

## Dietary and physical activity practices and preferences in children: An approach from school parliaments in educational public establishments

### Prácticas y preferencias alimentarias y de actividad física en niños y niñas: Una aproximación desde los Parlamentos Escolares en establecimientos educacionales

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#### What do we know about the subject matter of this study?

Overnutrition in Chilean children keeps on increasing, becoming a public health problem. Promotion and prevention strategies in childhood have a greater probability of success since it is a habit-forming stage. Therefore, perfecting these tools will help to solve this problem.

#### What does this study contribute to what is already known?

Children's participation in decisions on interventions can be an important instrument to generate permanent behavioral changes over time, particularly in eating habits. In this sense, School Meetings contribute to the joint generation of knowledge based on the discourse of children and incorporate a rights-based approach.

#### Abstract

In Chile, overnutrition continues to increase, especially affecting children. Solving this public health problem requires the development of promotion and prevention strategies that consider the suggestions of the communities, especially those of the children themselves. **Objective:** To know the opinions and suggestions of third and fourth-grade children from schools in the southern area of Santiago, Chile, regarding their eating practices and physical activity, as part of the FONDEF IT 1810016 project. **Subjects and Method:** Seven School Meetings were held in seven schools using a participatory qualitative methodology, collecting the opinions of 176 children regarding both their food and

#### Keywords:

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Children

physical activity habits and preferences. **Results:** The most consumed and preferred foods are those easy to prepare and highly available, such as bread, pasta, and milk. Foods that require preparation or are less available, such as fish, legumes, fruits, vegetables, and homemade preparations, are less consumed and have less preference. Regarding physical activities, video games and soccer stand out. Students propose increasing the hours of physical education and recesses and improving the availability and access to healthy foods in school environments as a solution strategy. **Conclusions:** School Meetings as a participatory strategy contribute to the joint generation of knowledge. The need to include communities as participants in health initiatives recognizes, through their role, children as subjects of rights.

## Introduction

In Chile, overnutrition affects more than 50% of the child population<sup>1</sup> and only 1 in 5 children aged 9 to 11 years is physically active<sup>2</sup>. This situation has a negative impact on their well-being and increases the risk of continuing with this condition in adulthood, in addition to developing health complications<sup>3</sup>.

Solving these public health problems requires the development of promotion and prevention strategies in the child population<sup>4-6</sup> since it has been shown that they have a greater probability of success at this age, as it is one of the crucial stages in the formation of dietary and physical activity habits<sup>7-10</sup>. Also, this brings multi-dimensional and interdisciplinary challenges that demand the participation of many actors and institutions in decision-making<sup>11</sup>.

A topic little reviewed in the literature is the participation of the children themselves in the decisions on the interventions that should be adopted to change habits, especially when it is desired to generate a permanent behavioral change over time<sup>12</sup>. In this regard, both the 2017 National Food and Nutrition Policy and the National Physical Activity and Sport Policy 2016-2025 provide the referential framework to create such healthy environments and exercise processes of citizen participation in health<sup>13,14</sup>, understood as a right capable of influencing the orientation of public policies in health<sup>11</sup> and where children should be considered<sup>15</sup>.

In Chile, the legal recognition of child participation is established in Article 12 of the International Convention on the Rights of the Child, which establishes the right of every child to express her/his opinion and to have it considered in all matters that affect her/him<sup>16</sup>. Within this framework, in 2017, the Ministry of Health developed a participatory process called "Healthy School Meetings", where children in kindergarten and elementary education reflected on how to build healthier schools, and the conclusions were submitted to the Ministry of Education and the Ministry of Health<sup>17,18</sup>, moving forward in the construction of a

manual for participatory processes in educational establishments<sup>18</sup>. Thus, the School Meetings are activities that are framed in the spirit of this right, generating instances in which children freely express their opinion and discuss national health issues, seeking to empower them at the school stage to participate in a deliberative and proactive way in the construction of healthier educational environments<sup>18</sup>.

This study reports some results from the FONDEF IT 1810016 project "Development, scaling and validation of an integrated system of school interventions on nutrition, physical activity, and community environment in *Ciudad Sur*". In this context, information was collected from the implementation of School Meetings about food, physical activity practices, and preferences of children in order to promote the success and sustainability of interventions that contribute to improving school food environments. Thus, to provide a social and participatory component with a rights-based approach, the objective of this study was to know the opinions and suggestions of children in third and fourth grade of elementary education from schools belonging to the southern area of Santiago, Chile, regarding their eating practices and physical activity through the implementation of School Meetings.

## Subjects and Method

Qualitative exploratory descriptive study<sup>19</sup>. This study tries to generate a constructed knowledge on the food and physical activity practices and preferences of children in third and fourth grade of elementary education from schools in the southern area of Santiago, through their opinions and suggestions. The children who participated were selected by convenience<sup>20</sup> according to the selection criterion of being in the second basic cycle, that is, in 3rd or 4th grade of the schools participating in the FONDEF project. The initial contact was made with the teacher in charge of the Technical Pedagogical Unit (TPU) of each school, who indicated the classes that would participate according to

the research team's specifications in order to respond to the proposed objective.

176 children from 3rd and 4th grade were included and were distributed in a non-homogeneous way in each school, forming working groups of 20 to 34 children. In total, seven School Meetings were held during the last quarter of 2019, in seven public schools belonging to the Municipalities Association of *Ciudad Sur*<sup>i</sup> of the FONDEF IT 1810016 project and whose average vulnerability index associated with poverty is  $91.5 \pm 5.4$  (min: 88.0; max: 98.0)<sup>21</sup>.

The same methodology was used for the development of each School Meeting in order to standardize the way they were carried out. For this purpose, we worked with a group of professionals external to the school who were part of the project team and were previously trained to act as facilitators. Each Meeting was recorded in MP4 format, complemented with a photographic record of the material worked on, such as drawings and posters. Each session lasted 2 to 3 chronological hours.

This activity was approved by the ethics committee of the *Universidad de Santiago de Chile* (USACH). The students and parents gave their assent and consent, respectively, and the principals of each school approved these activities before their realization.

### Development of the School Meetings

Each School Meeting began by registering the participating children, using labels with their names and a distinctive color to determine the group to which they belonged. After a brief explanation of the activity, a dynamic recreational activation was performed to generate confidence and a more relaxed atmosphere in preparation for the following activities. After this, with the help of the facilitators, each group met so that each participant could do a mental walkthrough of what they ate and what physical activity they did from morning to night. Then, each child drew and wrote down the name of the physical activity she/he did during the day and the main foods she/he consumed at each of the main meals. To that end, a mural was arranged and divided into two halves, one half was named "What I like" and the other half "What I don't like", so that children could distribute their drawings according to their preferences. Afterward, each group had to answer the following questions: *Why do they like the foods mentioned? Why don't they like the foods mentioned? What physical activity do they like to do and where do they do it? and What recommendations would they make to have a healthier environment?*

<sup>i</sup>Ciudad Sur is a non-profit private law entity. It is composed of the municipalities of Lo Espejo, El Bosque, Pedro Aguirre Cerda, La Granja, San Ramón, and San Joaquín, covering a territory of approximately 635,000 inhabitants.

### Data analysis

In the first stage, lists were constructed for each of the schools with foods and types of physical activity described or drawn by the students at each time of the day and then the frequency in which it was described or drawn was recorded. With these frequencies, levels of food consumption mentioned by the students were established as well as the frequency of performing the different types of physical activity. The frequency was grouped into three levels: *high*, *medium*, and *low*. The limits were established based on the calculation of percentiles as a way of differentiating frequency, considering as low level those foods or types of physical activity below the 33rd percentile, medium level those between the 33rd and 66th percentile, and high level those above the 66th percentile. In addition, rankings were created to determine the levels of acceptance and rejection of the foods they consume and the types of physical activity they engage in, sorted by the highest to the lowest number of mentions of each item and school.

The identification of the reasons why they like or dislike certain foods or types of physical activity was carried out by content analysis<sup>19</sup>. For this, the children's School Meetings were transcribed in order to identify themes that grouped the different reasons given, identifying common patterns and categories that allowed the analysis in each of the School Meetings. This content analysis also allowed identifying recommendations from the students themselves to improve school environments, which were complemented with the incorporation of facilitating and hindering elements that they identified through their narratives.

In the second stage, the results found in each school were consolidated through thematic coding<sup>22</sup>. This procedure responded to the search for comparability of the analysis, i.e., the children's answers about the foods they consumed, the ones they liked the most, and the ones they liked the least, as well as the physical activities they did and which ones they liked the most were reviewed. The steps for this were the following:

- a) *In-depth analysis of each case*: An open coding was carried out based on the systematization of the seven School Meetings, and then the thematic domains were selected to obtain a condensed view of the information. The result was a thematic structure developed to compare the groups, according to the answers given regarding food and physical activity, identifying the similarities and differences of each group, and denominated *comparability of interpretations*<sup>22</sup>.
- b) *Generalizations*: Through the comparability of interpretations, the previous analysis allowed to contrast the responses in each group, identifying categories and subcategories for analysis. In the case

of food, 8 categories with their corresponding subcategories were obtained (Table 1), according to the Dietary Guidelines for the Chilean Population (GABAS)<sup>23</sup> and the Food Sanitary Regulation<sup>24</sup>.

According to the 2020 WHO definition, for physical activity, the categories “Recreational activity” and “Non-recreational activity” were created, whose subcategories are “Sedentary” and “Active” in both cases (Table 2).

## Results

The results found for each of the topics addressed in the School Meetings are presented as follows:

### Feeding

Table 3 describes the foods identified in each category and subcategory.

*Level of consumption:* The foods with the highest level of consumption are those in the “Cereals” category, mainly bread and pasta, milk in the “Dairy” category, and juices. No fruits or vegetables nor water were observed at this level of consumption.

At a medium level, stand out foods from the categories “Meat, Legumes, and Eggs” such as fish, chicken, and some legumes, “Dairy products” such as yogurt and cheese, and certain fruits such as apples. Within the “Cereals” category, rice and potatoes are identified, in the “Fast food” subcategory, French fries were found, as well as cookies, chocolates, and ice cream in the “Sugars and sweets” subcategory. On the other hand, in a low level of consumption, all the subcategories of the category “Preparations” stand out, finding in “Home preparations” the *cazuela*, stews, *humitas*, *carbonada*, and lasagna; in the “JUNAEB” subcategory, breakfast and lunch are mentioned, while in the “Fast food” subcategory, pizza stands out. Other subcategories and/or foods found at this level and not previously identified are nuts, avocado, water, and vegetables, broken down into a wide variety of foods, as well as tripe, seafood, sausages, cold meats, corn, and salted snacks such as *Doritos* and *Suflitos*.

*Preference level:* The foods that stand out at a high level of preference are bread, milk, and juice, while at a medium level chips, soda, and chicken were identified as well as cookies and chocolate in the subcategory “Sugars and sweets”. At the low level of preference, the three subcategories of the “Preparations” category stand out, in addition to the subcategories “Meats”, “Sausages and cold meats”, “Fruits”, “Vegetables”, “Other dairy products” such as cheese and yogurt, and “Legumes” such as beans and lentils.

### Physical Activity

Table 4 describes the physical activities identified in each category and subcategory.

*Frequency of physical activity:* At a high level, activities in the “Recreational activity” category predominate and video games in the “Sedentary” subcategory, while in the “Active” category, soccer and basketball stand out. On the other hand, in the low level, active recreational activities are identified, such as dancing, playing ping-pong, swimming, playing outdoors in the square or park, and riding a scooter, while in the sedentary type of recreational activities, reading, writing, and watching movies via streaming services stand

**Table 1. Categorization of foods**

Category	Subcategories
Fruits and vegetables	Fruit Vegetables
Dairy	Milk Dairy products
Meats, legumes and eggs	meats Viscera fish and shellfish Egg Legumes
Cereals	Bread Other cereals (rice, noodles, potatoes, oats, corn, others)
liquids	Water Drinks /Juices coffee/tea
packaged	sugars and sweets saline sauces and dressings Sausages and cured meats
preparations	homemade preparations Fast food JUNAEB
Others	Others

**Table 2. Categorization of physical activity**

Category	Subcategories
Recreational activity	Sedentary Active
Non-recreational activity	Sedentary Active

out. In the “Non-recreational activity” category and “Active” subcategory, activities such as cleaning, tidying up, and going shopping are observed, while in the “Sedentary” subcategory, doing school homework stands out.

*Preference level:* The activities found at a high level of preference are playing video games and soccer. Regarding the medium level of preferences, athletics, running, cycling, running games (e.g. *tombo*), dodgeball, and swimming are identified. Lastly, playing ping-pong, dancing, skating, riding a scooter, and walking a pet stand out at a low level of preference.

### Recommendations for a healthier diet

*Food and Nutrition Education:* A key element is the provision of clear knowledge about the food they eat. In this regard, children express not only the need to learn about healthy eating and its benefits but also the need to know those aspects that can be harmful to their health: “*Show what is right with food and what is wrong*” (Student from Liceo Malaquías Concha).

*Variety and flavor of culinary preparations:* Another suggestion made by the children is to improve the flavor of certain foods and/or preparations by adding salt or seasoning, as well as having the opportunity to learn about and try new food preparations that promote the consumption of healthy foods creatively: “*They should add more salt to lunch, and more salt and lemon to salads so that the flavor is tastier*” (Student from Escuela Presidente Salvador Allende Gossens); “*Prepare it in another way... as juice, cake (carrot)*” (Student from Liceo Malaquías Concha).

Similarly, another suggestion is that there are healthy versions of foods and/or preparations that they like but that do not necessarily comply with this characteristic, as in the case of ice cream, which is a food that can be 100% fruit to promote its consumption more healthily.

*Supply and access to healthy food:* Increasing the supply of healthy food, from the perspective of children, can be through two sources: the school and their homes. From the school, they propose that the supply and access to food in the school tuck shop and the school cafeteria improve, either by having more accessible prices or a greater variety of healthy foods to buy and/or consume. In addition, they have the feeling that the food they eat at school is not always healthy. In this sense, the expansion of the supply of healthy food is mainly related to the possibility of increasing the intake of fruits, vegetables, and water, being this the most requested as a way to eat healthily: “*We can*

*place a school tuck shop with fruits and healthier snacks, bananas, apples*” (Student from Escuela Ricardo E. Lat-cham).

Regarding homes, children recognize them as an important place for the promotion of healthy eating. In this regard, they consider that there should be support from homes to improve nutrition by sending healthy food to be consumed at school, especially snacks: “*Do not bring drinks with a lot of sugar*” (Student from Liceo Malaquías Concha).

### Recommendations for the promotion of physical activity

*Educate about the benefits of practicing physical activity:* They suggest educating about the benefits of practicing physical activity as well as the negative consequences of not doing so since it is the children themselves who recognize a lack of knowledge about the positive effects of doing physical activity and that this has repercussions in stimulating their practice: “*Show the good that could happen if we perform physical activity*” (Student from Liceo Malaquías Concha).

*Infrastructure and equipment:* They recommend having more and better infrastructure and materials for the practice of physical activity and sports within the school, to provide them with motivation and safety in the practice of physical activity: “*We should have more exercise machines*” (Student from Escuela Fray Camilo Henríquez); “*If we put grass on the space that has dirt, we could play soccer and basketball*” (Student from Escuela Batalla de la Concepción).

*Physical Education Classes:* The scarce time that children have for physical activity at school is a relevant factor, which is the reason they ask for an increase in the number of physical education classes, in addition to expanding the range of sports and physical activities to be practiced in these classes in order to attract the interest of more students: “*They should give physical education (classes) every day*” (Student from Escuela Presidente Salvador Allende Gossens).

*Varied offer of physical activity in schools:* They determine the need to expand the offer of activities not only in Physical Education classes but also in other areas of the school, identifying recess as an instance to take advantage of the practice and promotion of physical activity, as well as the incorporation of healthy breaks at different times of the school day.

Finally, they recognize a lack of stimulus that makes it possible to understand physical activity as a form of entertainment, from there they request complementary elements such as music and games.

**Table 3. Foods identified in each category and subcategory, according to the frequency of mentions**

Category	Dimensión	Nivel de consumo				Nivel de preferencias			
		Alto	Medio	Bajo		Alto	Medio	Bajo	
Fruits and vegetables	Fruit		Plum, Peach, Apple, Banana	Strawberry, Cherry, Kiwi, Orange, Pear, Pineapple, Watermelon, Grape, Melon, Custard Apple, Raspberry		Apple	Apple banana	Orange, Grape, Cherry, Strawberry, Watermelon, Pear, Pineapple	
	Vegetables		Chard, eggplant	Beetroot, Broccoli, Lettuce, Paprika, Tomato, Carrot, Squash, Italian Squash			Carrot	Lettuce, Tomato, Artichoke, Radish, Cabbage	
Dairy	Milk	Milk				Milk		Cheese, Yogurt	
	Other dairy		Yogurt, cheese						
Meats, legumes and eggs	Meats		Chicken	Meat			Chicken	Meat	
	Fish and Shellfish		Fish	Fish, Tuna, Salmon, Mackerel, Shrimp					
Cereals	Viscera			Guatitas, (Tripe) Panita (Liver)					
	Egg		Egg					Egg	
Liquids	Legumes		Beans, Peas	Lentils, Chickpeas, Broad Beans				Lentils, Beans	
	Bread	Bread				Bread			
Packaged	Other cereals (rice, noodles, potatoes, oats, others)	Noodles	Rice	Corn, Potato			Noodles	Noodles, Rice	
	Water			Water				Water	
Preparations	drinks/juices	Juice	Drink			Juice	Drink	Drink	
	Coffee/Tea			Tea coffee				Tea coffee	
Others	sugars and sweets	Chocolate, Cookies		Cereal bars, Candies, Cake, Ice cream, Cake			Chocolate, Cookies	Cereals, Cake	
	Saline			Snacks (E.g. Doritos)					
Others	Sauces and Dressings			Ketchup , Mayonnaise, Mustard				Ketchup , Tomato sauce	
	Sausages and cured meats			Viennese, Salami, Ham				Viennese, Salami	
Others	Homemade preparations		Mashed potatoes	Meatballs, Arepa, (traditional Venezuelan corn bread), Carbonada (meat and vegetable stew), Casserole, Ceviche, Humitas, (traditional Chilean corn pastry), Puree, Tamales (traditional Venezuelan food), Charquicán Pantrucas (traditional Chilean food), Lasagna			Mashed potatoes	Mashed potatoes, Lasagna	
	Fast food		French fries	Completo (Hot dog), Burger, Pizza, Nuggets			French fries	French fries, Pizza, Complete Breakfast lunch	
Others	JUNAE			Breakfast lunch					
	Others			Olive, Peanut, Walnut, Avocado					

**Table 4. Physical activities identified in each category and subcategory, according to the frequency of mentions**

Category	Dimension	Physical activity level			Preference level		
		High	Half	Low	High	Half	Low
Recreational activity	Sedentary	Video games	Cell phone use, watching television, singing, computer use, drawing	Streaming movies, reading, board games, writing	Video games, cell phone use	Using the computer, watching television	Streaming movies, drawing, playing balls, using the tablet
	Active	Soccer, basketball, run-forward game (e.g. catching each other), taca taca (Foosball, traditional chilean game), hide and seek, jump rope	Skating, tennis, volleyball, swing, bicycling, walking, running game (e.g. D)	Dancing, handball, table tennis, outdoor games (plaza, park), swimming, scooter, playing musical chair	Soccer, basketball, run-forward game (e.g. catching each other), taca taca (Foosball, traditional chilean game), hide and seek, jump rope	Athletics, bicycling, running games (eg. tombo, quemaditas traditional chilean game, swimming, skating	Walking the pet, table tennis, dancing, skating, playing the musical chair, jumping on the trampoline, riding a scooter
Non-recreational activity	Sedentary		Homework	Study			
	Active			Do cleaning, order, buy			

## Discussion

The foods identified in a high level of mentions, both in terms of consumption and preferences, show the habitually of their consumption, the ease with which they can be consumed, and their no- or easy preparation. This result is consistent with the literature, where it has been shown that children prefer certain foods depending on whether they are easy to eat<sup>25</sup>. In addition, although this study does not investigate the exact weight of the foods consumed, it is possible to point out that the low frequency of consumption of certain foods mentioned by the children coincides with the results of the National Food Consumption Survey (ENCA)<sup>26</sup> and the publication of Suárez-Reyes et al. (2021) regarding the consumption of water, fish, legumes, and vegetables, where school children report the lowest compliance in relation to the recommendations of the dietary guidelines for this population<sup>27,28</sup>. The opposite case occurs with fruits, with discrepancies with other studies in which their consumption is higher than that recommended, or they obtain one of the highest preferences in the school population<sup>28-30</sup>.

Some studies corroborate the results found regarding foods with low preference<sup>29,31,32</sup>. Foods such as legumes and fish, together with the category "Preparations", are characterized by requiring more work and time for their preparation, by not being presented attractively on the plate, or by having smells and textures

that are not always well accepted. On this last point, despite that vegetables are not well accepted, the one most preferred by children is carrots, finding similarities with another study in which it was identified that crunchy vegetables are preferred<sup>32</sup>.

Regarding physical activity, those found in a high frequency, both in terms of performance and preferences, are characterized by being recreational activities that have a competitive component, where there must be a person or group of winners, in addition to requiring teamwork. This situation is associated with the fact that children, when choosing with whom to engage in physical activity or sport, mostly prefer to do it with their friends or schoolmates<sup>33</sup>.

In the case of active recreational activities, when there is no sex distinction, as is the case in our study, there is no consensus in the literature regarding physical activity preferences, with running, walking, and playing tag or cops and robbers being the favorites<sup>33,34</sup>. However, in other studies, when a distinction is made between the preferences of girls and boys, soccer is identified as one of the favorite activities only by the male sex<sup>33-35</sup>.

In the case of non-recreational activities, only a medium and/or low frequency of physical activity was identified, and they stand out for being activities that are carried out individually and that imply a responsibility on the part of the child that is given by an adult. As for the active recreational activities identified in

these frequencies of performance, those that must be performed outdoors or require additional equipment to perform them (skating, scooter, swimming) stand out, which limits the possibility of performing them in the context of the group studied. This was evidenced in a study with schoolchildren where this population perceived that living in inaccessible areas and the feeling of insecurity were barriers to being active<sup>36</sup>.

Improving the palatability and taste of preparations composed of healthy foods has been shown to increase the intake of these foods in the long term<sup>37</sup>. In addition, preparation methods influence the liking for certain foods or preparations, i.e., it is influenced by a complex mixture of a uniform appearance, easily controllable textures, and a typical taste<sup>32</sup>. This aligns with the recommendations given by both boys and girls in terms of having a greater variety and better taste of certain preparations, also challenging the notion that healthy foods are not tasty.

Finally, including communities as interested parties in health initiatives produces positive health and social outcomes, ensuring the contextual relevance of interventions to local needs<sup>38,39</sup>. Specifically, involving children in the research process throughout its different stages represents a rights-based approach, compatible with the framework established by the UN Convention on the Rights of the Child<sup>40</sup>. In this sense, processes such as School Meetings contribute to the joint generation of knowledge, integrating different realities of a public health problem based on the discourse of children. The challenge is to develop more instances such as these, of a permanent participatory and inclusive nature, which allows for expanding knowledge on issues of nutrition and physical activity and to implement joint actions that favor access to healthy environments and the development of strategies that increase positive attitudes towards healthy eating and physical activity, with policies that recognize the value of dialogue and deliberation and consider the voice of the child population as subjects of rights to improve their lifestyles.

## Conclusions

1. Bread, pasta, juices, and milk are the foods that children participating in School Meetings consume and prefer the most.
2. Video games and soccer are the activities that children enjoy and prefer the most.
3. The children participating in the study suggest increasing food education, improving food preparation in schools, and having a greater supply and availability of healthy foods in school environments. Households should contribute by providing healthy snacks for their children.
4. The students in the study propose to increase the number of hours dedicated to physical activity, improve infrastructure and equipment for sports, and offer a greater variety of physical activity in schools.
5. School Meetings as a participatory strategy contribute to the joint generation of knowledge. The need to include communities in health initiatives leads to positive social and health outcomes, recognizing children as actors with rights, whose participation is relevant to the design and implementation of health programs, plans, and policies.

## Ethical Responsibilities

**Human Beings and animals protection:** Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

**Data confidentiality:** The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

**Rights to privacy and informed consent:** The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

## Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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