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Supporting vulnerable families' meal practices: process evaluation of a nationwide intervention implemented by a retailer and social organizations

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Abstract

Background Lower socioeconomic status (SES) is associated with poorer dietary habits and fewer family meals. Therefore, initiatives to empower families with a lower SES to adopt healthier meal practices are employed. The objective of this study was to evaluate a nationwide intervention "Dinner is served at 1-2-3 euros", developed by a Belgian retailer in collaboration with social organizations. It targets families with a lower SES and aims to promote more balanced and freshly cooked meals by providing recipe booklets of affordable meals at a guaranteed price of 1, 2, or 3 euros per portion. The process evaluation aimed to gain insight into the implementation process (Reach, Recruitment, Dose-delivered, Context), the satisfaction with the intervention (Dose-received), and the perceived impact of intervention participation.

Methods A mixed-methods study combining qualitative (i.e., focus groups and individual interviews) and quantitative research (i.e., surveys) was conducted. An interview with the retailer ($n=1$), three focus group interviews with the involved social organizations ($n=15$), and interviews with participants of "Dinner is served at 1-2-3 euros" ($n=26$) were carried out, as well as surveys among these social organizations and participants.

Results Social organizations were generally satisfied with the project and appreciated the collaboration with the retailer. The main barrier to implement the project was a lack of time to help participants subscribing. Participants appreciated the inspiration from the recipe booklets, and the recipes' ease of preparation, their healthiness, and the variety. However, the recipes were sometimes deemed too exotic for participants' children. Participants also appreciated the budget friendliness, although the price guarantee mechanism of 1, 2 or 3 euros per portion was not always clear. Positive effects were mentioned in areas such as perceived healthy cooking and eating, improved cooking skills and ideas, and reduced financial concerns.

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Conclusions In general, participants and social organizations were satisfied with the delivery and implementation of the intervention. Participants also noted some positive effects on their meal practices. Future research should provide insight into the intervention's effectiveness and impact on the healthiness of participants' dietary choices.

Trial registration The study protocol was pre-registered prior to data collection at Clinicaltrials.gov (NCT05595551–27/10/2022).

Keywords Health promotion, Intersectoral collaboration, SEP, Family, Consumer behavior, Home-made meals

Introduction

Large socioeconomic health inequalities exist [1]. People with a lower socioeconomic status (SES) are more likely to develop chronic illness earlier and live shorter lives than those with a higher socioeconomic status [2, 3]. Also, having a lower SES is associated with poorer dietary habits [4, 5], which in turn can increase the risk of obesity and non-communicable diseases [6]. Health inequalities are a public health problem that has multiple, intersecting causes (e.g., linked to the broader environment as well as an individual responsibility), and is often referred to as a wicked, complex problem [7]. One possible explanation at the individual level, is the association between lower SES and lower food literacy [8, 9]. On an environmental level, the food context plays a role by people with lower SES being likely to have a higher exposure to unhealthy food environments [10]. Hence, to improve dietary quality and health equity, an intersectoral approach seems promising [1, 11–14].

Intersectoral collaboration is characterized by applying a mix of solutions that target various levels of influence [15]. Since reaching families with a lower SES to promote health is known to be difficult [16], an intersectoral intervention including social organizations can be helpful. Moreover, research showed that "downstream" health promoting interventions occurring at the individual level can increase health inequalities by benefiting already more advantaged (lower-risk) groups [17–19]. In contrast, "upstream" interventions occur at a more structural and system level (e.g., income support and fiscal measures). So, to better support individuals with a lower SES, structural interventions that require a lower level of individual agency (i.e., cognitive, psychological and material resources), or a mix of both (i.e., so-called agent-structural interventions) are needed [18–20].

In Belgium, an intersectoral collaboration between a retailer (i.e., Colruyt Lowest Prices) and civil social organizations (e.g., public center for social welfare) has grown out to a national intervention called "Dinner is served at 1-2-3 euros", that targets families with a lower SES and aims to support in cooking home-made, balanced meals. Both home-cooked and family meals have been shown to positively influence dietary habits of adolescents and adults [21–26] as well as psychosocial outcomes in adolescents (e.g., increased self-esteem) [27, 28]. Yet, the frequency of family meals has decreased over time, especially among families with a lower SES [29–31]. Hence, by focusing on the family meal, all family members living in one household are targeted, which enhances the opportunity to improve dietary habits from a young age [32, 33]. The intervention "Dinner is served at 1-2-3 euros" provides biweekly recipe booklets and offers a fixed price of no more than 1, 2 or 3 euros per portion. In essence, the fixed price is no discount, but since food prices fluctuate, the retailer provides a guarantee that the products of the recipes in the booklet can be bought at this fixed, low price. What makes the intervention unique is the retailer's long-term engagement (i.e., 2016 – now) to offer these advantages, and the long-term collaboration with various Belgian social organizations, who bring the intervention to these families. Moreover, the intervention helps to overcome financial barriers and to avoid stigma, by offering recipes at a low, fixed price which is provided through scanning the customer's loyalty card at the counter (i.e., invisible for other customers and employees), and offering a free product four times a year. People with a lower SES often report the price of healthy foods as a barrier, so interventions that help overcome this could be promising in reaching behavior change [20]. "Dinner is served at 1-2-3 euros" combines both an agentic (i.e., requiring a higher level of individual agency) and a more structural aspect.

To better understand how this ongoing intervention "Dinner is served at 1-2-3 euros" can contribute to existing knowledge on how to reduce health inequalities, a large scale research project was set up. As part of the project, this specific study aims to gain insights into the implementation process of public-private collaborations, how implementers (i.e., retailer and social organizations) experienced the implementation process, the collaboration and its impact, as well as how participants with lower SES experienced the intervention. Guided by the process evaluation components of Saunders et al. [34], and adding an extra component of perceived impact, this study investigates the following three research questions: (1) How was the intervention implemented (Reach, Recruitment, Dose-delivered, Context)?; (2) How satisfied were the target group and implementers (i.e., social organizations and retailer) about the intervention, and how did the target group use it (Dose-received Exposure

and Satisfaction)?; (3) How did the project affect the participants with lower SES (Perceived impact)?

Methods

Study design

A mixed-methods study combining qualitative (i.e., focus groups or individual interviews) and quantitative research (i.e., online/telephone-administered survey) [35] was conducted from March to July 2023 in Flanders, Belgium. Qualitative and quantitative data were analyzed separately and then cross-validated. The study was approved by the Ethics Committee of Ghent University Hospital (ONZ-2022-0343). The quality of the research was assessed against the Consolidated Criteria for Reporting Qualitative Research checklist to ensure quality of reporting [36]. The study protocol was pre-registered prior to data collection at Clinicaltrials.gov (NCT05595551–27/10/2022).

Intervention

The intervention "Dinner is served at 1-2-3 euros" was launched in 2016, as a collaboration between a large Belgian retail chain (Colruyt Lowest Prices) and a social organization in the city of Kortrijk, Belgium (i.e., Public Center for Social Welfare). Since then, the intervention has been growing gradually and, by now, it is implemented throughout the whole country, with more than 300 social organizations and cities/municipalities participating to spread it, and reaching more than 9000 families with a lower SES. The goal of the intervention is to support families with lower SES in preparing fresh, tasty and balanced meals. The main target group of the intervention are families (the recipes are made up for three people, namely one adult and two children), but other family compositions can also participate (e.g., households of two or one). These families can enroll with the help of a partner social organization. The organization itself decides whether a family is suited to use the intervention. Once a family is registered, they biweekly receive recipe booklets at home. The booklets (for an example booklet, see Additional file1) consist of six easy-to-prepare, child-friendly recipes with accompanying shopping lists. Recipes include fish, meat, and veggie dishes. Each recipe is guaranteed to cost no more than one, two, or three euros per portion. For a more detailed description of the intervention and a discussion of the recipe's healthiness, see Additional file 2.

To understand how and why an intervention brings about change, it is important to identify behavior change techniques (BCTs) (i.e., active ingredients of the intervention that influence factors that are linked to behavior change) and targeted determinants in the intervention [37]. The research team identified these retrospectively for the "Dinner is served at 1-2-3 euros" intervention, based on the Intervention Mapping Protocol [38] and the taxonomy of Abrahams & Michie [39]. An overview can be found in Table 1. Main determinants targeted in this intervention are family's knowledge (on meal planning, preparing and nutrition), cooking attitudes, cooking skills, cooking self-efficacy, meal planning skills, and financial barriers.

Participants and recruitment

Families can subscribe to the intervention via social organizations that ask them if they are interested in using the booklets and the price guarantee. When they agree, they receive a loyalty card from the supermarket. To enroll in the study, the retailer sent a study invitation e-mail to all Dutch-speaking customers in Flanders who were subscribed in the intervention and who had used their loyalty card in the last six months at least once. Due to privacy reasons, no information on demographics was available and families with a lower SES could not be selected on the criterion of having children living at home. Thus, participants in our study could be part of a single household or a household of more people. The e-mail provided a link to an online Checkmarket platform, where the participants with lower SES could provide their informed consent and contact details. This online platform was accessible to the research team, who could contact the participants to organize individual interviews. We selected participants randomly but considered a geographic range of the whole of Flanders. Participating customers received a €20 voucher from the grocery store as an incentive for their participation. The same procedure was followed to recruit representatives of social organizations: the retailer sent an e-mail to all involved social organizations in Flanders, Belgium. Representatives then could subscribe to the Checkmarket platform, after which the research team could contact them.

Data collection and procedure

Individual interviews Based on a semi-structured interview guide (see Additional file 3), individual interviews with participants with lower SES were conducted. The interview guide included questions based on Saunders' process components [34], more specifically, we aimed to gain insight into reach, recruitment, dose-received, context, and the perceived impact of the intervention. Table 2 provides an overview of these components, with related subthemes (i.e., qualitative data) and survey items per source (i.e., quantitative data). Participants could choose whether they liked to meet in person for the interview, or preferred an online platform or telephone call. A detailed overview of the conducted interviews, with date, location and number of children, can be found in Additional file 4. Interviews were recorded. The data collection was done

Table 1 Overview of practical applications, channels, BCTs and determinants of the intervention "Dinner is served at 1-2-3 euros"

Practical applications	Channel	Behavior change technique[1]	Targeted determinants
Recipe booklets are **offered bi-weekly**	Postal mail	Repeated exposure	Cooking attitude
A low cost is guaranteed and provided with a fixed price mechanism (i.e., maximum 1, 2 or 3 euros per portion) via scanning loyalty cards	Loyalty card, recipe booklet	Facilitation	Cooking self-efficacy, Overcoming financial barriers
Free products are offered 4 times a year	Loyalty card, recipe booklet	Facilitation	Overcoming financial barriers
There is a **summary page** with information in the recipe booklet on the price, and a summary page with all recipes and their price (with a different color for each price category)	Recipe booklet	Advance organizers, Facilitation	Knowledge on meal planning, Cooking self-efficacy, Meal planning skills
Clear shopping lists are provided with pictures of each product they need to buy	Recipe booklet	Advance organizers, Facilitation	Knowledge on meal planning, Cooking self-efficacy, Meal planning skills
The booklets are **adapted to the target audience**, namely vulnerable families: using pictures, logos, and simple language	Recipe booklet	Tailoring	Knowledge on meal planning and preparing, Cooking skills, Cooking self-efficacy
The **recipe itself** is displayed with pictures, logos with indication of number of people and time, and is described in simple steps	Recipe booklet	Active learning	Cooking skills, Cooking self-efficacy
The booklets **contain tips** (how to handle leftovers, how to cook together with children), always represented by a symbol and in a separate box	Recipe booklet	Instruction on how to perform a behavior[2]	Knowledge on meal preparing, Cooking skills
The **nutritional value** of each dish is shown in the booklets	Recipe booklet	Descriptive labeling	Nutrition Knowledge
Logos are used to indicate which dishes are lactose-free, gluten-free, vegetarian or vegan	Recipe booklet	Evaluative labeling	Nutrition Knowledge
Booklets are prepared **taking into account** minimum kitchen infrastructure, limited number of ingredients and limited cooking time (max. 30 min)	Recipe booklet	Tailoring	Overcoming barriers (structural and financial), Cooking self-efficacy

[1]Kok, Gottlieb, Peters, Mullen, Parcel et al. (2016) [38]

[2]Carey, Connell, Johnston, Rothman, de Bruin, Kelly, & Michie, 2019 [37]

by the first author (MV) and research assistants (LDK, AK, LV, MVV, HR, EJ, HVdV, JDP), with the first author monitoring and coordinating the whole process. The research assistants received a training and a handbook with guidelines on how to conduct the interviews and survey to assure standardization in data collection. Participants were not contacted for validation of transcripts.

Moreover, to gain insight into the reach, recruitment, dose-delivered and context, an individual interview (see Table 2) of no more than 30 min with the intervention coordinator of the retailer was conducted online. See Additional file 5 for the interview guide with the retailer.

Focus groups To gain insight into the process of recruitment, dose-delivered, dose-received and context of the intervention, online focus group discussions with representatives of social organizations were conducted by the first author (MV), based on a semi-structured interview guide (see Additional file 6 and Table 2). Each focus group lasted no more than one hour. Representatives were not contacted for validation of transcripts.

Surveys A quantitative survey was completed by the researcher at the end of the individual interview with the participants with lower SES. The survey (see Additional file 7) consisted of demographic questions such as age, sex, living situation, as well as process evaluation questions (see Table 2). Representatives of social organizations received an e-mail two days prior to the focus group discussion asking them to complete a sociodemographic questionnaire (see Additional file 8) via a Qualtrics link.

Data analysis

Qualitative data of the interviews with participants and focus groups with representatives of social organizations was transcribed verbatim and transcriptions were uploaded in NVivo 1.4 as a tool for analysis. Based on the reflexive thematic analysis by Braun and Clarke [40, 41], an iterative process of data collection and analysis was conducted. Analysis of interviews with lower SES participants was done separately by four research assistants and the first author, which made it possible to reach researcher triangulation. Analysis of the three focus groups with representatives of social organizations

Table 2 Evaluated process evaluation components with related qualitative subthemes and survey items per source

	PARTICIPANTS WITH LOW SES		SOCIAL ORGANISATIONS	RETAILER
Components	**Interviews Subthemes**	**Survey items**	**Focus groups Subthemes**	**Interview Subthemes**
REACH: How much of the target group participated, and why?	Reasons to participate	/	/	Amount of families & social organizations subscribed
RECRUITMENT: How were participants recruited? How were social organizations contacted?	How participants were introduced to the intervention	/	How families were recruited & how organization was recruited	Retailer's role to respond and organize start-up meeting
DOSE-DELIVERED: Was the intervention (booklet) delivered to all participants two-weekly? Were the recruitment materials delivered to social organizations?	/	/	How promo materials were delivered	When and how promo material and booklets were sent to organizations and families
DOSE-RECEIVED – EXPOSURE: Did participants use and engage with the material of the intervention?	How often the intervention & fixed price was used and why	Do you read the booklets? How many recipes do you make every two weeks? Do you make the recipes more than once? Do you use the grocery list? How often do you buy groceries at the retailer?	/	/
DOSE-RECEIVED – SATISFACTION: How satisfied were participants and social organizations with the intervention, and what are possible points of improvement?	Satisfaction with the intervention, booklet, recipes & recommendations	What do you think of the recipes? Are you satisfied? (with 10 subitems)	Satisfaction with the intervention, collaboration with retailer & recommendations	/
CONTEXT: What aspects might have affected intervention implementation or intervention impact/outcome?	Circumstances – lifestyle (e.g., not owning a car)	/	Barriers for organizations to implement (e.g., lack of time), barriers for families to participate (e.g., language)	Decline of subscription rates due to Covid-19
PERCEIVED IMPACT: How did the intervention affect the participants?	Impact of the intervention on cooking skills, eating healthy, eating together, .	How does the intervention help you? (with 10 subitems)	/	/

was done separately by the first (MV) and fourth author (VP). Both an inductive (i.e., exploratory phase to generate open codes) and a deductive (i.e., process evaluation components) approach to analysis was taken. The six phases of reflexive thematic analysis were used, from familiarizing with the data and open coding (i.e., inductive approach), over theme-generation, to telling a story that addresses the research questions. The interview with the retailer was recorded and summarized in a written report, after which it was deductively analyzed in Word. Because this interview was conducted last (i.e., after the other data collection), remaining unclarities from discussions with social organizations and participants could be compared and cleared up. The model of Malterud and colleagues [42] identifies five items that have an impact on information power, which indicates that the more information the sample holds, the lower amount of participants is needed. Based on this model, we felt that our sample reached sufficient information power (i.e., broad study aim, dense specificity, presence of theory, quality of dialogues and broad analysis strategy) [42, 43]. Survey data was analyzed with SPSS Statistics 26 using descriptive statistics. To test whether the participants in the study indeed were of lower SES, we created an SES score (ranging from 1 to 6) based on the three measured SES indicators: educational degree, profession, and net monthly income [44]. More details on the SES score and the used formula can be found in Additional file 9.

Table 3 Demographics of participants (*N* = 26)

Characteristics	Range	Mean (SD)
Age	22–61	45.5 (9.5)
SES score [1–6]	1.6–3.8	2.7 (0.7)
	Total n	**Total %**
Sex		
Female	22	85
Male	4	15
Born in Belgium	21	81
Living situation		
Alone	10	39
With partner	3	11
With children	8	31
With partner and children	4	15
With parents	1	4
Children living at home		
0	13	50
1	3	12
2	6	23
3	4	15
Degree		
Secondary education	19	73
Higher education	7	27
Profession		
Unemployed	14	54
Blue collar employee	2	8
White collar employee	8	30
White collar employee management	1	4
Self-employed small business	1	4
Family net monthly income (euro)		
1000–2000	17	65
2000–3000	9	35
Subscribed to the project		
< 1 year	4	15
> 1 year	22	85

Table 4 Demographics of representatives of social organizations (*N* = 15)

Characteristics	Range	Mean (SD)
Age	28–67	48.2 (13.1)
	Total n	**Total %**
Sex		
Female	13	87
Male	2	13
Been working on intervention since		
0–1 years	6	40
1–3 years	2	13
3–6 years	3	20
> 6 years	4	27
Job position		
Volunteer	2	13
Manager/coordinator	8	53
Social worker	4	27
Family counselor	1	7

Results

Demographics

Table 3 provides an overview of the demographics of the 26 participants that were interviewed for this study. Table 4 provides the characteristics of the 15 representatives of social organizations.

In what follows, results of the qualitative and quantitative analysis of participants with lower SES, social organizations and the retailer will be discussed on the basis of the research questions. When a difference is found between participants with and without children living at home, this is specifically mentioned in the results. For each process evaluation component, Table 2 provides an overview of subthemes (i.e., qualitative data) and survey items (i.e., quantitative data) per source. To give an idea of how many participants said something in the interviews, the following words were used: one, a few (around 10–20%), some (30–40%), half (50%), many (60–70%), most (80+%). In Additional file 10, an overview of the specific survey items and its results can be found.

How was the intervention implemented (Reach, Recruitment, Dose-delivered, context)?

Reach In July 2023, 315 social organizations had joined the intervention, and around 9400 participants were subscribed. Except for the summer period, every week or two weeks a social organization would contact the retailer to join the intervention. From 2018 until 2020, every year around 2500 new participants subscribed. Since Covid-19 (March 2020), the rate dropped to around 800 participants per year.

The target group gave a myriad of reasons to participate in the intervention. First, the financial aspect, namely the low price of the recipes, was often mentioned. Also, most participants indicated that they signed up because of the inspiration the intervention provides to prepare daily meals. Other less mentioned reasons were: healthiness and variety of recipes, being curious about the intervention, tasty recipes, easy recipes and free products.

> *"I am sometimes uninspired with cooking, and somewhat conscious with price-quality (…). I thought yeah, budget-friendly that is one, and second, healthy and varied." M, 40, no children.*

Recruitment The retailer had a web-page of the intervention, but did not actively approach social organizations to join. The intervention solely ran on word-of-mouth advertising from social organizations. When a social organization was interested in the intervention, they contacted the retailer and a start-up meeting was planned. The goal of the meeting was to explain the intervention, answer questions and sign a commitment statement.

Some social organizations hung up posters of the intervention or used folders to attract potential families with a lower SES. Others promoted the intervention in activities, for example: in cooking activities, trainings, thematic group gatherings, etc. Many representatives of social organizations were able to engage participants in the intervention because of their job position in the organization. Each organization decided on whether a participant is suited to participate in the intervention (e.g., by asking questions to possible candidates, for example if they have specific cultural diets). Most organizations were satisfied with the one-paper information and subscription letter (i.e., not digitalized) to recruit new families. Inside the organizations, mostly one person represented the intervention and committed to recruiting participants. Sometimes, however, several employees within one organization recruited. For example, in a smaller organization for family counseling, all the counselors were aware of the intervention and could recruit participants. Moreover, many local municipalities worked with (and thus informed) volunteer organizations that are in contact with the target group.

> *"Uh, we have about 500 families who are all supported through an activation, a support plan from the Public Center for Social Welfare. (…) We do have quite a few families that we accompany because there is poverty (…). And in this way, we make an assessment of which families we sign up for the project, and we make a joint assessment as to whether these are families who would really benefit from this project." F, 58, coordinator.*
>
> *"We try to advertise the project in our store, but that's not running as smoothly yet as we would like it to. We would like some more, yes to put a little more time in there or make it run a little more smoothly. Now we don't really have uh the time to offer it in a structured way, but that also has its advantages. So, we are still searching a bit." F, 45, coordinator.*

Social organizations learned about the intervention in different ways: They were contacted by an e-mail from the retailer, they read about it in a newsletter for social organizations, they were involved in the pilot project, or they knew about it via a former job. Through these channels, the social organizations committed themselves to participate as implementer in the intervention.

Dose-delivered Every two weeks the retailer sent the booklets to the participants, with the included price guarantee on the ingredients of the recipes. Promo materials (i.e., 10 posters and flyers) were sent to the social organizations who newly joined, which they also received digitally to be able to print more when needed.

Most social organizations did not comment on the delivery of the promo material. They received the material at the start and received two-weekly e-mails from the retailer with the booklet (digitally) attached. One representative, however, stated to have never received the promo material and that 10 flyers would not be enough.

Context Due to Covid-19, lower SES participants' subscription rates decreased drastically (see 'Reach'). According to the retailer, possible explanations could be the quarantine measures which reduced the visits to social organizations, as well as priorities shifting for social organizations.

The most frequently mentioned barrier for representatives of social organizations to help participants subscribe to the intervention was the lack of time. Many representatives tried to help subscribe new participants, but some simply handed over the subscription letter. In some organizations, a language barrier and the representative not completely understanding the functioning of the loyalty card and the price guarantee, were mentioned.

> *"I regularly remind our social workers, because one crisis after the other means that we are constantly focusing on the fact that there are many people who need free food, but that the social workers still have too little knowledge of the project. So that's why I'm going to send that email over and over again." F, 58, coordinator.*

Furthermore, some representatives mentioned barriers at the supermarket- or at family-level that withheld lower SES participants to make use of the intervention. For example, the accessibility of the retailer was not the same in each municipality (i.e., presence of a local store in the neighborhood), and one representative stated that the lack of bicycle racks was an issue. Also, a language and culture barrier (i.e., cultural diet such as halal) was mentioned, as well as the size of the family.

> *"I hear that some people do go to Colruyt because it's the closest store. With us, it's just the opposite. I don't really have very much insight into who among our clients goes to Colruyt and who doesn't. But an X or Y store, for example, are much closer to our city center than Colruyt." F, 45, coordinator.*

Lastly, a few participants mentioned aspects in their life that were of influence on the intervention effect or on their participation. One member did not have a car and could only go to the grocery store when a partner would drive her. Another participant had specific food allergies.

How satisfied were the target group and implementers (i.e., social organizations and retailer) about the intervention, and how did the target group use it (Dose-received Exposure and Satisfaction)?

Dose-received – exposure There were differences between participants in how often they made the recipes (i.e., from once a month to twice a week). Some participants without child(ren) at home said they used the intervention rarely, others solely as inspiration. Reasons to not always prepare the recipes of the booklets were externally driven (e.g., moved to a new home, no store of the specific retailer in the neighborhood), as well as because of the intervention itself (e.g., not liking every recipe). In the category of participants who have one or more child(ren) living at home, the child(ren) were often a reason to use the booklets or not. One participant stated to not frequently use them because the child(ren) were picky eaters. Others made recipes depending on whether or not the children liked them, and another participant said to only use the booklet when the children were at home that week. One participant, whose children were already enrolled in higher education, mentioned that they used the booklets in their dormitories. Generally, the use depended on the tastiness of the recipes, and the time participants had to cook.

> *"From the booklets, no, that will be only once a week. Getting a little bit of inspiration and looking at the recipes. I look at all of them and will use it once a week, but will not always do it exactly." F, 50, no children.*

Most families mentioned going to the retailer to buy the ingredients and thus use the fixed price. Some did not buy all ingredients but combined the ingredients bought at a fixed price, with what they already had at home.

In the survey, 45% of participants stated to make one recipe every two weeks, and 23% made two recipes every two weeks. When asking if they prepared the recipes after the two-week period, 50% stated sometimes and 31% often. Over half of the respondents (57%) indicated to often or always use the grocery shopping list that is appended to every booklet. Moreover, most respondents (73%) often or always shopped for groceries at a local store of the retailer who organized the intervention.

Dose-received – satisfaction Representatives of social organizations also gave their opinion on the intervention and the booklets. Most of them mentioned that it is a "unique" and "nice" intervention. Generally, they appreciated the provided anonymity for participants when receiving the fixed price (i.e., by scanning their loyalty card). The tips to cook with children were positively received, and one family councilor even noticed more children cooking with their parents (via photos posted on social media). Some representatives found the recipes to be easy and accessible, however some others also stated that they are too one-sided with too many carbs. Even though the inspiration and lay-out of the booklet was mostly appreciated (i.e., clear pictures, cooking steps and visualizations of the recipes and grocery list products), a few tips for improvement were offered: digitalization of the booklets (e.g., by using a QR-code or app), offering cooking videos, and using more pictograms for non-native speakers. A few representatives mentioned that a search function in an app of the retailer would be useful. This way they could find recipes with a specific seasonal vegetable, for example. Moreover, some representatives would like the intervention to be better tailored to single households, instead of only providing recipes for three people per household. Lastly, they felt that some participants with lower SES did not understand the fixed price mechanism and proposed to change the recipes to the total price of 3, 6 or 9 euros, instead of per portion. One representative even found it a bit misleading.

> *"What is also nice and what I think is positive is that they also always have a piece saying what children can do to help. That is sometimes difficult for parents to come up with." F, 31, family councilor.*
> *"I think the beautiful thing about the project is that people have their loyalty card and the other people don't see that they take that product, or they take that product for €1,25. (…) And that is exactly what I like, that people are not stigmatized." M, 67, volunteer coordinator.*

Most organizations were satisfied with the collaboration with the retailer. Some even worked together with the local store of the intervention-organizing retailer to organize additional events or activities (e.g., food packages, gadgets) and were very pleased with it. One representative stated that communication was difficult and that a planned start-up conversation never happened.

When participants were asked to describe the intervention in three words, they mostly mentioned the budget friendliness. Other popular words were simplicity/ease, inspiring and healthy. Moreover tasty, child friendliness, family activity, surprising, variation, fun and less stress were mentioned a few times. Lastly, time-saving, non-stigmatizing, increasing confidence in house brands, and accessible were mentioned once.

Regarding the booklet itself, almost all participants were positive, saying that it was clear, attractive, and they liked the used pictures. One participant stated that the booklet was a bit too ordinary. Half of the families found the grocery list very clear as it contained pictures of all ingredients. Mainly positive voices were raised concerning the free products offered once in a while (see Table 1), as well as the special editions of the booklets

(see Additional file 1) four times a year. Some participants never noticed the free products, nor the special editions. Parents with children (who represented half of the participating families) appreciated the tips about how to involve children in cooking. There was some confusion regarding the fixed price guarantee: it seemed to be unclear what counted as a portion, how different package amounts (e.g., 500 g of minced meat when less is needed) were calculated, and what the exact discount on the receipt was. Still, most participants were happy with the price guarantee and trusted it. However, a few said they only trusted the guarantee after they checked for it, and one participant completely did not trust it and thought there must be a catch behind it.

> *On the booklet: "Uh I think it's very clear. You have a picture of the dish, which gives you an immediate idea of what it entails. I think it's a short, easy explanation. Uh, it's nice that it's so clear that it says 'the children can help with this." F, 34, 2 children at home.*
> *On the shopping list: "I find that very easy. I sometimes take a picture of it and go shopping with that picture. I think that's really cool. Then you immediately see which brand you should have." F, 58, 2 children.*

Opinions about the recipes were mixed. Most participants appreciated the recipes and mentioned enough variation, little complexity, and ease of preparation. However, a few participants would have appreciated more vegetarian recipes, and some (one participants with and one without children living at home) mentioned that there was too little variety, while another participant with children living at home appreciated the fact that there were not too much "special ones". A few parents stated that the recipes were too special for children.

> *"Well I like it very much. Uh it's simple, usually 6 maximum 10 steps to make a dish then that's very simple." M, 40, no children.*
> *"Yes chili con carne is there but yes for the kids that's too strong. (…) Two weeks ago it was mashed potatoes with meatballs. Yes, we made that. (…) Something we know, like soup, then we say we can make soup again." M, 31, 3 children at home.*

Recommendations and tips for improvement were also discussed. Some participants mentioned that the booklet could be modernized and digitalized (e.g., linked to the retailer's app so products could be added to the shopping basket). Concerning the recipes, following tips were given: provide more vegetarian recipes, provide an alternative to make a recipe vegetarian (and even the other way around), for a product that is sold out in store, and for special ingredients like coconut milk and chickpeas (or add more child-friendly recipes).

> *"The only thing that should be improved is the vegetarian part. (…) and maybe recipes with whole grain products instead of regular (white) pasta." F, 44, 2 children.*
> *"Yes and giving a tip like "hey you don't like chicken or you don't like meat then maybe you can do that instead" or "if you don't eat lentils, then you can do that instead" so something like that would be nice (…) like make a meat dish veggie or make a veggie dish not veggie. It would be nice if that would be more included in the booklet." F, 42, 2 children at home.*

Based on the survey results, 92% of the participants stated that they 'always' understood the recipes. Moreover, the majority of the respondents (79%) reported that they 'often' or 'always' liked the grocery list in the booklet. Regarding the price of the recipes, 89% of respondents 'often' or 'always' liked it. Regarding the dishes, the majority of respondents (69%) indicated to 'often' or 'always' like the dishes, 77% of the respondents indicated that there were enough different recipes and 73% indicated that the recipes were always easy to make. Concerning tastiness for children, 54% of the parents stated to 'often' or 'always' find the recipes tasty for children, and 31% found they were sometimes tasty. Of the responding parents, 46% 'always' liked the tips for children in the booklet, and 46% had 'no opinion'.

How did the project affect the participants with lower SES (perceived impact)?

When asked if the intervention had an impact on their meal habits, many participants stated to be eating healthier (e.g., eating more vegetables), and to have learned to prepare new dishes. Some participants even said that they combined recipes or adapted them. Also, having less stress or finding more peace because of the inspiration and fun it brings, was sometimes mentioned. One participant lived alone and stated that the intervention was even an incentive to eat. Participants with children living at home often mentioned the family activity of cooking together with the children (i.e., letting them help) as a perceived effect of the intervention.

> *"We eat much healthier, much more vegetables. Uh, we eat different than before, not so much fat and totally better, I think." F, 58, 2 children.*
> *"Yeah, it, it's been an added value. I say it, sometimes you're uninspired and you don't always know what is healthy or what you can make on a budget-*

friendly level and yeah, that did give a bit of a new angle yes." M, 40, no children.
"Yes, I use them especially yeah as a family activity. I like to cook with my son." F, 42, 2 children at home.
"But eventually I did find that it gave a lot more peace in not having to be concerned anymore with what am I going to eat or what I should put on the table. I could then let it go a bit and in the more difficult period it brought me a lot more peace." F, 37, 2 children at home.

Quantitative results showed more or less similar outcomes, with 58% of respondents agreeing on eating healthier, and 88% agreeing they can cook healthier meals with little money. Moreover, 85% agreed on having more ideas to cook a fresh meal, and 58% on having learned to cook better. In addition, most respondents (70%) agreed on enjoying cooking more. Only 23% of the families with children living at home agreed on eating more often with the children than before the intervention. Regarding financial worry, 57% agreed on worrying less about not being able to buy food, and 58% agreed on having more money left.

Discussion

This study aimed to gain insight into the implementation process of "Dinner is served at 1-2-3 euros", how implementers (i.e., retailer and social organizations) experienced it and the collaboration, as well as how participants with lower SES experienced the intervention. The study showed that the intervention seemed well-received by both the target group and social organizations. Both participants and social organizations observed the budget friendliness, inspiration and simplicity of the recipes as success factors. However, some of the main barriers identified included uncertainties about the price guarantee of products and concerns about the recipes not being child friendly. For social organizations, the main barrier to implement the intervention was a lack of time to help participants with their subscription. Lastly, participants' perceived effects of the intervention were found in improved cooking skills, enjoyment while cooking, healthy cooking and eating, cooking together, and less financial worries. This positive effect on financial worries was mostly found in the survey results, but also in the interviews when participants were asked to describe the intervention. All these insights can enhance further development of the evaluated intervention as well as novel interventions being developed in future.

Participants with lower SES were generally satisfied with the intervention. This can be explained by several factors. First, "Dinner is served at 1-2-3 euros" targets both individual (e.g., cooking skills) and structural determinants (e.g., products at a fixed, low price). Previous research showed that when more agentic interventions are accompanied by structural changes which eliminate barriers that constrain healthy choices, health intervention-generated inequalities could be reduced [18–20, 45]. This intervention makes this structural change by overcoming financial barriers and avoiding stigma. Second, the intervention also combines a range of methods and is tailored to people with a lower SES [17, 46]. As demonstrated by Coupe et al. [46], people with lower SES frequently encounter challenges when it comes to setting goals (e.g., meal planning). This can be attributed to language and literacy barriers as well as daily hassles, that these people experience more often [46, 47]. The intervention "Dinner is served at 1-2-3 euros" targets meal planning skills and cooking self-efficacy by providing clear overviews and visual lists of simple recipes, this way overcoming food literacy barriers at the level of planning and preparing the food, which are two of the four food literacy components (i.e., plan, select, prepare and eat) described by Vidgen & Gallegos [48]. Indeed, participants mentioned feeling able to cook healthier meals with little money.

Based on both the qualitative and quantitative results, many of the involved participants reported to be cooking and/or eating healthier (e.g., because they learned new flavor combinations, learned how to cook with little money), which can be seen as a positive perceived effect of the intervention. Even though the recipes were not evaluated as perfectly healthy (see Additional file 2), on average they do provide the necessary amount of vegetables for a meal (one of the relevant indicators of a healthy meal). Indeed, it could be that the current recipes were much healthier than the meals the participating families used to eat. However, families' perception and knowledge of a healthy meal are unclear [49]. It is possible that their dietary habits have changed, but it is unsure whether these really became healthy. We would recommend making some small changes to the recipes, which could gather a lot of health benefits (e.g., replacing all carbohydrates to their whole-grain variant), and thus lead to a stronger effect of the intervention.

The intervention "Dinner is served at 1-2-3 euros" is unique for its sustained collaboration between the public and private sector, where a common goal between civil society actors and a retailer serves as the backbone of the intervention. This common goal, as well as shared values and perceived benefits of collaboration, have been shown to be important to make intersectoral collaboration a success [14, 50, 51]. The importance of social organizations' role to connect with the target group [2], is demonstrated by, among other things, the dropped subscription rates during Covid-19. Even though health promotion often falls out of the scope of the social organizations' tasks and many representatives reported not

having enough time, they still put in the effort to disseminate and implement this intervention. This is in line with a recent study that found that one of the reasons for social organizations to engage in health promotion programs, is through initiatives from partner organizations (in our case other social organizations that already engage in the intervention) and community interest (e.g., participants who show interest to be part of the intervention) [52]. Given the hard-to-reach nature of low SES populations [53], and the fact that public health problems are often complex and rooted in various contexts [15, 54, 55], a collaboration across sectors (e.g., health, education, industry etc.) seems necessary. Our study showed that collaboration with the supermarket was crucial to reach as many participants as we did (around 200), since they had a database of families using the intervention, while research shows that using other recruiting strategies (e.g., flyers and social media) yield around 30–50 participants with lower SES [56–58]. Some researchers, however, have warned for these collaborations, pointing out conflicts of interest and power imbalances, even recommending limiting the industry's decision power [59, 60]. This intervention is a good example of how a public-private collaboration can work in favor of society. Governments could consider financially supporting social organizations to implement health promoting interventions, given their crucial role of connecting with vulnerable groups. Also for retailers this does not need to be a loss operation. Although the retailer guarantees a fixed price (even if prices of products have increased), this intervention also ensures that a large consumer segment is still served. The large group of customers visiting the store can offset the smaller margins.

One important aspect of the "Dinner is served at 1-2-3 euros" intervention is that it can be used on the long-term, for as long as consumers want. Two studies that evaluated interventions with recipe booklets, with and without a financial incentive confirmed the importance of a long-term intervention since positive results disappeared after the intervention ended [61, 62]. Based on the current qualitative study, we cannot draw the conclusion that there is an impact of time, but most lower SES participants were subscribed for longer than a year and were still actively using the recipe booklets, even though they mostly mentioned making only one or two recipes every two weeks from the booklets. This result is a relevant contribution to the field of health promotion and health inequalities, indicating that this sort of intervention seems to motivate participants to keep using it, which also increases the intervention's impact. However, a quantitative longitudinal study is still necessary to look into the long-term use and effects of the intervention (e.g., on participants' diet quality). As mentioned before, this qualitative research is part of a large-scale study to evaluate the "Dinner is served at 1-2-3 euros" intervention; first conducting a process evaluation, second looking at effects on families' food purchases, and third measuring effects on various determinants (e.g., food literacy, food security, etc.) in a controlled pre- and post-trial.

The study's strengths lie in the use of a mixed method design which results in validated results. Also, a thorough process evaluation (based on process evaluation components of Saunders et al. [34]) has been conducted, collecting data from the target group and from implementers. To the best of our knowledge, no process evaluation of an intersectoral intervention targeting people with lower SES has been done. Yet, some limitations should be noted. First, an SES score (1–6) has been calculated (see Additional file 9 and Table 3), but literature did not present a cut-off score to categorize people in lower and higher SES. Thus, based on a mean score of 2.7 ± 0.7 and a range from 1.6 to 3.8 in our sample, and by comparing our sample's net monthly income category (i.e., mostly between €1000 and €2000) to the 2022 poverty threshold in Belgium (i.e., net monthly wage of €1366 for a single person, and €2868 for a family of two adults and two children) [63], we could carefully conclude that our sample mostly consists of households with lower SES. Second, the order of collecting quantitative and qualitative data changed after the first few interviews. By conducting the survey before the interview, some of the interview questions were already answered. After discussing this with the research team, it was decided to conduct the survey after the interview. This way some questions were asked again but in a more formal and quantitative manner (e.g., "Do you sometimes make those recipes more than once?" with answering options: never, sometimes, often, always). Third, results could be positively affected because of a selection bias (i.e., attracting people who were already satisfied with and motivated for the intervention). However, the voucher incentive could have helped to also attract people who were less satisfied with the intervention. Fourth, the used methodology, one-on-one contact with the interviewer, comes with a risk for responding in a socially desirable way. While it is not possible to exclude this risk completely, we tried to reduce socially desirable responses by building rapport with participants such as humor and self-disclosure, and by guaranteeing that all data would be handled completely anonymously [64]. Lastly, given that our methodology is mainly qualitative, we cannot generalize results. However, in order to increase transferability, our research has been described as detailed as possible [65].

Conclusion

This paper provides insights into the delivery, implementation process and perceived effects of the intervention "Dinner is served in 1-2-3 euros", after its first implementation seven years ago. The unique collaboration between a retailer and social organizations seems to pay off, with many vulnerable families and individuals using the intervention and being satisfied with it. The intervention's success seems to lie in the common goal to reduce stigma and financial worry, in combination with enhancing self-efficacy and food knowledge and skills.

Abbreviations

SES	Socioeconomic status
M	Male
F	Female
BCT	Behavior change technique

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

Supplementary Material 5

Supplementary Material 6

Supplementary Material 7

Supplementary Material 8

Supplementary Material 9

Supplementary Material 10

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Author contributions

Conceptualization: MV, WVL, BD, AVK; Methodology: MV, WVL, BD, AVK, VP, NM, MG; Writing - original draft: MV; Writing - review & editing: MV, WVL, BD, AVK, VP, NM, MG, MP. All authors have read and agreed to the published version of the manuscript.

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Data availability

The datasets analyzed during the current study are not publicly available due to privacy reasons, but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and all procedures were approved by the Ethics Committee of Ghent University Hospital (ONZ-2022-0343). All participants received and signed an informed consent form.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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