

SUPPLEMENT ARTICLE

What policies are there and what policies are missing? A Photovoice study of adolescents' perspectives on obesity-prevention policies in their local environment

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Summary

The aim of this study was to investigate adolescents' critical awareness of whether obesity prevention policies targeting physical activity (PA) and nutrition were operating in their local community. Participants were 41 adolescents (aged 16–18, 90% women) recruited from three communities in Poland. Prior to this study, they were involved in obesity-prevention participatory initiatives (conducted within the CO-CREATE project), where obesity-related public policy limitations were analyzed in a youth-led discussion. A Photovoice exercise was designed to capture obesity-related public policies that were either present or absent in young people's local environments. The photographs ($N = 213$) were coded and mapped according to the policy themes they illustrated, using the MOVING and NOURISHING frameworks. The public policies represented in the photographs are most frequently related to: healthy retail or food service environments; food advertising or promotion; structures and surroundings that promote PA; and infrastructure and opportunities that support public or active transport. Adolescents are critically aware of the presence and lack of specific public policies operating in their local environment, particularly policies affecting structural aspects of food and PA environments. Policy-oriented photovoice exercises may prompt critical awareness among adolescents and empower them to contribute to obesity prevention policy processes.

KEYWORDS

adolescence, framework, obesity prevention policies, Photovoice

1 | INTRODUCTION

Public policy actions aimed at environmental determinants of poor diet and lack of physical activity (PA) at population levels might be the

most effective means to halt obesity prevalence by addressing health inequalities and achieving environmentally sustainable food systems.¹

There is growing interest in the involvement of young people in the policy-making process as a beneficial practice for delivering effective

and tailored policy solutions that account for different options and diversity of perspectives.² Thus, it is important that young people are meaningfully engaged and participate in the development and implementation of public policy processes that affect their health.³

Youth-led participatory action research (YPAR) is an approach that can encourage young people to identify, research, and propose solutions to problems relevant to their local community.⁴ According to the principles of YPAR, research conducted by young people should be: (1) inquiry-based (where youth collect data and evidence), (2) participatory (with youth sharing power with adults by making choices about the actions of interest), and (3) transformative (focusing youth led-research aims at new knowledge, practices or policy to improve the lives of youth).⁴ Photovoice is an example of YPAR activities, which may be used to obtain insights about the public policies operating in the local environment, identify the existing gaps in the implementation of obesity prevention policies, and consequently, inform the development of policy ideas.⁵ Photovoice invites people to use photography to record their lives and their local environment/community, engage in critical dialog with one another, and advocate for change in their communities.⁶ This participatory method has particular potential for exploring local environments and revealing health barriers and opportunities in the community.⁷ Photovoice was originally designed to engage and empower groups of individuals, whose voices might have been marginalized, to express their perceptions through photography and written captions, summarizing the main insights of the photographers.^{6,8} It is often used with youth, whose expertise may be disregarded or undervalued when stakeholders are tasked with a development of an obesity prevention public policy, its implementation, or revision.⁹ To date, health-related public policies have rarely been considered a topic of Photovoice projects conducted among young people. A systematic review by Fountain and colleagues indicates that only four (out of 39) identified Photovoice projects conducted in the context of health promotion in the United States directly addressed (public) health policies.⁹

Involving young people by taking photographs of the ways obesity prevention policies operate in their own environment may constitute a step in the process of empowering youth to develop policy ideas that fit with the needs of young people in their community and allow for a change in a complex system of obesity drivers. Photovoice methods may be particularly well suited to increase “critical awareness.”^{10,11} In Photovoice, typical questions that guide the capturing of photographs are designed to raise critical awareness about the complexity of the subject (e.g., “What is really happening here?” “How does this relate to our lives?” “Why does this situation exist?” and “What can we do about it?”).^{6,12}

Critical awareness of a policy is a complex phenomenon that could be defined as the extent to which individuals notice public policies, are informed about specific regulations,^{13,14} and are equipped with relevant tools that would empower them to act in line with the policies or act to change the policies.¹⁵ Critical awareness of obesity prevention refers to reflections on the functioning and characteristics of one's environment, and specifically what factors in that environment might either hinder or promote obesity in young people. Critical

awareness of the environment in which one lives is central to youth empowerment.^{10,11} In particular, empowerment is driven by “a critical awareness of youth of the way they exist in the world with which and in which they find themselves.”¹⁰ Furthermore, empowerment is derived from an individual's understanding of how their circumstances are shaped by broader social and political forces, not only their behavior.¹⁰ By questioning these circumstances and forces, youth can uncover their own sense of agency and become empowered themselves.^{10,11}

Typologies and frameworks of PA policies and food environment policies propose a way to systematize, monitor, and benchmark policies, as well as identify gaps in their implementation.^{16–18} The NOURISHING framework was designed to operationalize policy actions to effectively promote healthier eating. It consists of 10 key policy areas within three domains: food environment (e.g., “Use economic tools to address food affordability and purchase incentive [U]”); food system (e.g., “Harness supply chain and actions across sectors to ensure coherence with health [H]”); and behavior change and communication (e.g., “Inform people about food and nutrition through public awareness [I]”).^{17,18} The MOVING framework operationalizes a comprehensive approach to policies that promote PA, following a similar structure and principles to those applied for NOURISHING.¹⁷ The framework consists of six policy areas across three policy domains: active societies (e.g., “Make opportunities and initiatives that promote PA in schools, the community and sport and recreation [M]”); active environments (e.g., “Visualise and enact structures and surroundings which promote PA [V]”); and active people (e.g., “Give PA training, assessment and counselling in healthcare settings [G]”). NOURISHING and MOVING also include subdomains ($n = 66$ and $n = 35$, respectively) that further specify the types of policy options.

1.1 | Aims

This study aimed to explore adolescents' critical awareness of obesity prevention public policies as manifested by either their presence or absence in the local environment. Our study utilizes the NOURISHING and MOVING frameworks,¹⁷ to summarize public policies related to obesity prevention. These policies were identified by adolescents as either being in operation or implemented, or lacking in the local environment.

2 | METHOD

2.1 | Study design: the CO-CREATE project

The Photovoice study was conducted as a part of a larger project, conducted in line with YPAR principles.⁴ “The confronting obesity – co-creating policy with youth (CO-CREATE)” project aimed to provide insights into obesity prevention policies by combining the perspectives of adolescents, scientists, and stakeholders into jointly

proposed policy ideas.^{5,19} Adolescents and the local CO-CREATE staff formed three groups called Youth Alliances for Childhood Obesity Prevention. Youth Alliances in CO-CREATE aimed to: (1) promote and support adolescent political participation and empowerment, as well as (2) develop context-specific research-based and experience-informed policy ideas that would have the potential to better their complex environments through overweight and obesity prevention.^{5,19} As part of the Youth Alliance, young people were introduced to complex system factors and their association with adolescents' obesity. Specifically, obesity system maps, developed by Polish adolescents,²⁰ were discussed. System maps are known for their interconnectedness of various system factors (such as people and places, physical and commercial environments, political situations, and other environmental factors). These maps also demonstrate feedback loops that can either amplify an undesirable situation or maintain an existing state.²⁰

In line with the CO-CREATE protocols, local CO-CREATE teams (involving researchers and co-facilitating young adults) and adolescent Youth Alliance members could explore and adapt policy ideas in their alliances to achieve these goals.^{4,19} The first and second of the Youth Alliance monthly meetings were devoted to youth-led discussions of youth obesity and ways to stop the obesity epidemic. These meetings also included a brief introduction of key characteristics of public policies (a systemic change, prompting a behavior change, initiated and/or supported by local/national authorities), highlighting their inclusiveness (e.g., an activity in one school vs. an activity in all schools in the region). This was followed by two examples of policies: (1) the “Do the right mix” policy in Paris, promoting a combination of public transportation, cycling, car-sharing, and walking; and (2) the “Health star rating” policy in Australia (a simple visual system or front-of-pack labeling of food healthiness). The Photovoice activities took place at the third and fourth meetings of the Youth Alliances (photographs were taken between these two meetings). During the fourth meeting, the adolescents participated in a group discussion where they presented two of their own photographs and discussed their content. They were encouraged to use photovoice reflections to further discuss policy ideas, prioritize which policies they wanted to discuss with local stakeholders, and propose details for the content and implementation of those policies.

2.2 | Recruitment

Photovoice constituted a part of the CO-CREATE Youth Alliances, established in three upper secondary schools across different regions (communes) of western Poland, representing rural (low socioeconomic status [SES]), rural–urban (low SES), and urban (high SES) areas. The communes were selected using a national index that qualifies each commune in Poland based on taxable personal income per capita in a commune.²¹ In each of the low-SES locations, the recruitment was conducted in the only upper-secondary public school operating in the respective commune. Besides low family income per capita, the rural commune is also geographically isolated and has limited access to

public transportation. This makes it difficult for its residents to travel to other communes that offer better social, economic, employment, and educational opportunities. Participants and locations are a convenience sample.

As part of the CO-CREATE research project, adolescents between the ages of 16 and 18 were involved in creating novel and context-specific public policy proposals to tackle the issue of overweight and obesity (for details, see Bröer et al. and Klepp et al.^{5,19}). The data gathered for this project included photos and captions submitted by Polish adolescents who were part of the CO-CREATE Youth Alliances.

We used a convenience sampling method to invite adolescents who were interested in taking part in the research and information gathering activities. Participants agreed to the use of their photographs for research purposes in Photovoice research. Standard informed consent and parental consent were obtained by circulating information about the project and consent packages to potential participants and their parents (if below the age of 18). The study was approved by the Ethics Committee at SWPS University, Wrocław, Poland.

2.3 | Participants and data collection

A total of $N = 41$ participants from the three locations (90.24% women; $M_{\text{age}} = 16.87$; $SD_{\text{age}} = 0.88$) were recruited. Information regarding participants' ethnicity and body weight was not collected.

Photovoice was conducted after an initial introduction and training sessions (the third meeting of Youth Alliances) held between January and February 2020 (participants were explained the purpose, procedure, and ethical considerations of Photovoice). The photographs were taken by the end of February 2020, before the onset of the COVID-19 pandemic. The Photovoice method was introduced as a visual research methodology where participants take photographs and are engaged in the research process.⁶

Next, participants were asked to use their smartphone cameras (or, if preferred, cameras provided by the CO-CREATE staff) and before the next meeting take: (1) up to three photographs of places and things/objects showing what public policies were being implemented (or exist/operate) in their environment that enabled healthy eating or PA among young people, as well as (2) up to three photographs showing a lack of policy implementation (and that should be present in their local environment). Implemented (or existing) policies were defined as actions that are already operational and integrated into the local environment. A lack of policy was defined as the absence of operational policy actions that could be integrated into the local environment and meet the needs of the local community. Additionally, participants were asked to provide written captions for each photograph regarding: (1) what was represented in the picture; (2) what kind of policy action or lack of policy action was captured; (3) where the picture was taken; and (4) who is/would be the target population for this policy. Each adolescent was asked to choose at least one photograph representing a presence and one representing a lack of policy to be discussed during the following (fourth) meeting of the Youth Alliance.

In the fourth meeting, participants shared and discussed their photographs. At least one of the research team members took notes in cases when the discussed photo lacked captions or the author of the photograph raised additional thoughts/views in the course of the discussion.

To be included in the subsequent analysis, the photographs had to portray the local environment and the presence or lack of a public policy and be accompanied by a written description/caption. A total of 222 photographs were included in the analysis. Nine photographs were excluded in the process of coding (e.g., pictures of privately owned gyms; an ambiguous caption). Of the 213 eventually included photographs, $n = 88$ considered healthy diet policies (within which $n = 22$ represented existing policies and $n = 66$ a lack of policies) and $n = 125$ portrayed policies targeting PA ($n = 91$ capturing implemented policies; $n = 34$ documenting a lack of policies).

2.4 | Coding of public policy themes

In order to identify policy themes, a total of six researchers coded the data independently. Three researchers coded 88 photographs and their captions using the NOURISHING framework, and three coded 125 photographs using the MOVING framework¹⁷ (coding details are available upon request from the corresponding author). The coders were five PhD students with experience in designing and conducting health behavior interventions and/or public policy implementation research and one clinical nutritionist. All coders received training regarding the two frameworks and the coding procedures.

The coders were asked to review each photograph; they independently screened it for obesity prevention policy-related content, read the caption, decided if the visual content and the accompanying caption fit the description of any of the domains/subdomains of the NOURISHING framework (or MOVING framework, respectively), and allocated the photograph to a subdomain(s) of the framework. One photograph could capture more than one theme from one or more policy domains.

During the process of coding, in the case of the NOURISHING framework, six photographs from two domains were coded within their respective general domains only (e.g., N instead of N1), as the coders did not identify a sub-domain that would adequately reflect the theme captured in the photograph's caption. Regarding the domain "Improve nutritional quality of the whole food supply [I]," the coders proposed an additional sub-domain ("Limits on the availability of high-processed salty snacks [Ife7]") to better reflect policy themes captured in nine photographs (see Table S1 for details).

In the case of the NOURISHING framework, in 54 out of 88 cases, at least two coders identified the same policy themes in photographs. Regarding the MOVING framework, in 67 out of 125 cases, at least two coders identified the same policy themes in photographs. The involved researchers met to reach a consensus regarding the 11 photographs, which were coded differently. In cases where consensus was not reached ($n = 3$), a fourth researcher (AL) was consulted in order to facilitate the final decision.

Across photographs coded within the NOURISHING framework, $n = 63$ captured a single policy theme (e.g., only a theme representing Nfe1), $n = 23$ were coded as capturing two themes (e.g., Nfe1 and O1), and $n = 2$ - three themes (e.g., Nfe1, O1, and U1). Across photographs coded within the MOVING framework, $n = 35$ captured one policy theme, $n = 86$ captured two themes, and $n = 4$ - three themes. See Figures 1 and 2 for examples of photographs and captions.



FIGURE 1 Examples of photographs of policies targeting physical activity (PA) and healthy nutrition - captions and coding. Top left panel: a lack of policy solution (female, 16 years old, a rural - low SES area; coded as V5 and I6 from MOVING). Caption: *This photograph presents a lack of safe infrastructure to get, for example, to/from school; a cycling path should be created between our village and the town (i.e., where the school is).* Top right panel: a lack of policy solution (female, 16 years old, a rural - low SES area; coded as O7 from NOURISHING). Caption: *This photograph pictures a vending machine at the community sports center; unhealthy food products should not be available so easily, especially in places promoting physical activity.* Bottom left panel: a presence of policy solution (female, 16 years old, a rural - low SES area; coded as V2 and V6 from MOVING). Caption: *This photograph presents a public outdoor gym next to the school and a sports field, which provide an easy and cost-free opportunity for all the residents to be active.* Bottom right panel: a presence of policy solution (female, 17 years old, a rural-urban - low SES area; coded as Nfe4 from NOURISHING). Caption: *This photograph shows a section with healthy and affordable food options available in stores because of product positioning regulations (the sign says: fresh, healthy fruits and vegetables at a low price). Makes it easier for people to shop because most of the healthy products are located in one place, so they do not have to look all over the store, and they can be sure that these products are healthy. This is helpful, especially for those who do not recognize products with healthy ingredients.*

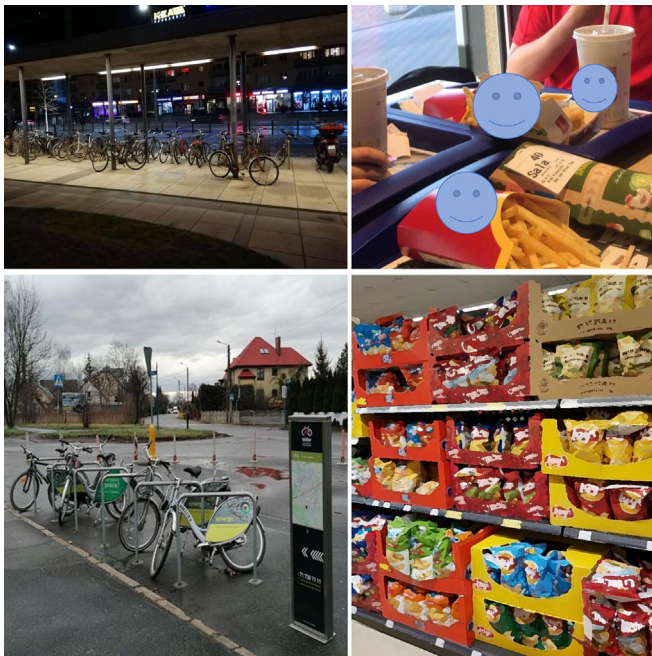


FIGURE 2 Examples of photographs of policies targeting physical activity (PA) and healthy nutrition - captions and coding. Top left panel: a presence of policy solution (female, 17 years old, an urban - high SES area; coded as V5 and I6 from MOVING). Caption: *This photograph shows a place where you can safely leave your bike (there is a plenty of room). Additionally, it is connected to a train station. Such infrastructure encourages people to be physically active (if they own a bike).* Top right panel: a lack of policy solution (female, 18 years old, a rural-urban - low SES area; coded as S4 and S6 from NOURISHING; a food brand logo is covered). Caption: *This photograph is supposed to emphasize that openings of new fast-food restaurants should be abandoned or regulated, and alternative places with healthy food options should be provided (especially for children).* Bottom left panel: a presence of policy solution (female, 17 years old, an urban - high SES area; coded as V5 and I6 from MOVING). Caption: *The photograph pictures easily available city bikes in the suburbs of our city, encouraging residents to cycle to other parts of the city.* Bottom right panel: a lack of policy solution (female, 18 years old, a rural-urban - low SES area; coded as R4 from NOURISHING; the photograph is blurred to cover the food brands). Caption: *This photograph shows that unhealthy snacks are placed in the center of the food market. There is a lack of regulations on the placement of salty snacks in the stores; healthy products should be placed there instead.*

3 | RESULTS

Of the 213 included photographs, $n = 88$ considered healthy diet policies (within which $n = 22$ represented existing public policies and $n = 66$ a lack of public policies), with 114 healthy diet policy themes identified. Regarding PA policies, $n = 125$ photographs were included ($n = 91$ capturing implemented public policies; $n = 34$ documenting a lack of public policies), with 219 PA policy themes identified.

3.1 | Awareness of presence of public policies addressing healthy diet

A total of 24 policy themes (representing 100% of the themes in the analysis presented in this section) were identified in $n = 22$ photographs. Table 1 provides the number of photographs that relate to each policy theme and the corresponding percentages for the NOURISHING domains (including subdomains - Table S1). For examples of photographs and captions provided by adolescents, see Figures 1 and 2.

Photographs and captions provided by youth documented the presence of healthy diet policies in seven out of the 10 domains of the NOURISHING framework. Across all photographs documenting the presence of respective policies, 33% of themes captured in the photographs dealt with policies related to setting incentives and rules to create a healthy retail and food service environment (S domain), with initiatives directed at increasing the availability of healthier food in stores and out-of-home venues (S2; for details, see Table S1) being the most often represented subdomain of all themes captured in the photographs representing the presence of healthy diet policies (25%).

The remaining 67% of policy themes were distributed across six domains. Specifically, 17% of themes captured in photographs referred to the use of nutrition label standards and regulations on the use of claims and implied claims on food (first N domain; in particular, all identified themes referred to on-shelf labeling), and 17% referred to restrictions on food advertising and other forms of commercial promotion (R domain). The remaining photographs captured themes from four domains (8% for each), including solutions related to: offering healthy food and setting standards in public institutions and other specific settings (O domain); using economic tools to address healthy food affordability and purchasing incentives (U domain); harnessing the whole food system and the sectors that influence it to ensure coherence with healthy eating (H domain); and informing people about food and nutrition through sustainable and multiple-channel public awareness campaigns (second I domain). Out of 67 subdomains of the NOURISHING, only 13 were captured in photographs and represented the presence of a healthy diet policy (Table S1). Three remaining domains (first I, second N, and G domains) of NOURISHING were not captured. See Figure 3 for the color-coded chart presenting the findings.

3.2 | Awareness of a lack of public policies addressing healthy diet

Overall, 90 policy themes (representing 100% of the themes in the analysis presented in this section) were identified in $n = 66$ photographs. Table 1 provides the number of photographs that relate to each policy theme and the corresponding percentages for the NOURISHING domains (including subdomains - Table S1).

Photographs and captions provided by youth documented a lack of healthy diet policies in seven out of the 10 domains of the NOURISHING framework. The policy themes most frequently captured (44%) in the photographs dealt with policies based on setting

TABLE 1 The number of policy themes and percentage of indications addressing respective themes across the NOURISHING domains.

The NOURISHING framework (N of photos = 88, N of policy themes = 114 ^a) Domains ^c	A presence of policy solutions						A lack of policy solutions																								
	Rural area ^b (n of photos = 6)			Rural-urban area ^b (n of photos = 9)			Urban area ^b (n of photos = 7)			Policy themes across the three areas (N of photos = 22)			Rural area ^b (n of photos = 20)			Rural-urban area ^b (n of photos = 30)			Urban area ^b (n of photos = 16)			Policy themes across the three areas (N of photos = 66)									
	Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e		Sum ^d	% ^e					
Food environment	0	0	2	2	2	2	25	4	17	2	6	1	3	0	0	0	0	3	3	0	0	0	0	0	3	3	0	0	3		
N - nutrition label standards and regulations on the use of claims and implied claims on food																															
O - offer healthy food and set standards in public institutions and other specific settings	0	0	2	20	0	2	0	2	8	1	3	2	5	5	26	8	9														
U - use economic tools to address food affordability and purchase incentive	0	0	1	10	1	13	2	8	0	2	0	0	2	5	0	2	2														
R - restrict food advertising and other forms of commercial promotion	0	0	2	20	2	25	4	17	3	10	14	35	1	5	18	20															
I - improve nutritional quality of the whole food supply	0	0	0	0	0	0	0	0	0	9	29	5	13	3	16	17															
S - set incentives and rules to create a healthy retail and food service environment	4	67	1	10	3	38	8	33	16	2	16	40	8	42	44																
Food system	2	33	0	0	0	0	2	8	0	0	0	0	0	0	0	0	0														
H - harness supply chain and actions across sectors to ensure coherence with health																															
Behavior change communication	0	0	2	20	0	2	8	0	2	8	0	0	2	11	2	2															
I - inform people about food and nutrition through public awareness																															
N - nutrition advice and counseling in healthcare settings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
G - give nutrition education and skills	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
Sum of indications across all domains	6	100	10	100	8	100	24	100	31	100	40	100	19	100	90	10															

Abbreviation: SES, socioeconomic status.

^aOne photo could capture more than one policy theme (policy theme represents a code from NOURISHING and MOVING framework, e.g., N1).^bRural area = representing low SES, rural-urban area = low SES, urban area = high SES.^cFor clarity the subdomains of the framework (e.g., N1) were not shown.^dThe number listed for each policy theme represents how many times the theme was identified in the photos and coded (e.g., number 4 means that four policy themes from S domain in a rural area were captured/coded); note that a single photo may contain multiple themes (e.g., N1 and O1), hence the number does not indicate the number of photos coded for a given theme.^eThe percentage listed represents the proportion of coded policy themes within each domain, relative to all themes coded across all domains (100%), e.g., in a rural area, 4 identified policy themes for S domain (presence of policy) represent 67% from all n = 6 (100%) coded policy themes within the NOURISHING in this area.

NOURISHING FRAMEWORK		MOVING FRAMEWORK			
FOOD ENVIRONMENT	N	Nutrition label standards and regulations on the use of claims and implied claims on food	M	Make opportunities and initiatives that promote physical activity in schools, the community and sport and recreation	
		➤ On-shelf labelling		➤ Physical education in the curriculum	
	O	Offer healthy food and set standards in public institutions and other specific settings		➤ Policies increasing PA in and outside of classrooms	
	U	Use economic tools to address food affordability and purchase incentive		➤ Community initiatives promoting PA across the life course	
	R	Restrict food advertising and other forms of commercial promotion	➤ Mandatory regulation of food advertising on non-broadcast communications channels		➤ Financial and non-financial incentives to promote PA
			➤ Mandatory regulation of food advertising through any medium		
			➤ Mandatory regulation of specific marketing techniques		
			➤ Mandatory regulation of marketing of specific food items and beverages		
		Improve nutritional quality of the whole food supply		O	Offer physical activity opportunities in the workplace and training in physical activity promotion across multiple professions
	I	➤ Voluntary reformulation of food products		V	Visualise and enact structures and surroundings which promote physical activity
	➤ Limits on the availability of high-sugar food products and beverages		➤ Design guidelines and regulations for buildings that prioritise equitable, safe, and universal access by all, that encourage occupants to be physically active		
	➤ ADDED during coding: Limits on the availability of high-processed salty snacks		➤ Active design guidelines outside building		
	Set incentives and rules to create a healthy retail and food service environment		➤ Active design guidelines for open/green space		
	➤ Incentives and rules for stores to locate in under-served neighbourhoods		➤ Walking and cycling infrastructure		
S	Set incentives and rules to create a healthy retail and food service environment	➤ Initiatives to increase the availability of healthier food in stores/out-of-home venues		➤ Sport facilities infrastructure	
		➤ Incentives and rules to offer healthy food options as a default in food service outlets		➤ Policies that support access to quality public open space and green spaces	
		➤ Planning restrictions on food outlets		I	Implement transport infrastructure and opportunities that support active societies
		➤ Voluntary agreements to create a healthy food service environment in specific settings		➤ Policies that support public transport	➤ Road safety actions including safety of pedestrians, cyclists etc
				➤ Policies promoting active transport	
			➤ Policies promoting active transport to and from school		
H	Harness supply chain and actions across sectors to ensure coherence with health		N	Normalise and increase physical activity through public communication that motivates and builds behaviour change skills	
BEHAVIOUR CHANGE COMMUNICATION	I	Inform people about food and nutrition through public awareness		G	Give nutrition education and skills
	N	Nutrition advice and counselling in healthcare settings			
	G	Give nutrition education and skills			

FIGURE 3 The coding results for the NOURISHING (left) and MOVING (right) frameworks are depicted using green and red colors to represent the top indications of policy themes being present (green) or absent (red) in adolescents' environments. A green and red color gradient was used when a policy theme was reported as frequently present and lacking at the same time.

incentives and rules to create a healthy retail and food service environment (S domain). Among the most frequently documented policy types, three out of five referred to the subdomains of the "S" domain (Table S1): 19% of policy themes indicated in the photographs addressed initiatives to increase the availability of healthier food in

stores and out-of-home venues; 11% of policy themes captured in the photographs related to incentives and rules to offer healthy food options as a default in food service outlets; and 10% addressed planning restrictions on food outlets (e.g., limit the opening of new fast-food outlets).

Two other domains of the NOURISHING, captured in the youth's photographs, were addressing policies related to: (1) restrictions on food advertising and other forms of commercial promotion (e.g., of soft or energy drinks for children; R domain) - 20% of themes captured this domain. Specifically 12% (the fourth most frequently indicated subdomain) of all photographs captured lack of mandatory regulation of specific marketing techniques (e.g., for salty and sweet snacks/beverages floor placement in stores or near cash registers; for details, see Table S1) and (2) a need to improve the nutritional quality of the whole food supply (first I domain) - 19% of themes were referring to this domain. Specifically 11% (the fifth most frequently indicated subdomain) of all photographs captured absence of limits on the availability of high-sugar food products and beverages. The additional subdomain added in the process of coding (addressing a lack of implementation of limits on the availability of high-processed salty snacks) was represented by 7% of themes.

The photographs also addressed policy themes from four more domains of the NOURISHING: "Nutrition label standards and regulations on the use of claims and implied claims on food (first N domain)" (3%); "Offer healthy food and set standards in public institutions and other specific settings (O domain)" (9%); "Use economic tools to address food affordability and purchase incentive (U domain)" (2%); and "Inform people about food and nutrition through public awareness (second I domain)" (2%). The remaining three NOURISHING domains (H, second N, and G domains) were not captured in adolescents' photographs. See Figure 3 for the color-coded chart presenting the findings.

3.3 | Awareness of presence of public policies promoting physical activity

Overall, 168 policy themes (representing 100% of the themes in the analysis presented in this section) were identified in 91 photographs. Table 2 provides the number of photographs that relate to each policy theme and the corresponding percentages for the MOVING domains (including subdomains - Table S2). For examples of photographs and captions provided by adolescents, see Figures 1 and 2.

Photographs and captions provided by youth document their awareness of implementing PA policies in three domains of the MOVING framework. Across all photographs documenting the presence of PA policies, 85% of the themes captured in the photographs dealt with policies considering visualizing and enacting structures and surroundings that promote PA (V domain). The four most frequently documented policy themes belonged to subdomains of the "V" domain (Table S2): 36% of policy themes indicated in the photographs addressed sports facilities infrastructure (e.g., designing guidelines that provide accessible and safe environments and infrastructure for PA - such as recreational sports facilities); 17% of policy themes captured in the photographs addressed active design guidelines outside buildings (e.g., planning of footpath network and outdoor gyms); and for public open and green spaces (e.g., designing guidelines for play/sports facilities, drinking fountains, and signage; 14%); another 14%

addressed walking and cycling infrastructure (e.g., safe and connected cycling paths).

The other domains that were captured in the photographs addressing PA policies included: (1) implementing transport infrastructure and opportunities that support active societies (e.g., promoting active transport; I domain), with 13% of policy themes captured in the photographs referring to this domain; and (2) making opportunities and initiatives that promote PA in schools, the community, and sport and recreation (e.g., physical education included in the curricula and mandated at the national level; M domain) - 2%. Photographs of the presence of PA policies did not capture the three remaining domains (O, N, and G domains) of the MOVING framework. See Figure 3 for the color-coded chart presenting the findings.

3.4 | Awareness of a lack of public policies promoting physical activity

Fifty-one policy themes (representing 100% of the themes in the analysis presented in this section) were identified in 34 photographs. Table 2 provides the number of photographs that relate to each policy theme and the corresponding percentages for the MOVING domains (including subdomains - Table S2).

Photographs and captions provided by youth documented a lack of PA policies in three out of six domains of the MOVING framework. Across all photographs documenting a lack of PA policies, 69% of themes captured in the photographs dealt with policies considering visualizing and enacting structures and surroundings that promote the PA domain (V domain) of the MOVING framework. Three most frequently documented policy themes were referring to the subdomains of the "V" domain: 24% of policy themes indicated in the photographs addressed designing guidelines and regulations for buildings that prioritize equitable, safe, and universal access by all, that encourage occupants to be physically active (e.g., lack of attractive alternatives available for moving staircases in public places; for details, see Table S2); another 24% of policy themes captured in the photographs addressed lack of walking and cycling infrastructure (e.g., lack of safe and well-connected cycling paths in the neighborhoods), 12% addressed lack of active design guidelines for open/green spaces (e.g., lack of guidelines regarding amenities or play/sports facilities for public green spaces).

The photographs also addressed a lack of PA policies included in such domains of the MOVING as: (1) the need to implement transport infrastructure and opportunities that support active societies (e.g., lack of facilities encouraging going to and from school with a bicycle; I domain), with 26% of policy themes captured in the photographs referring to this domain; and (2) the lack of opportunities and initiatives that promote PA in schools, the community, and sport and recreation (e.g., lack of financial and non-financial incentives to encourage young people to use public sport centers; M domain), with 4% of policy themes captured in the photographs referring to this domain. One domain, "Normalise and increase PA through public communication that motivates and builds behaviour change skills"

TABLE 2 The number of policy themes and percentage of indications addressing respective themes across the MOVING domains.

	A presence of policy solutions						A lack of policy solutions						Policy themes across the three locations (N of photos = 34)					
	Rural area ^b (n of photos = 31)		Rural-urban area ^b (n of photos = 35)		Urban area ^b (n of photos = 25)		Rural area ^b (n of photos = 10)		Rural-urban area ^b (n of photos = 13)		Urban area ^b (n of photos = 11)							
	Sum ^d	% ^e	Sum ^d	% ^e	Sum ^d	% ^e	Sum ^d	% ^e	Sum ^d	% ^e	Sum ^d	% ^e						
The MOVING framework (N of photos = 125, N of policy themes = 219 ^a)																		
Domains^c																		
Active societies	M - make opportunities and initiatives that promote PA in schools, the community, and sport and recreation	1	2	3	4	0	0	0	0	2	4	0	0	0	0	0	0	0
	O - offer PA opportunities in the workplace and training in PA promotion across multiple professions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Active environments	V - visualize and enact structures and surroundings that promote PA	50	94	54	79	38	81	142	85	10	71	14	64	11	73	35	69	
	I - implement transport infrastructure and opportunities that support active societies	2	4	11	16	9	19	22	13	3	21	7	32	3	20	13	25	
Active people	N - normalize and increase PA through public communication that motivates and builds behavior change skills	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	G - give PA training, assessment, and counseling in healthcare settings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sum of indications across all domains	53	100	68	100	47	100	168	100	14	100	22	100	15	100	51	100	

Abbreviations: PA, physical activity; SES, socioeconomic status.

^aOne photo could capture more than one policy theme (policy theme represents a code from NOURISHING and MOVING framework, e.g., M1).

^bRural area = representing low SES, rural-urban area = low SES, urban area = high SES.

^cFor clarity the subdomains of the framework (e.g., M1) were not shown.

^dThe number listed for each policy team represents how many times the theme was identified in the photos and coded (e.g., number 50 means that fifty policy themes from V domain in a rural area were captured/coded); note that a single photo may contain multiple themes (e.g., M1 and O1), hence the number does not indicate the number of photos coded for a given theme.

^eThe percentage listed represents the proportion of coded policy themes within each domain, relative to all themes coded across all domains (100%), e.g. in a rural area, 50 identified themes for V domain (presence of policy) represent 94% from all n = 50 (100%) coded policy themes within the MOVING in this area.

(e.g., by public campaigns, N domain), was rarely represented (2% of the captured themes). Photographs documenting a lack of PA policies did not address policies from the two remaining domains (O and G) of the MOVING framework. See Figure 3 for the color-coded chart presenting the findings.

4 | DISCUSSION

This Photovoice study provides evidence for adolescents' critical awareness of their local environment as a setting where numerous public policies operate jointly and where numerous policies are lacking or are still to be implemented. A sample of young people ($N = 41$) generated 213 photographs capturing 333 policy themes, documenting the presence or lack of obesity-related public policies targeting PA and dietary behaviors within their local environments.

Regarding obesity prevention policies related to food environment and healthy diet, adolescents documented a lack of a policy (90 policy themes, 66 photographs) three times more often than implemented, already operating policies (24 policy themes, 22 photographs). The indication of a lack of implementation of healthy food environment policies is consistent with the findings of Pineda and colleagues,¹⁶ who found that Poland has a poorer implementation of public policies promoting a healthy food environment compared with such European countries as Estonia, Finland, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, or Spain.

Public policies representing the NOURISHING domains referring to setting incentives and rules to create a healthy retail and food service environment (S domain) and restrictions on food advertising and other forms of commercial promotion (R domain) were most frequently indicated by adolescents as not operating in the local environment, but at the same time several policies representing these domains were indicated as already implemented. These findings highlight the importance of these two domains as recognized and critically appraised by youth as requiring further attention of the stakeholders, youth political activism, engagement in a dialog or working together with other stakeholders to develop and refine new policy ideas.²² The policies from the two domains can be considered agento-structural policies.²³ Agento-structural policies require some human agency, for example making a conscious choice by a consumer to buy a product X instead of a product Y, in an environment where some food choice editing strategy was already imposed by policies.²³ Structural policies (e.g., a ban on the sale of products A and B at schools; no conscious consumer choice is needed) and agento-structural nutrition policies have a higher potential to reduce social inequalities in obesity than agentic nutrition policies (e.g., healthy eating campaigns at schools; the policy relies on conscious efforts of the consumer to get educated), which are often more feasible for those who are better educated or/and have more (financial) resources.²³

A recent study also conducted in Poland, but using a different food framework of good policy practices and interviews with policymakers, researchers, and practitioners from the field of nutrition and food environment, indicated weak or very weak nutrition and

food environment policies from the same areas (e.g., initiatives to increase the availability of healthier food in stores and out-of-home venues).²⁴ The similarities may indicate that critical awareness of youth is shared by other stakeholders involved in a dialog on improving food environment policies and preventing childhood obesity more effectively.

Regarding public policies promoting PA, adolescents more frequently documented operating policies (168 policy themes, 91 photographs) than a lack of policies (51 policy themes, 34 photographs). The most frequently documented public policies related to the presence and absence of policies in the MOVING domains focus on two areas of the framework. These areas are: promoting physical activity through structures and surroundings (V domain) and providing transport infrastructure and opportunities that encourage active lifestyles (I domain). It may be interpreted as young people's critical awareness that much is being done, but more structural changes to promote active behaviors are needed. The adolescents mostly focused on structural policies. Structural policies aim to move away from the paradigm²³ of personal responsibility, such as deciding on an education program or sharing information about physical activity guidelines. Instead, the focus is on developing and implementing structural changes in the physical environment that may benefit all members of the community, regardless of their status and capabilities. Structural obesity prevention policies are likely to reduce social inequalities in obesity as they do not require additional resources, which may be constrained in low SES groups.²³ A recent analysis of PA-promoting public policies in Poland indicated that across domains, Polish policies that are relatively well implemented include structural policies (developing team-sports facilities for youth in each commune), along with agentic policies (PA promotion via local sport animators and education programs at schools to attend physical exercise classes).²⁵ Another recent study using a different PA framework and conducted by means of interviews with European policymakers and researchers from the field of PA policies indicated that the most important policy domains refer to transport and urban design (both refer mostly to structural policies) as well as PA education policies.²⁶ Besides similarities that indicate that the critical awareness of youth is shared by other stakeholders involved, youth clearly prioritize structural policies that may have the highest potential to reduce health inequalities.²³ Prioritizing education policies (over, e.g., changes in urban design and broadening cycling paths) may be related to policymakers' perceptions that such policies are easier to implement and thus are more feasible.²⁶ Adolescents' focus on structural policies in our study might be influenced by the procedures of our study. Photovoice was preceded by Youth Alliance meetings where young people were asked to discuss policies that help "everyone" in their community, which could sensitize adolescents to actions that affect those people who have less resources (e.g., time) or limited capabilities (e.g., learning skills) and thus are less likely to enroll in extracurricular education programs (or other agentic policies, requiring their own resources and effort).

Several types of obesity prevention public policies, documented by youth in their Photovoice research, involve structural changes and do not require high self-regulatory effort invested by an individual.²³

Structural policies, such as changes to the physical environment as public food procurement and editing food choices, are considered to reduce socioeconomic inequalities in obesity and obesity prevention actions.²³ In contrast, policies relying on conscious self-regulation may increase socioeconomic inequalities in weight gain.²³ Does it matter if adolescents are critically aware of structural policies and invest a conscious effort in documenting them using Photovoice? First, this study enrolled adolescents to identify perceived gaps in the implementation of obesity prevention policies that are operating in their local environment. The perceived absence of policies may be a first step in the process of advocating for new policies. Second, the study was conducted in the context of youth empowerment to co-create policies by adolescents involved in Youth Alliances.^{5,19} Considering this specific context, it is essential for young individuals to examine and evaluate different policies, such as structural, agentic, and agento-structural policies that they perceive to be missing or present in their community. The ultimate goal of the CO-CREATE research was to recognize what can be done and empower young people to (photo)voice their concerns (e.g., about a lack of certain policies that fit young people's needs).

The findings indicate some gaps in the policy themes identified during this Photovoice study: the photographs did not capture two domains of the NOURISHING (“Nutrition advice and counselling in healthcare settings [N]” and “Give nutrition education and skills [G]”) and two domains of the MOVING (“Offer PA opportunities in the workplace and training in PA promotion across multiple professions [O]” and “Give PA training, assessment and counselling in healthcare settings [G]”). Adolescents did not address these domains, neither in the photographs of the presence of a policy nor in those that documented a lack of a public policy. It is possible that the domain addressing workplace opportunities was not addressed in photographs as it was less relevant for adolescents themselves (e.g., compared with school-related policies). A lack of photographs capturing these policies may partially result from difficulties in taking photographs of counseling or training-related policies. However, the ways the photography was used during this Photovoice study were designed to increase the likelihood of capturing complex policy processes in the local environment. First, young people were invited to take photographs that represent the environment where there is a lack of a policy (either the policy had not been developed or it had not been implemented at the time of the study) or where the policy is in place and operating. Second, they were asked to provide one–two sentences summarizing their conclusions and insights/thoughts regarding the photograph's content. For example, the photograph could have pictured a school building, and the caption could refer to the absence of education policies at schools (referring to either PA or a healthy diet). The use of photos and voice (caption) enables the effective presentation of policies that may not be easily conveyed through photographs alone. Finally, young people were not instructed to present all possible public policies but to record their insights about a few policies (or a lack thereof) that focused their attention at a particular moment. Although examples of already implemented policies were discussed with youth before taking photographs, participants were not formally trained in

policy implementation theories or research; thus, the policy themes represent young people's perceptions and interpretations of their environment. In sum, the collected data and our findings should not be interpreted as documenting a lack of critical awareness of some policies but rather as findings that inform about the policy themes that are central to young people's perceptions.

Our study has a number of limitations. Because of a relatively small number of adolescents enrolled in the Photovoice in low SES locations (rural and mixed rural–urban environments) and high SES locations (urban environments), and consequently a limited number of photographs per policy domain in low SES (rural) versus high SES (urban) areas, we were not able to conduct an analysis of differences between locations varying in economic and land structure. The data were collected in one country only, and the majority of participants were young women. The perception of the environment and prioritization may differ between genders. Findings may be country-specific; previous research on the evaluation of the implementation of food policies by adult stakeholders indicates that across food policy domains, countries such as the Netherlands or Norway may have a higher level of implementation of healthy nutrition policies than Poland.¹⁶ As Photovoice was conducted as a part of meetings of Youth Alliances (YPAR activities addressing obesity prevention), the content of Alliances' discussions regarding public policies preventing obesity (see Section 2) that took place prior to Photovoice could influence the content of the photographs. The content of the discussion varied across the locations and meetings, as it was proposed by the participating adolescents. The convenience character of the sample and its specificity (young women from Poland involved in YPAR activities) limits the generalization of results. The adolescents' motivation to join the study might influence the study's results. Unfortunately, we did not investigate these motives in a systematic way. Future studies involving adolescents from other countries, controlling for prior knowledge about obesity-related public policies and motivations to engage in policy-related research, are needed. The question remains open whether various stakeholders, such as adolescents and government representatives, have different levels of awareness regarding the existence or lack of implementation of policies related to obesity prevention. This awareness may also vary between different countries. Although participants were discussing their photographs during the Youth Alliances meetings, the coding of policy themes was conducted by researchers only (without involving youth), and the findings were not validated by the members of the Youth Alliances. The YPAR guidelines require adolescents' involvement in any data analysis, and this condition was not fulfilled in the present study. Further in-depth qualitative studies are needed to distinguish between the frequency of capturing a respective policy theme in Photovoice and adolescents' prioritization of a specific public policy action to prevent obesity.

5 | CONCLUSIONS

This study offers new understanding of adolescents' critical awareness of public policies aimed at preventing obesity in their surroundings.

Critical awareness of obesity prevention policies is a first step for young people on their way to political engagement. Using a YPAR approach and the Photovoice method, young people documented both existing obesity prevention policies and those that are missing and/or require better implementation. Young people indicated that the policy solutions related to the domains of NOURISHING and MOVING frameworks are relevant to them. These policies include: creating a healthy environment for retail and food service through incentives and regulations, limiting advertisements for unhealthy food products, promoting physical activity through structures and surroundings, and providing transportation infrastructure that encourages active lifestyles. These findings suggest that adolescents are critically aware of particular structural PA policies and structure-agent food environment policies, both of which have a higher potential to reduce obesity-related inequalities.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest statement.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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