Communication Strategies to Improve Healthy Food Consumption among Schoolchildren: Focus on Milk

Laura Gennaro *, Alessandra Durazzo, Sibilla Berni Canani, Fabrizia Maccati and Elisabetta Lupotto

Consiglio per la Ricerca in Agricoltura e l’Analisi dell’Economia Agraria, Centro di Ricerca CREA-Alimenti e Nutrizione, Via Ardeatina 546, 00178 Roma, Italy; alessandra.durazzo@crea.gov.it (A.D.); sibilla.bernicanani@crea.gov.it (S.B.C.); fabrizia.maccati@crea.gov.it (F.M.); elisabetta.lupotto@crea.gov.it (E.L.)
* Correspondence: laura.gennaro@crea.gov.it; Tel.: +39-065-149-4534

Academic Editor: Edgar Chambers IV
Received: 13 February 2017; Accepted: 30 June 2017; Published: 5 July 2017

Abstract: This work provides an updated picture of communication strategies developed to improve healthy dietary habits in schoolchildren, with a focus on the importance of milk consumption. The paper has investigated two main areas: the definition of the main orientations and key points of research approach relative to the communication methods, with special attention to multiple strategies and the identification of their peculiarities to increase daily milk consumption. The school environment is considered as a unique environment to help increase the adoption of a correct dietary habit and lifestyle; it increases physical activity by facilitating the flow of health-related information. In this regard, several studies have highlighted the importance and effectiveness of school-based interventions on a large-scale, also considering multiple contexts, early interventions as well as the involvement of teachers, students and families. The effective actions range from interventions on prices and the availability of desirable and undesirable foods to educational programmes that improve food knowledge and the choices of students and/or their parents. From the nutritional point of view, milk is an important component of a well-balanced diet—especially for children—because it contains essential nutrients. It is a substantial contributor to the daily energy intake; however, its consumption often declines with aging and becomes insufficient. Therefore, developing strategies to increase its consumption is an important objective to reach.

Keywords: children; healthy eating habits; milk; model and environments; school-based programmes

1. Introduction

Healthy eating during childhood and adolescence is very important both for the physical and cognitive development of individuals [1]. Eating behaviours change during the first years of life: children ask what, when, and how much to eat. They learn about food through direct experiences with food itself and by observing the eating behaviours modelled by others [2]. Food preferences derive from the interaction between genetic and environmental factors that leads to individual differences [3–5]. Food preferences represent the main predictor of food intake in children [6]. The benefits of food preferences is that the dislike for a food can be reduced or even reversed by a combination of several factors. The understanding of how these preferences are shaped through children’s food experiences represents a key issue and is related to the several factors that influence children and adolescent dietary choices, i.e., early tasting exposure, availability and preference of particular foodtypes, portion size, parenting style, and modelling [7,8]. Eating behaviour is set up during early years of childhood and persists into adulthood: childhood represents a critical moment to establish healthy eating patterns [9–11].
A lot of studies analyse how parents and children influence each other’s eating behaviour [2,12–15]. Both children’s attitudes towards food and children’s assessment of satiety could be affected by family [16,17].

Rhee et al. [18] describe three categories of parental influences: specific parent feeding practices, general parental behaviours and global parenting influences. The recent systematic review and meta-analysis of Yee et al. [19], by studying the influence of parental practices on child promotive and preventive food consumption behaviours, has highlighted how the number of parental behaviours are strong correlated to the dietary behaviour of children. However, the authors underlined three main understudied areas in parental behaviours that influence the patterns of food consumption among children: active guidance/education, psychosocial mediators and moderating influence of general parenting styles [19]. For example, some works highlight the increase of children’s intake of fruit, vegetables and milk after observing adults or their peers consume these foods [20–23].

The positive modelling represents an indirect, yet effective, strategy to promote healthy eating patterns in children. Hebestreit et al. [24], throughout a European multi-centre study, pointed out how the parent-child communication approach is a key element of health education. In 2013/2014 the I. Family study cross-sectionally assessed the food intakes of families in eight European countries with to determine whether an association exists between children and parents’ dietary patterns and whether the family food environment (the number of shared meals or soft drinks available during meals) affects this association: the availability of soft drinks and the negative parental role modelling resulted in important predictors of children’s dietary patterns [25].

National and international organisms have elaborated guidelines to provide useful information about balanced diet and physical activity [26]. In the frame of the “Guidelines for the Nutrition Education” [27], for example, the Italian Ministry of Education has noted how an incisive line of action to improve children’s dietary choices should involve the different environments in which the child spends most of his/her time: such as family, school, as well as healthcare and society settings. A large part of nutritional needs are met at school: starting from this assertion, school environment is the ideal place where policies can be implemented to encourage healthy eating habits in children [28–31]. This statement also underlies that teachers affect the eating behaviour of their students for a whole school year or many school years, acting as authoritative figures and representing a model through their own food habits [32–34].

For this reason, a lot of programmes have been developed at the school level and in other backgrounds [34–39]. In this perspective, the implementation of proper information campaigns is an important procedure to encourage the adoption of correct lifestyles, including physical activity. Their purpose is to give birth to integrated and multisectorial strategies and actions (projects, programmes, etc.) in school-based programs, involving different school and out-of-school figures (students, teachers, family, public bodies etc.). Their aim is to change the behaviour of the single or the group (educational approach) as well as the context that supports the incorrect behaviour (socio-ecological approach) [40].

2. Material and Methods

Our search strategy includes the use of search engines Scopus, Science Direct, and PubMed, where the following keywords were typed: communication strategies and children’s dietary habits; dietary habits and childhood; teacher and children’s dietary habits; family and children dietary habits; dietary habits and elementary school; fruit and communication strategies; vegetable and communication strategies; nutrition programmes and childhood.

For the focus on milk, additional keywords have been inserted: milk consumption and schoolchildren; flavoured milk consumption and schoolchildren; chocolate milk consumption and schoolchildren; communication strategies and children’s milk consumption.
3. Attention to Multiple Strategies Is Needed to Improve Eating Habits in Children: Examples and Update of Communication Strategies

In this work, the main lines and key points of research approach—with attention to the multiple strategies—are described and extracted through updated and targeted examples, starting from the awareness that the effective actions for the promotion of children’s healthy dietary habits involve a large number of school-based interventions: from interventions on prices and availability of desirable and undesirable foods to educational programmes to improve food knowledge and the choices of students and/or their parents [2,41–45].

From the meta-analysis of Dudley et al. [35] from the 49 eligible papers, it has emerged that the dominant strategies were: enhanced curriculum approach \((n = 29)\), cross-curricular approaches \((n = 11)\), parental involvement \((n = 10)\), experiential learning approach \((n = 10)\), contingent reinforcement approaches i.e., rewards or incentives given to students in response to desired behaviours \((n = 7)\), literacy abstraction approaches i.e., literature read by/to children whereby a character promotes/exemplifies positive behaviours \((n = 3)\), game-based approaches \((n = 2)\), and web-based approaches \((n = 2)\). It is also worth mentioning the recent review of Decosta et al. [46], where the following intervention areas were categorized: parent control, reward/instrumental feeding, social facilitation, cooking programmes, school gardens, sensory education and taste lessons, choice architecture and nudging, branding, food packaging, and spokes-characters, and offering a choice.

A first type of approach is the repetitive exposure to healthy foods [47]. As reported by Knai et al. [48] the increased exposure to healthy foods (i.e., fruit and vegetables) represents a key intervention, useful to push children towards healthier behaviours. Roe et al. [49], in a crossover design on 61 children (aged 3–5 years), showed that providing a variety of vegetables and fruit as snacks leads to an increased consumption of both food types in a childcare facility. However, motivation is another important factor for encouraging children to eat fruit and vegetables. In fact, some authors conclude that presenting a food as a reward or giving small prizes for tasting increases children’s preference for that food, because they act as an incentive to encourage healthy eating in children [41,43,50]. On the contrary, pressing children to eat specific foods leads them to dislike those foods. Likewise, restricted access to some foods leads towards an overconsumption of those foods when children are free to choose them [51]. Again, Birch et al. [2] reported and underlined how giving rewards for food selection in preschool children could lead to avoid the same food when rewards are over. The recent work of Loewenstein et al. [52], instead, indicates that short-run incentives can produce changes in behaviour that persist after incentives are removed.

Concerning economic incentives, Jensen et al. [53] evaluated their effectiveness in eliciting sound nutritional behaviour in schools and highlighted how such incentives are effective for altering the consumption patterns in the school setting.

Another potential approach is the creation or implementation of food policies in the school environment that would limit or deny access to undesirable foods i.e., snacks and soft drinks. As reported by Cullen et al. [54], the availability of obesogenic foods in schools is associated with less healthy food preferences and food choices. Generally, the availability and accessibility of food represent the key determinants in food choices [55].

In a 2015 research, Losasso et al. [56] carried out a case study in Northeast Italy: several nutrition policies were developed in public schools. The purpose of the experiment was to compare the consumption of beverages and snacks in two different environments, school and extra-school contexts: the results highlighted the protective role of educational institutions in the promotion of healthier dietary patterns.

A dual strategy on the dietary behaviour of elementary pupils involving both a cafeteria environment intervention and a classroom nutritional program was reported by Song et al. [57] as a successful example of a multiple school-based nutrition program. However, in this work, the authors also have highlighted how behavioural economic approaches produce enhanced outcomes when paired with food education.
In this context, gardening can be considered as another advantageous strategy to encourage healthy dietary behaviours among children. It is worth mentioning the review of Berezowitz et al. [58] that summarizes studies on how school gardens could enhance the academic performance and the dietary habits in children: it offers evidence that garden-based learning does not negatively affect academic performance or fruit and vegetable consumption. On the contrary, it may favourably influence both. However considering the small set of studies, the authors also underline how other experimental designs and outcome measures are necessary [58]. The systematic review of Savoie-Roskos et al. [59] showed that although the evidence was mixed and fraught with limitations, most studies suggested how gardening-based interventions in school, community, or afterschool settings can have a small, but positive, influence on children’s fruit/vegetables intake.

Another example of effective initiatives in schools is changing the length of time available for lunch. Cohen et al. [60] studied the association between the amount of time students (aged 8.4–15.6 years) have to eat their lunch and school food selection and consumption: having little time to eat was associated with a significant decrease in the consumption of entrées, milk, and vegetables.

This study suggests that school policies should encourage at least 25-min lunches in order to reduce food waste and improve dietary intake. Generally, schools should consider both collaborating with chefs and using a certain choice plan to increase fruit and vegetable selection, as reported in another study of Cohen et al. [61]; this research also stressed the importance not to abandon healthier options even if they are initially met with resistance [61]. The study of Just et al. [62] showed a pilot experiment of how chef-created dishes can increase school lunch participation and fruit and vegetable intake.

An effective approach of nutrition information aimed to increase healthy behaviour is the “image-based strategy”, i.e., emolabeling, that uses simple expressions of emotions to convey a message on health (i.e., happy = healthy, sad = not healthy). Siegel et al. [63] demonstrated that using smiley emoticons in an elementary school cafeteria increased vegetable and Plain Fat Free Milk purchase (PFFM) by 29% and 141%, respectively. A combination between the use of both emoticons and small prizes was applied as a strategy in several studies. Barnes et al. [64], for example, showed how a two-level approach based on the use of emoticons followed by small prizes as incentives for better food choice led to significant and sustained improvement of healthy eating.

It is important to develop strategies that involve school staff, teachers, parents, and students in order to increase diet quality and physical activity [65–71]. Diet and physical inactivity are now among the leading causes of preventable death and disability, i.e., obesity [72]. Some examples of multiple and integrated strategies have been reported.

In a school-based intervention to promote healthy behaviours, Sacchetti et al. [73] highlighted the importance of planning integrated and multisectorial actions to encourage correct dietary habits and physical activity. The intervention involved 11 classes of children aged 8–11 for three years, from their third to their fifth class. The activities were planned, with the aim of modifying both the behaviour and the context that causes the incorrect behaviour, including training modules for teachers and sport instructors, educational activities in class, sport and games at school, cookery and sensory workshops, creation of didactic materials, and motor activities. Results have shown that dietary habits have improved after the intervention. The percentage of children who consumed an adequate mid-morning snack increased ($p < 0.0001$), while the percentage of children who consumed snacks and drinks after dinner decreased ($p < 0.01$). An increase, but not significant, of the percentage of children who ate five or more portions of fruits and vegetables daily was also reported. Furthermore, no significant modifications were observed in motor performances.

Another example of intervention strategy is shown by Moss et al. [74] and it is based on the quasi-experimental design that analyses the effects of the combination between the Coordinated Approach to Child Health (CATCH) [75] nutrition curriculum and the Farm to School program [76] to assess the nutrition knowledge of 3rd-grade students. CATCH, a coordinated school-based health program, was implemented by planning and introducing a curriculum on nutrition with educational
activities—including physical activity—combining them with the Farm to School programme that encourages the consumption of locally grown foods to support farmers. Findings suggest that CATCH nutrition education and farm tours can positively affect nutrition knowledge and fruit and vegetable consumption behaviour among schoolchildren [74].

In this regard, it is interesting the work by Prelip et al. [77] that monitored the effects of a “hybrid” school-based nutrition programme on attitudes, beliefs, and behaviours related to fruit and vegetable consumption diffused throughout a large urban community. The hybrid intervention included a combination of district strategies, local school-defined strategies, and “home-made” strategies/activities created by teachers. The intervention resulted in a significant change in teacher influence on students’ attitudes toward fruits and vegetables ($p < 0.05$) and students’ attitudes towards vegetables ($p < 0.01$), even after adjusting for gender, grade, and race/ethnicity [77].

Considering that children today spend a large amount time on mobiles and social networks, and are exposed to various forms of interactive advertising [78], another strategy to encourage healthy habits is given by a combined approach on a school-based and media intervention. As an example, the work of Grassi et al. [79] showed the efficacy of this approach to increase fruit and vegetable intake in Italian children, while Blitstein et al. [80] underline the benefits of including a parent-focused social marketing campaign in nutrition education interventions. Additionally, it’s worth mentioning examples of complementary online interventions. The recent work of Dumas et al. [81] showed an example of development of an evidence-informed blog to promote healthy eating among mothers using Intervention Mapping Protocol.

The recent study of Roccaldo et al. [82] showed how teachers’ training program accompanying the “School Fruit Scheme” fruit distribution improves children’s observance of the Mediterranean diet. This underlines the importance of the inclusion of teachers’ training programmes in communication strategies to improve healthy eating habits in children.

At this regard, it is worth mentioning the study of Hall et al. [83] which highlights how health educators should collaborate with teachers in the design, implementation, and evaluation stages of curriculum development in order to better meet the needs of students and facilitate the delivery of high-quality nutrition education to them.

The work of Goldberg et al. [84] describes a school-based intervention, Great Taste, Less Waste (GTLW), a preliminary example of communication strategy that linked healthy eating to the environment to improve the quality of foods from home: GTLW was well received, but no significant changes were observed in the quality of food brought to school. Whether classrooms are an effective environment for change remains to be explored.

Additionally, the work of Kastorini et al. [85] is interesting, evaluating the effects, through a cohort study, of a food aid and promotion of healthy nutrition programme (the “DIATROFI” programme) on the diet quality of Greek students. At the end of the intervention, the consumption frequency of all the promoted foods, namely milk, fruits, vegetables, and whole grain products, increased among children and adolescents, boys and girls ($p \leq 0.002$). This study highlights the importance to address the school-based nutritional programmes in particular towards low socioeconomic status groups that tend to adopt unhealthier choices.

4. Some Additional Specificities Related to Strategies to Increase School Aged Children’s Daily Milk Consumption

In the context of multiple and interdisciplinary communication approaches, the strategies to increase daily milk consumption among school children are placed. Identifying additional specificities for developing actions to increase the consumption of milk, as the main goal of this paper, is now discussed.

Milk is an important component of a well-balanced diet—especially for children—because it contains essential nutrients. It is a substantial contributor to the daily energy intake; however, its consumption often declines with aging and becomes insufficient [86]. The fundamental role of
milk in school nutrition reflects its unique nutrient contributions to children’s diets. The increase of consumption of milk at school could lead students closer to recommendations on nutrients provided by milk.

Encouraging people drink milk from a young age might represent a strategic action for increasing the intake of some essential nutrients and improving healthy habits. In order to encourage sales, milk is now produced with a set of characteristics that meet the needs of consumers and attract them (e.g., tasty flavours, new and captivating packaging, straws, etc.). Clearly, if milk is served with meals, the energy density and portion sizes of foods can influence children’s energy intake. However Kling et al. [87] studied the effect of varying the energy density (1% fat or 3.25% fat) and the portion size of milk served with the lunch on the intake of milk among preschool children (3–5 years old). The results have shown that across all ages, food intake decreases when higher-energy density rather than lower-energy density milk is served, whereas meal energy intake (food plus milk) does not change significantly. This study highlighted how the effects of milk energy density on meal intake vary between children. In any case, serving milk in larger portions promotes the intake of this nutritious and dense beverage.

In the USA, in response to the increase of childhood overweight and obesity [88,89], milk with lower fat levels is requested by schools and at the same time U.S. companies are paying more attention to the reformulation of flavoured milk with significantly reduced added-sugar content. In this regard, the work of Li and Drake [90], understanding the sensory perception of both adults and children about flavoured milk can help food developers and manufacturers to achieve attractive attributes while reducing the sugar content to meet the needs of a healthy diet.

As for the availability of flavoured milk in school and relative communication strategies, the argumentation is controversial: several schools embrace the idea that any milk is better than no milk. In this case, flavoured milk represents an alternative for meeting the recommended intake of this food [91–93]. Other schools limit or ban the sale of chocolate milk. Several authors discuss if altering the availability of flavoured milk could influence other eating behaviours of students within meal compensation or after-school snacking patterns. Quann and Adams [94] reported that when flavoured milk was removed on 1 to all days of the week, there was a 26.0% reduction in milk sales and a 11.4% increase in the percentage of milk surplus, resulting in a 37.4% decrease in milk consumption. Waite et al. [95], by investigating how environmental intervention could affect elementary school students’ food selection during lunchtime, concluded that requiring students to ask for an item rather than self-serve could help modify food choice. In detail, in one school, students were required to “Ask for Chocolate Milk”, a strategy that resulted in an 18% increase in the selection of white milk compared to the choices made by control students. In another school, students were exposed to “Increased White Milk Quantity” (the availability of white milk was three times as much as that of chocolate), but the visual cue of a three-fold greater quantity of white milk compared to chocolate milk did not significantly alter selection patterns [95].

Yon et al. [96,97] reported how the flavoured milks reformulated to be either low-fat or with reduced sugars tested in a school programme, remained popular among students. Cohen et al. [98] reported how the effect of removing flavoured milk from schools during the 2012–2013 school year, among 1030 elementary and middle school children in Boston area, resulted in a reduction in the selection and consumption of total milk. Henry et al. [99] studied the impact of replacing traditional chocolate milk with the reduced-sugar option on milk consumption in elementary schools: children preferred chocolate milk over plain milk even when a reduced-sugar formula was offered; so, switching to reduced-sugar chocolate milk led to a decrease in the number of students choosing milk. Hanks et al. [100] showed how, in the context of students’ lunch, eliminating chocolate milk from school cafeterias led to a reduction of calories and sugar consumption; but, at the same time, it led students to take less milk or drink less of the white milk they took; furthermore, the number of students participating in the National School Lunch Program decreased. Then, the authors added that there could also be some consequences on the way students compensated during lunch, or later in the day, for example selecting a dessert. The authors suggested that food service managers needed to
carefully evaluate costs and benefits of removing chocolate milk and identify options to make white milk more convenient, attractive, and make it the default choice [100].

Other studies underlined that transforming “white milk” into the preferred choice, and making “flavoured milk” less convenient (without removing it), could lead to an immediate increase of white milk selection, by simultaneously reducing potential controversy [95,101,102].

Nowadays, also in some European countries (especially in Northern Europe) milk is directly taken from home. In some schools it can be sold by vending machines. Moreover, several programmes started to promote the distribution of milk in the schools for the mid-morning break or for lunch [103].

It is worth mentioning the work by List and Samek [104] that showed the positive impact of incentives adopted in the school lunchroom on the milk choice made by children from low-income households; the lunchroom is a “teachable moment” to encourage children in making healthy choices as it is defined by the same authors. The study of Sao et al. [105] underlined the importance of hands-on farming experience with dairy products in order to increase the consumption of milk and dairy products among children.

Hendrie et al. [106] have focused their attention on interventions targeting an increase in the consumption of dairy food or Ca intakes among children.

5. Conclusions

This work highlights the effectiveness of multiple and interdisciplinary communication strategies for improving healthy dietary habits among schoolchildren. It then concludes how the promotion of a well-balanced diet combined with physical activity should be the starting point of a modern strategy of communication. A fundamental step that needs to be integrated with other innovative actions, i.e., training courses for teachers, farm to school programs, and an enhanced curriculum approach.

The strategies to increase daily milk consumption among schoolchildren should follow this direction. Since the consumption of milk declines with aging and becomes insufficient, developing strategies to increase drinking of this beverage is an important goal to fix. As for additional specificities, the authors conclude that the promotion of milk with lower fat levels and the reformulation of flavoured milk with a significantly reduced added-sugar content should be considered.

Acknowledgments: The authors thank Annalisa Lista for the linguistic revision and the editing of this paper.

Conflicts of Interest: The authors declare no conflict of interest.

References


56. Losasso, C.; Cappa, V.; Neuhouser, M.L.; Giaccone, V.; Andrighetto, I.; Ricci, A. Students’ consumption of beverages and snacks at school and away from school: A case study in the North East of Italy. *Front. Nutr.* 2015, 2, 30. [CrossRef] [PubMed]


77. Prelip, M.; Slusser, W.; Thai, C.L.; Kinsler, J.; Erausquin, J.T. Effects of a school-based nutrition program diffused throughout a large urban community on attitudes, beliefs, and behaviors related to fruit and vegetable consumption. J. Sch. Health 2011, 81, 520–529. [CrossRef] [PubMed]


