

Book clubs as strategy for increasing nutrition knowledge among general population. Pilot study

Clubs de lectura como estrategia para aumentar el conocimiento sobre nutrición entre la población general. Estudio piloto

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Abstract

Introduction: The spread of false news related to nutrition shows the need to provide general public validated information on food and health, inducing them to follow healthy dietary habits. **Objective:** To assess whether attendance to book clubs devoted to scientific dissemination books is a useful strategy for improving nutritional knowledge among the population. **Methodology:** 65 adults participated in a reading club, attending a research center once a month for 4 months to talk about informative scientific books on food/nutrition. The knowledge of the participants was monitored through a survey performed in all the sessions of the club. **Results:** Participants were mostly female with university studies. Attendance to the book clubs caused a significant increase ($P < 0.05$) in the number of correct answers on a questionnaire about common misbeliefs on the topics covered in the discussed books. Participants showed a high degree of satisfaction with the activity and willingness to read more scientific dissemination books, even when most of them were not previously usual readers. **Conclusions:** Book clubs based on popular science books and led by scientists with expertise in the field could increase nutritional knowledge among general population, which should be further explored in different socioeconomic contexts.

Key words: nutrition misbeliefs; food myths; scientific dissemination; food literacy; nutritional education.

Resumen

Introducción: La difusión de noticias falsas relacionadas con la nutrición muestra la necesidad de proporcionar al público general información validada sobre alimentación y salud, induciendo a llevar hábitos dietéticos saludables. **Objetivo:** Evaluar si la asistencia a clubs de lectura dedicados a libros de divulgación científica es una estrategia útil para mejorar el conocimiento nutricional entre la población. **Metodología:** 65 adultos participaron en un club de lectura, asistiendo una vez al mes, durante 4 meses a un centro de investigación para conversar sobre libros científicos divulgativos de alimentación/nutrición. Se llevó a cabo un seguimiento de los conocimientos de los participantes a través de una encuesta realizada en todas las sesiones del club de lectura. **Resultados:** Los participantes fueron en su mayoría mujeres con estudios universitarios. La asistencia a los clubs de lectura provocó un aumento significativo ($P < 0,05$) en el número de respuestas correctas en un cuestionario sobre las creencias erróneas comunes en los temas tratados en los libros discutidos. **Conclusiones:** Los clubs de lectura basados en libros de divulgación científica y dirigidos por científicos con experiencia en el campo pueden aumentar el conocimiento nutricional entre la población en general, debiéndose explorar más a fondo en diferentes contextos socioeconómicos.

Palabras clave: creencias erróneas sobre nutrición; mitos alimentarios; divulgación científica; alfabetización alimentaria; educación nutricional.

Introduction

Nutrition is one of the fields where fake news has spread most in the last decades. This is due to a combination of reasons, such as a desire from general public to shortcut the long process between preliminary evidence and dietary recommendations, together with a poor understanding of the research process (Williams et al., 2021). This fake news, nevertheless, goes beyond some arbitrary recommendations and may have strong health effects. Such is the case with wrong recommendations for nutrition during pregnancy in many websites (Storr et al., 2017), which have led some researchers to develop specific tools in order to fight fake news on that topic (Verduci et al., 2021). Indeed, consumers strongly trust in information from social media, e.g., modifying their purchase decision when unfavorable comments about a product have been spread, even when they are not able to distinguish between fake news and real information (Soon, 2020). This fact is not always related to a low education level since, for example, parents with high education level and economic resources preferentially use complementary medicine—mostly without scientific evidence—for their children (Ventura et al., 2021). Besides, the influence of fake news is particularly relevant in young people, where nutrition is one of the topics they look more often in social media, focusing on aspects such as dietary supplements, “clean eating” or body changes (Goodyear et al., 2019). At the same time, this last generation of fake news coexists with food myths of misbeliefs remaining for a long time, for instance regarding all fats having the same health effects, which is thought by one third of population in some European countries (Pomerleau et al., 2001).

This landscape shows the need to encourage efforts to provide general public validated information about food and health, in a wider context than the concept of nutritional education through attractive formats for the population, such as the use of Information Technologies (Murga Eizagaechearria, 2016) or food literacy as strategies to improve knowledge and skills to make healthy dietary choices (Vidgen & Gallegos, 2014). Despite the complexities around the concept of food literacy (Perry et al., 2017; Thomas et al., 2019) there is an increasing tendency for addressing it, for instance, designing high-school curricula with modules on agriculture, nutrition and cooking, including specific learning objectives and evidences of learning (Ruiz et al., 2021; Nogueira et al., 2022).

Books have proven to be a promising way to transmit nutritional knowledge. This fact has been validated in children, where several intervention trials have shown that reading them storybooks about vegetables is a useful simple intervention to increase willingness to try an unfamiliar vegetable (Heath et al., 2014; Nekitsing et al., 2019; Elrakaiby et al., 2021) the effects being similar to those obtained with a digital game (Braga-Pontes et al., 2021). Interestingly, it has been reported that interactive or dialogic reading with children (including questions to be answered by them) lead to a higher engagement and, thus, a greater vegetable consumption than passive reading (with children just listening) (Droog et al., 2014). Although this classification between interactive and passive reading cannot be directly transferred to adults, book clubs imply a dialogic reading procedure. In this way, some book clubs on technical texts have been developed for specific health sectors, such as undergraduate students (Jones et al., 2022) or pharmacy resident students (Chappell & Dervay, 2016) and, particularly, a book club for undergraduate students attending to a course on language acquisition was based on scientific dissemination books on the topic (Sylvan, 2018). Book clubs have also been developed for different therapeutic purposes, for instance, in subjects with aphasia (Knollman-Porter & Julian, 2019) or in a follow-up program for cancer survivors (Hammer et al., 2017). Billington et al. (2013) evaluated how a literature-based intervention impacted upon behaviors symptomatic of dementia in older people concluding that engagement in reading-group activities significantly reduced dementia symptom severity. Similarly, Tukhareli (2011) defined bibliotherapy as an effective way of promoting educational measures aimed at African people living with HIV/AIDS, managing to reduce the isolation of people, especially among children and young adults. In the context of nutrition and healthy habits, book clubs have been included as an additional tool in a weight loss programme (Ehlers et al., 2015) and have proven to be useful for promoting physical activity among women (Huberty et al., 2010). Nevertheless, the use of rigorous scientific dissemination books, designed for general audiences, as a tool for decreasing nutrition misbeliefs among adults has not been explored yet.

This study aimed to explore whether book clubs for general public, based on food and nutrition dissemination books and led by researchers in the field, may be a valid strategy for increasing food literacy, particularly regarding the identification of food myths.

Methodology

Study Design and Setting

The main basis of the pilot project NutriReadings (*NutriLecturas* in its original title) was the use of evidence-based books in the field of food and nutrition, directed towards general public, in book clubs where non-specialized public may discuss about them in presence of experts on the different explored topics. The first step was to select the books to be discussed in the clubs, for which the following criteria were fixed: books published during the last five years; books orientated towards general public; books dealing with hot topics; books written by active researchers, willing to participate in the project. Taking all these aspects into account, four books were selected dealing with the following topics: celiac disease, cocoa and chocolate, genetically modified organisms (GMOs) and food myths (Sanz Herranz, 2015; Martin Arribas, 2016; Mulet, 2017; Herrero, 2018). These books provided the possibility of discussing both immediate and conceptual nutritional and agricultural aspects, as described later. Once the books were fixed, the next step was identifying some active researchers in the topics covered by each book, in order to behave as “scientific moderators” in the book clubs, a specific figure conceived in this project. Thus, researchers were required to have a professional and investigation background not only making them familiar with the topics explored in each book, but also to be actively developing their research lines close to that topic.

Book clubs were developed at the research center where scientific moderators were ascribed, the Institute of Food Science, Technology and Nutrition (ICTAN-CSIC, Madrid, Spain). It was conceived that celebrating book clubs at that setting would be an additional way to approach participants towards nutrition research, since most of them had never been at a research center.

Participant Recruitment

The only requirement for participating in the book clubs was to be willing for reading each one of the books during one month, in a total period of four months. Several diffusion strategies were used in order to create the groups that constituted each book club (18 participants per club and a total of 4 clubs). The number of the participants was defined according to the maximum capacity allowed in the spaces of the center in which the reading club sessions were held, also considering the limitation due to the sanitary situation generated by the COVID-19 pandemic during the reading club execution

period (February 2021-May 2021). The main one was diffusion through some public libraries which collaborated in another task of this project, developing book exhibitions of food and nutrition scientific dissemination books. This was combined with some complementary strategies: information at websites and social networks of the institutions involved in the project; sheet distribution; mailing to public libraries and cultural entities; internal database of the researchers involved in the project with participants in previous diffusion activities. Once a person received the information about the project and agreed to participate, a basic survey including questions such as age, gender, level of studies and reading habits was filled in. For collecting this personal information, approval from the [omitted for double-blind reviewing] Ethics Committee was previously obtained (170/2020).

Book Club Development

In NutriReadings project, four groups were constituted for the book clubs, with two different timetables in the afternoon/evening (5:00-6:30 pm and 6:30-8:00 pm). Once a participant was assigned to a book club, they remained in that group during all project development. Book club sessions were celebrated monthly, for a total of four months. As it happens with literature book clubs, participants previously received the book (provided by the project) and, at the end of the session, an exchange took place with the participants that were arriving to the next schedule, so the four book clubs read the four selected books, but in a different order. At this point, it should be mentioned that, due to the sanitary situation, a specific COVID-19 protocol for book exchange had to be established.

Each session of book clubs was divided in three different periods: i) first round of book impressions from the participants: since NutriReadings wanted to promote the reading of scientific dissemination books as an enjoyable activity, in this round, participants did not only provide their opinion about the scientific content of the book, but also about its writing, how easy or funny had been to read the book, etc.; ii) discussion: this section was the longest of the session, where the scientific moderators, based on the comments provided in the first round and some questionnaires previously filled in by the participants (see below), tried to explore more in detail those aspects from the book that may be more controversial or hard to understand, always keeping a real discussion between participants, or participants and moderators, instead of a fixed question/answer structure. At this point, the moderators highlighted current evidence on each topic (or the existence of discrepancies on a specific topic, if

it was the case, but always in the context of scientific evidence-based nutrition); iii) current research: since the researchers were experts on the aspects covered by each book, they also explained the research they were currently performing, thus providing the participants information beyond the one contained in the book and, especially, showed them that research is an on-going process where new aspects are being discovered or rediscovered under a different perspective.

It should be highlighted that the selection of the books was orientated towards discussing immediate aspects (such as the current tendency for following gluten-free diets by people with no diagnosis of any gluten-related

disease) but also more conceptual aspects (for instance, the need of using realistic doses in nutritional intervention studies) that may be useful for participants to place into context future nutritional-related information they may receive, allowing them to critically assess these topics. All these aspects are summarized in Table 1.

Finally, each author attended to one of the sessions of each book club, what provided the participants the opportunity to have direct contact with a book writer. In addition, since all writers were at the same time active researchers, it was possible to have a discussion with participants about the different approaches for writing scientific papers or scientific dissemination texts.

Table 1. Examples of topics covered by the books selected for the book clubs, and how they connect to both immediate and conceptual aspects.

Book topic	Immediate aspects	Conceptual aspects
Celiac disease	Pathology of celiac disease and other gluten-related diseases; current tendencies to adhere to a gluten-free diet in the absence of a gluten-related diagnosed disease	Research on food technology may develop products improving quality of life
Cocoa and chocolate	Current scientific evidence on the cocoa-health effects (as an entity different to chocolate)	Need to employ realistic doses in nutritional intervention studies
GMOs	Myths of GMOs regarding human health and environment	Interconnection between basic and applied research, as well as between different domains of study
Food myths	Detox diets; milk removal from diet in the absence of diagnosed intolerance or allergy; myths on organic foods	Hypotheses in nutrition must be validated and cannot be directly translated as a recommendation

GMOs, genetically modified organisms.

Evaluation Instruments

Before starting the first session of the book clubs, the participants filled in a questionnaire with 12 items that were explored in the selected books. These items dealt with common misbeliefs in the field of nutrition, such as the number of eggs to be consumed per week, with a total of three questions per book- the full list of questions is provided in the Results section. At the end of the four sessions of the book clubs, the participants filled in the same questionnaire again, which allowed a quantitative evaluation of the impact of the project. In addition, a qualitative questionnaire including both closed and open questions was provided to the volunteers at the end of the project, asking about their evaluation of the experience and their willingness to read other scientific dissemination books in the future.

Statistical Analysis

Only questionnaires for participants attending to at least two sessions of the book clubs were collected. In the true/false questionnaire, answers to each question were codified with 0/1/2 values (true/false/no answer). Also, the total number of right answers was calculated for each participant. Then, answers pre-and post-participation

in the book clubs were compared by Wilcoxon signed ranks test, since data did not follow a normal distribution (assessed by kurtoses coefficient). Statistical significance was fixed at $P < 0.05$. Data were processed by SPSS Statistics Software version 27.

Results

Subject Recruitment

The flowchart for subject recruitment and description of the number of participants who were part of the convenience sample is shown in Figure 1. Among 146 people initially interested, additional information was provided to 102 of them, in order to create a group of 70 participants and 9 people in a reserve list, who later moved to book clubs due to drop-outs. The main reasons for not initially joining the book club was living in another city or not finding a suitable timetable. For drop-outs once started the project ($n=14$), most subjects ($n=8$) did not provide a reason. The first outcome of the activity was the participants' adherence. Although some subjects could not attend to the whole sessions due to schedule reasons, it was possible to keep a group of 71 active participants during the whole project, and 65 subjects attended to at least two sessions of the book clubs.

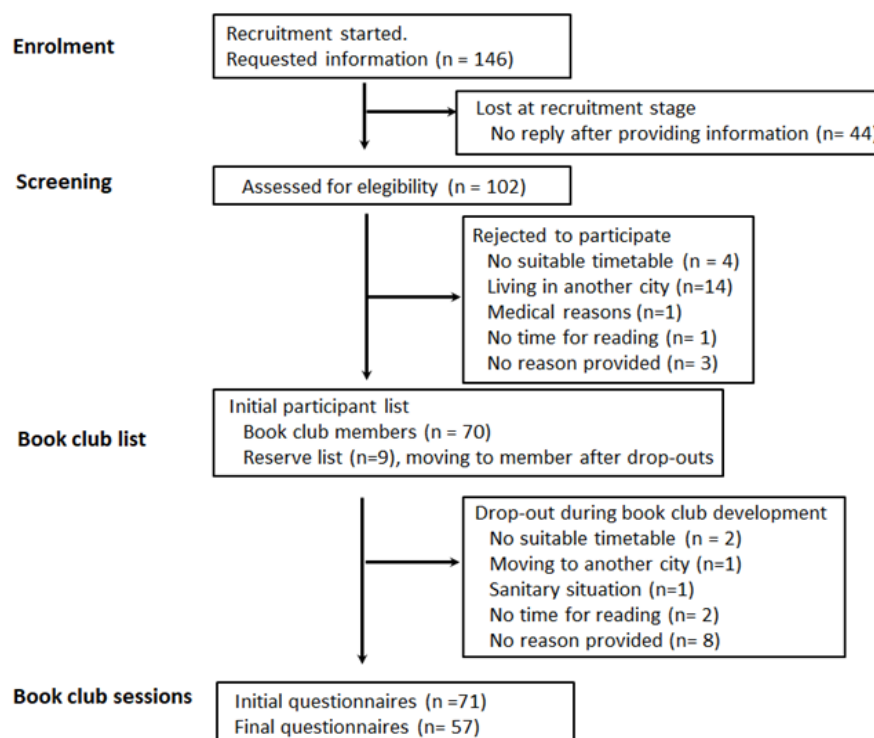


Figure 1. Flowchart of a pilot intervention study on the use of book clubs for general public focused on food and nutrition dissemination books as tool for increasing nutrition knowledge (NutriReadings project).

Subject Characteristics

Table 2 summarizes the characteristics of the participants in the book clubs. They were mostly women (87%) which finished university studies or were conducting them (92%). There was a higher heterogeneity regarding ages, with the

groups 18-30 years and 51-65 years as the most common ones. Interestingly, they were not a group particularly used to reading, since 40% of them read less than 5 books per year. Moreover, 78% had never participated in a book club.

Table 2. Basal characteristics of subjects attending to NutriReadings book club sessions (n, %).

	n	%
Gender		
Female	62	87
Male	9	13
Age (y)		
18-30	24	34
31-40	8	11
41-50	15	21
51-65	20	28
>65	4	6
Study level		
High-School level	2	2
Technical studies level	4	6
University level (including on-going)	65	92
Usual readings (books/y)		
0	0	0
>5	28	40
5-10	19	27
11-20	11	16
>20	13	17
Previous attendance to book clubs		
Yes	10	22
No	55	78

Satisfaction with the Project

As shown in Table 3, participants in the book clubs were quite satisfied with the project. Thus, the overall evaluation they provided was 9.2 ± 0.8 and the different book sessions were marked from 8.5 (celiac disease) to 9.2 (food false myths). The meeting with authors was the activity that liked the most, marked with 9.5 ± 0.6 . Seventy-seven percent of participants considered the knowledge they acquired during book clubs was “very interesting” and 66% of them defined the books as “quite enjoyable”. Moreover, 83% of the participants declared it was “very probable” that they would read a scientific dissemination book during the next year.

The questionnaire also had free text questions about what the participants liked most and least of the project. The best considered aspects were: to discover scientific dissemination books, to share opinions with other people during book club sessions; book club sessions as a whole; the opportunity to interact with researchers and authors (found to be close people); or to learn new aspects about food and nutrition. In contrast, the aspects the participants liked least were: the online session, the lack of contact with other authors (since each group only had a meeting

with one author), some less structured book club sessions where some participants talked about topics far from the debated subjects and the fact that some books were harder to read than other ones.

Finally, the participants could add other comments about the project and, among others, they mentioned: “What I have liked most has been discovering such great scientific dissemination books which have allowed me to learn so much”, “I am very thankful for participating in this initiative, I did not even know that there are public libraries which, a common person as myself, may read and may understand”, “In these pandemic times we have seen that science, even totally needed, has problems to make common people understand its expressions and, also, it has intrinsic limitations”, “I would say that reading this book has been... nourishing!”. These comments were joined by others mentioned by the participating libraries, such as “Many things arrive at the library, but when this arrived, I thought: This is really important”, “What I liked the most about the project has been the possibility that users who are not used to scientific dissemination have had access to these books and have realized that, in many cases, they are not complex at all”.

Table 3. Evaluation of NutriReadings projects by book club members (n = 57) at the end of the book club sessions.

Quantitative assessment	Mean	SD
Overall evaluation of the project	9.2	0.8
Session on “Food myths”	9.2	0.9
Session on “Celiac disease”	8.5	1.3
Session on “Chocolate”	9.0	0.9
Session on “GMOs without fear”	9.1	1.1
Meeting with author*	9.5	0.6
Qualitative assessment		%
What do you think about knowledge acquired during these months?		
Not interesting		0
Partially interesting		0
Quite interesting		23
Very interesting		77
How would you define books included in NutriReadings?		
Not enjoyable		0
Partially enjoyable		4
Quite enjoyable		66
Very enjoyable		30
After participation in NutriReadings, how probable is that you read a scientific dissemination book during next year?		
Not probable		0
Partially probable		6
Quite probable		11
Very probable		83

*each one of the four book clubs had a meeting with one of the authors.

Modifications in Nutrition Disbeliefs

The evolution in the right answers to the true/false questionnaire is shown in Table 4. Regarding answers before participating at the book club sessions, the questions where 40% of participants or more selected the wrong answer were “Subjects carrying celiac disease associated genes must consume a gluten-free diet” and “Genes of cultivated GMOs may be transferred to descendants through hybridization or cross-breeding”. Also, there were some statements where at least 10% of participants did not provide an answer, showing they were not sure about it: “Oat is a “toxic” cereal for people with celiac disease” and “Patents of cultivated MGOs may belong either to

public or private companies”. After participating in the book clubs, an increase in the percentage of right answers was seen for all statements, becoming significant ($P < 0.05$, see detailed P -values in Table 4) in those about GMO patents, GMO applications, egg consumption and chocolate-acne relationship (and approaching significance in the statement about organic foods, with $P = 0.071$). In addition, there were no statements with more than 8% of subjects not responding to the question.

The score of total correct answers was also obtained, showing a significant ($P < 0.001$) increase from the value before participating in the book club sessions (9.4 ± 1.8) to that one after carrying them out (10.4 ± 1.2).

Table 4. Evolution in answers to true/false questionnaire before and after participating in NutriReadings book clubs. P-values with an asterisk indicate significant difference.

Statement	Mean pre-book club sessions (% right answer)	Mean post-book club sessions (% right answer)	P-value
Consuming a just-prepared orange juice is as healthy as consuming oranges	87	91	0.480
Patents of cultivated MGOs may belong either to public or private companies	74	87	0.040*
Celiac disease is always revealed during childhood	99	100	0.317
Chocolate is an energy source	93	98	0.180
Chocolate consumption causes acne	70	99	0.003*
Genes of cultivated GMOs may be transferred to descendants through hybridization or cross-breeding	38	41	0.721
Subjects carrying celiac disease associated genes must consume a gluten-free diet	61	78	0.712
GMOs do not only have food applications, but also in medical or textile sectors, among others	81	96	0.004*
Due to their high cholesterol content, eggs must not be consumed more than twice a week	89	99	0.025*
Ecological foods exhibit a better nutritional profile than non-ecological foods	73	89	0.071
When chocolate gets a whitish aspect, it cannot be consumed	83	87	1.000
Oat is a “toxic” cereal for people with celiac disease	68	83	0.904
Overall evaluation	Pre-book club sessions (mean \pm SD)	Post-book club sessions (mean \pm SD)	P-value
Number of right answers	9.4 \pm 1.8	10.4 \pm 1.2	<0.001*

Discussion

Due to the long-time persistence of some food myths, nowadays coexisting with fake news spread by different digital media, there is a need to develop successful strategies in order to provide general public knowledge derived from evidence-based nutrition, together with conceptual aspects on how science (and, specifically, nutrition) evolves. Attending to dissemination talks provided by researchers, or following some active ones in social media, is a possibility, but which mostly means a passive attitude by the interlocutor. In contrast, in the NutriReadings project we tested an innovative approach, based on book clubs led by researchers in the field. Since each month the participants had to read a book, attended to the meeting and expressed their opinions, this meant an active involvement by them, which has been shown to develop skills such as perspective taking or critical thinking, as well as to provide long-term outcomes (Greene, 2013).

NutriReadings book clubs are an innovative initiative in the context of increasing food literacy for several reasons. The first one was the presence of active researchers involved as “scientific moderators”; it has been reported that, for ensuring productive book clubs in the literature field, the figure of moderator or facilitator is quite relevant, for ensuring the approach to different topics or to encourage non-participative members to join the discussion (Beach & Yussen, 2011). These tasks were carried out in this project by the scientific moderators, being researchers on the topic under discussion, what ensured the scientific level of the sessions at the same time that they provided the participants the opportunity to be in touch with “real” scientists- indeed, such opportunity is one of the reasons explaining, for instance, why people attend to science festivals (Jensen & Buckley, 2014). The second reason is that these book clubs may be conceived as a new spare time activity that contributes to increasing the education of the population in terms of foods and nutrition. Finally, the sessions were developed at a research center, showing it as a place closer to general people than commonly thought. Moreover, the fact that a fixed selection of people met regularly every month created a specific group dynamics that enhanced the discussion in each session.

Overall, the sessions of the book clubs got some dynamics that have been described for literature clubs, such as general comments on the book (although, evidently, they were not the kind of comments arisen from fictional stories, the participants had opinions on whether writing style was clear, boring, etc.) or the incorporation

of personal experiences connected with the topics explored in the book. However, there were some specific characteristics derived from the fact that they were led by a researcher which was not “neutral”, but, on the contrary, argued when some food myth may be supported by some participant. Interestingly, as common in a book club, the participants are expected to have different experiences, ideologies and tendencies (Álvarez-Álvarez, 2016), providing then a relevant mixed scenario for spreading nutrition knowledge. Such structure was well received by the participants, as shown by the high degree of satisfaction in the final questionnaires.

An aspect to be highlighted is that, although the book clubs were not directed towards a specific target group, there was a relevant proportion of undergraduate students including nutrition-related domains (Nutrition & Dietetics BSc degree, Food Science and Technology BSc degree). It was previously reported that a book club for undergraduate students of a course on language acquisitions based on scientific dissemination books helped the students to find connections between their studies and “practical life”. Thus, most of them stated that the readings were surprising or provided them a new perspective (Slyvan, 2018). Therefore, the structure of book clubs described here may be transferred, with the collaboration of college teachers, to nutrition faculties. Besides, a specific book club for university students exploring whether it contributed to increase their interest on science and their understating on the nature of scientific research found improvements in both parameters (Griffard et al., 2013). Such aspects should be explored in future book clubs designed as those in our project since, as described above, not only specific issues but also general conceptual ideas were explored from each book. It must also be highlighted the high participation of women in the project. In this regard, it is known that there are gender differences in relation to the use of social networks, participation in social activities and interest in health-related issues. It has been reported that women attach greater importance for uses of social networking sites as social connection and are also more interested in social topics than men (Krasnova et al., 2017). Moreover, the latest report on surveys on the social perception of science and technology in Spain has indicated that women are more interested than men in receiving information on health aspects, using the Internet to a greater extent as a tool to search for said information (FECYT, 2020). All these facts could justify that the advertisement of the project reached more women than men and that there be greater female participation in the development of these activities.

This pilot project contributed to increase food and nutrition knowledges among general population, as shown by the significant increase in the total number of right answers in the true/false questionnaire, as well as in some specific questions. Due to the proportion of wrong answers at the beginning, book selection proved to be valid, with many participants with confusing ideas about the relationship between chocolate and acne, aspects related to celiac disease and gluten-free diet or, particularly, to GMOs. This former topic was included, despite not being strictly a nutrition matter, not only because there is still a general rejection of food obtained by this technology, but also because this refusal is framed within a general context of promoting “natural products” (Scott et al., 2018), which may lead to adverse health effects, for instance in the context of dietary supplements (Tachjian et al., 2010). Moreover, this is a matter that, in contrast to other current hot topics in nutrition, such as the role of meat consumption in climate change, has shown to be transversal to different ideologies (Scott et al., 2018).

Another outcome of the project was the intention expressed by the participants of reading more scientific dissemination books on food or nutrition in the near future, even when they were not regular readers. This agrees with the well-known fact that participation in book clubs promotes reading habits, even among people previously lacking those habits (Kong & Fitch, 2003). It means that, in contrast to other scientific dissemination activities such as talks or small-group meetings with scientists, which have a clear end-point promoting book clubs together with a suggested reading list, may ensure a prolonged adherence of participants towards material disseminating evidence-based nutrition.

Finally, a parallel side of the project was the collaboration with public libraries, which organized exhibitions based on their own food and nutrition scientific dissemination bibliographical funds. This helped to transmit the idea that economic situation should not be a limitation for accessing to these books- although reading may be affected by other sociological circumstances. It is important to promote this among low-income social groups exhibiting a nutritional knowledge obtained from several sources, mostly inaccurate websites (McWhorter et al., 2022). Moreover, even for common users of public libraries, the location of the selected titles in a boosted position, taking them out from “hidden corridors” where they seldom access to, may help them to get interested by a topic which was not between their initial preferences. It should be highlighted that researchers involved in the project selected books to be included in the exhibitions

based on several quality criteria, since public libraries often offer a relevant proportion of not updated or directly incorrect nutrition books which are sometimes purchased due to fashions. This aspect should be reviewed by the heads of these institutions, particularly because, for many readers, finding a book in a public library implies rigor recognition. At the same time, involvement of librarians in the design of book clubs on scientific dissemination text is important, since they may provide their experience in the design of book clubs, solving potential problems such as lack of leadership or time management. Indeed, a successful collaboration was observed between librarians and faculty teachers when designing a book club aimed to health degrees students (Haley et al., 2019). Moreover, the implementation of book clubs regarding food and nutrition dissemination books connects with a general tendency towards the recognition of public libraries as social agents involved in a diversity of aspects, such as providing healthy meals (De la Cruz et al., 2020).

Strengths and Limitations

This project aimed to transmit evidence-based nutrition, with book club session led by scientific moderators which ensured that participants understood the main aspects explored in the book. Moreover, it was not only focused on the specific aspects directly related to each book, but also to provide a wider overview on food and nutrition research. Also, the fact that participants attended to the book club sessions once they had read the book allowed high quality debates, since they already knew the main ideas that, in other formats such as common scientific dissemination talks, would cover the whole session.

Despite the success of the initiative, some improvements may be included in the project. In particular, the profile of participants in the book clubs was biased, since they mostly were subjects with university studies. As stated previously, scientific dissemination in the field of nutrition is still needed in this population group, but efforts should be made for reaching other population strata. In this way, specific approaches for sectors less used to read whole books, such as providing them some selected fragments of the books or performing a telephone follow-up, could enhance their adhesion and adherence to these activities. Results obtained from the project if people with a lower educational level had participated would probably be different. On the one hand, there could be even greater improvements in relation to the acquisition of knowledge and changes in eating habits after attending book clubs since it is known that lower education generally is associated with poorer diet quality and nutrient intakes

(Livingstone et al., 2017) even conditioning the diet of the family environment (González Jiménez et al., 2012). However, a lower participation could also be expected in the monthly reading of each of the books or even in the difficulty of understanding some less common and more complicated aspects to assimilate. Another aspect to be improved is to assess not only whether the attendance to book clubs increased the participants' nutritional knowledge (for which book clubs showed to be effective), but also whether it eventually led to a modification in their dietary habits towards healthier choices.

Conclusions

Aspects related to eating behaviors or food properties are commonly discussed in our society, lacking frequently rigorous information and being based on non-validated social media sources. This originates a situation where many myths are spread, what is aggravated by the general lack of critical spirit of the population and by the difficulty of understanding the truthful results derived from scientific research. Added to this is the great power of advertising, which in many cases is misleading, leading people to believe that certain foods have or not beneficial health characteristics. For all these reasons, it is of crucial importance to provide general public validated information about food and health. At this respect, book clubs based on popular science books and led by scientists with expertise in the field could increase nutritional knowledge among general population, contributing to an adequate nutritional education and consequently promoting knowledges and skills to make healthy dietary choices.

Implications for research and practice

NutriReadings has been tested as a pilot project for increasing food and nutrition knowledges among general population based on book clubs led by scientific moderators. This format has proven to be successful in order to modify some common misbeliefs. Therefore, practitioners as well as policy makers should explore further initiatives based on the use of scientific dissemination books on food and nutrition, including cooperation with public libraries.

Author contributions

All authors have participated in the preparation of the manuscript and approved the final version presented.

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Data availability statement

Data presented in this study can be consulted by contacting the corresponding author.

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Conflict of interest

M.A.M. was author of one of the books selected for the book clubs.

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