary school children: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act.* 2015;12(1):28. <https://doi.org/10.1186/s12966-015-0182-8>.
 19. Hersch D, Perdue L, Ambroz T, Boucher JL. The impact of cooking classes on food-related preferences, attitudes, and behaviors of school-aged children: a systematic review of the evidence, 2003–2014. *Prev Chronic Dis.* 2014;11:140267. <https://doi.org/10.5888/pcd11.140267>.
 20. Tørslev MK, Thøgersen DB, Høstgaard Bonde A, Bloch P, Varming A. Supporting positive parenting and promoting healthy living through family cooking classes. *Int J Environ Res Public Health.* 2021;18(9):4709. <https://doi.org/10.3390/ijerph18094709>.
 21. Leech RM, McNaughton SA, Darawford DA, Campbell KJ, Pearson N, Timperio A. Family food involvement and frequency of family dinner meals among Australian children aged 10–12 years. Cross-sectional and longitudinal associations with dietary patterns. *Appetite.* 2014;75:64–70. <https://doi.org/10.1016/j.appet.2013.12.021>.
 22. van der Horst K, Mathias KC, Patron AP, Alliot X. Art on a plate: a pilot evaluation of an international initiative designed to promote consumption of fruits and vegetables by children. *J Nutr Educ Behav.*

- 2019;51(8):919-925.e1.
<https://doi.org/10.1016/j.jneb.2019.03.009>.
23. McMorrow L, Ludbrook A, Macdiarmid JI, Olajide D. Perceived barriers towards healthy eating and their association with fruit and vegetable consumption. *J Public Health*. 2016. <https://doi.org/10.1093/pubmed/fdw038>.
 24. Olson CM. Behavioral nutrition interventions using e- and m-health communication technologies: a narrative review. *Annu Rev Nutr*. 2016;36(1):647–64. <https://doi.org/10.1146/annurev-nutr-071715-050815>.
 25. Vasiloglou MF, Marcano I, Lizama S, Papathanail I, Spanakis EK, Mougiakakou S. Multimedia data-based mobile applications for dietary assessment. *J Diabetes Sci Technol*. 2022. <https://doi.org/10.1177/19322968221085026>.
 26. Azevedo LB, Stephenson J, Ells L, et al. The effectiveness of e-health interventions for the treatment of overweight or obesity in children and adolescents: a systematic review and meta-analysis. *Obes Rev*. 2022. <https://doi.org/10.1111/obr.13373>.
 27. Burrows T, Hutchesson M, Chai LK, Rollo M, Skinner G, Collins C. Nutrition interventions for prevention and management of childhood obesity: what do parents want from an eHealth program? *Nutrients*. 2015;7(12):10469–79. <https://doi.org/10.3390/nu7125546>. Article
 28. Chen Y, Perez-Cueto F, Giboreau A, Mavridis I, Hartwell H. The promotion of eating behaviour change through digital interventions. *Int J Environ Res Public Health*. 2020;17(20):7488. <https://doi.org/10.3390/ijerph17207488>.
 29. Vasiloglou MF, Christodoulidis S, Reber E, et al. Perspectives and preferences of adult smartphone users regarding nutrition and diet apps: web-based survey study. *JMIR mHealth uHealth*. 2021;9(7):e27885. <https://doi.org/10.2196/27885>.
 30. Hutchesson M, Gough C, Müller AM, et al. eHealth interventions targeting nutrition, physical activity, sedentary behavior, or obesity in adults: a scoping review of systematic reviews. *Obes Rev*. 2021. <https://doi.org/10.1111/obr.13295>.
 31. Kankanhalli A, Shin J, Oh H. Mobile-based interventions for dietary behavior change and health outcomes: scoping review. *JMIR mHealth uHealth*. 2019;7(1):e11312. <https://doi.org/10.2196/11312>.
 32. Burgess-Champoux T, Marquart L, Vickers Z, Reicks M. Perceptions of children, parents, and teachers regarding whole-grain foods, and implications for a school-based intervention. *J Nutr Educ Behav*. 2006;38(4):230–7. <https://doi.org/10.1016/j.jneb.2006.04.147>.
 33. Garaulet M, Pérez-Llamas F, Rueda CM, Zamora S. Trends in the mediterranean diet in children from south-east Spain. *Nutr Res*. 1998;18(6):979–88. [https://doi.org/10.1016/S0271-5317\(98\)00081-5](https://doi.org/10.1016/S0271-5317(98)00081-5).
 34. Kantor LS, Variyam JN, Allshouse JE, Putnam JJ, Lin BH. Choose a variety of grains daily, especially whole grains: a challenge for consumers. *J Nutr*. 2001;131(2):473S-486S. <https://doi.org/10.1093/jn/131.2.473S>.
 35. Meynier A, Chanson-Rollé A, Riou E. Main factors influencing whole grain consumption in children and adults—a narrative review. *Nutrients*. 2020;12(8):2217. <https://doi.org/10.3390/nu12082217>.
 36. Tharner A, Jansen PW, Kiefte-de Jong JC, et al. Toward an operative diagnosis of fussy/picky eating: a latent profile approach in a population-based cohort. *Int J Behav Nutr Phys Act*. 2014;11(1):14. <https://doi.org/10.1186/1479-5868-11-14>.
 37. Cano SC, Tiemeier H, van Hoeken D, et al. Trajectories of picky eating during childhood: a general population study. *Int J Eat Disord*. 2015;48(6):570–9. <https://doi.org/10.1002/eat.22384>.
 38. Dean M, O’Kane C, Issartel J, et al. Guidelines for designing age-appropriate cooking interventions for children: the development of evidence-based cooking skill recommendations for children, using a multidisciplinary approach. *Appetite*. 2021;161:105125. <https://doi.org/10.1016/j.appet.2021.105125>.
 39. Berner Fachhochschule. Kids Cooking@Home; 2022. <https://www.bfh.ch/de/forschung/referenzprojekte/kids-cooking-home/>. Accessed 20 Oct 2022.
 40. Infomaniak. Infomaniak - The Ethical Cloud. <https://www.infomaniak.com/en>; 2022. Accessed 20 Oct 2022.
 41. Flutter. Flutter - Build apps for any screen. <https://flutter.dev>; 2022. Accessed 20 Oct 2022.
 42. Spring.io, 2022. <https://spring.io>. Accessed 20 Oct 2022.
 43. Spring boot, 2022. <https://spring.io/projects/spring-boot>. Accessed 20 Oct 2022.

44. My SQL, 2022. <https://www.mysql.com/>. Accessed 20 Oct 2022.
45. Appleton KA, Hemingway A, Rajska J, Hartwell H. Repeated exposure and conditioning strategies for increasing vegetable liking and intake: systematic review and meta-analyses of the published literature. *Am J Clin Nutr.* 2018;108(4):842–56. <https://doi.org/10.1093/ajcn/nqy143>.
46. van der Horst K, Ferrage A, Rytz A. Involving children in meal preparation. Effects on food intake. *Appetite.* 2014;79:18–24. <https://doi.org/10.1016/j.appet.2014.03.030>.
47. Maiz E, Urkia-Susin I, Urdaneta E, Alliot X. Child involvement in choosing a recipe, purchasing ingredients, and cooking at school increases willingness to try new foods and reduces food neophobia. *J Nutr Educ Behav.* 2021;53(4):279–89. <https://doi.org/10.1016/j.jneb.2020.12.015>.
48. Alliot X, Da Quinta N, Chokupermal K, Urdaneta E. Involving children in cooking activities: a potential strategy for directing food choices toward novel foods containing vegetables. *Appetite.* 2016;103:275–85. <https://doi.org/10.1016/j.appet.2016.04.031>.
49. Saxe-Custack A, Egan S. Flint families cook: a virtual cooking and nutrition program for families. *J Nutr Educ Behav.* 2022;54(4):359–63. <https://doi.org/10.1016/j.jneb.2022.01.002>.
50. Khazen W, Jeanne JF, Demaretz L, Schäfer F, Fagherazzi G. Rethinking the use of mobile apps for dietary assessment in medical research. *J Med Internet Res.* 2020;22(6):e15619. <https://doi.org/10.2196/15619>.
51. Lu Y, Stathopoulou T, Vasiloglou MF, et al. goFOODTM: an artificial intelligence system for dietary assessment. *Sensors.* 2020;20(15):4283. <https://doi.org/10.3390/s20154283>.
52. Vasiloglou MF, Christodoulidis S, Reber E, et al. What healthcare professionals think of “nutrition & diet” apps: an international survey. *Nutrients.* 2020;12(8):2214. <https://doi.org/10.3390/nu12082214>.