Beïnvloedende factoren van het eetgedrag van kinderen en adolescenten in Sacaba, Bolivië

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Voorwoord

Eind 2022 vroeg prof. dr. Peter Decat mij om mee te werken aan een studie rond cardiometabole gezondheid in Sacaba, Bolivia, gefinancierd door VLIR-UOS. Tijdens mijn verblijf in Bolivië werd besloten dat mijn bijdrage zou focussen op eetgedrag bij kinderen en adolescenten. Samen met Silke Cnockaert (masterstudente Global Health), dr. Christine Leyns (Universiteit Gent) en sociologe Shirley Rasguido (Universidad Mayor de San Simón), maakten we een studieprotocol en voerden dit uit tussen februari en mei 2023. Na mijn terugkeer in België startte ik de huisartsenopleiding. Tussen 2023 en 2026 verwerkte de verzamelde data tot onderstaand artikel (p6-27), met de hulp van Silke Cnockaert (opstellen van de codeboom), ir. Sarah Croes (wetenschapster bij Sciensano, zij hielp met de statistische analyse), en onder supervisie van prof. dr. Peter Decat en prof. Maïté Verkest.

Ik merkte bij mezelf, andere HAIO's en zorgverleners doorheen mijn opleiding dat overgewicht en obesitas bij kinderen en jongeren terugkerend thema is. Artsen lopen er vaak op vast, zowel in de detectie als in de aanpak. Vanuit het Boliviaanse onderzoek had ik geleerd dat de omgeving en de multifactoriële context een gigantische invloed hebben op het eetgedrag van jongeren, dat het hele gezin betrokken moet worden, dat de zorgverlener moet vertrekken vanuit de hulpvraag en werken via motivationele gespreksvoering. De focus moet hierbij liggen op "gezonde groei" in plaats van op "overgewicht".

In het laatste jaar van mijn opleiding werkte ik in een multidisciplinaire huisartsenpraktijk in volle omvorming van prestatie- naar forfaitair systeem. Samen met collega verpleegkundige Gladys Vermeulen werkten we een zorgpad uit, in het kader van mijn masterthesis en haar opleiding tot praktijkverpleegkundige aan de Arteveldehogeschool Gent. Het addendum (p 34) beschrijft dat project: de aanpak van overgewicht en obesitas bij kinderen en adolescenten in Medisch Centrum De Horizon in Jette.

Het was een ontzettend interessant project, waarvan ik zowel als mens en als huisarts veel heb bijgeleerd. Ik wil daarom bovengenoemde personen maar ook alle deelnemers van het onderzoek, het school- en gezondheidspersoneel van Guadalupe en Larati uitvoerig bedanken, voor hun openheid en samenwerking.

Janne De Vestele

Abstract

Inleiding

Overgewicht en obesitas bij kinderen nemen wereldwijd toe, met name in lage- en middeninkomenslanden. Kinderen met overgewicht of obesitas lopen een verhoogd risico op het ontwikkelen van niet-overdraagbare ziekten op volwassen leeftijd. In Zuid-Amerika gaat deze trend gepaard met een aanhoudende prevalentie van ondervoeding, wat resulteert in een zogenaamde 'dubbele last' van ondervoeding. In Bolivia is onderzoek naar het eetgedrag van adolescenten tot op heden beperkt gebleven en grotendeels kwantitatief van aard. Deze studie beoogt de beïnvloedende factoren van het eetgedrag van kinderen en adolescenten tussen 10 en 18 jaar in Sacaba, Bolivië, vanuit meerdere perspectieven te onderzoeken.

Methode

Tussen maart 2023 en april 2024 werd een kwalitatief onderzoek uitgevoerd in twee openbare scholen — één in een landelijke en één in een stedelijke gemeente — in Sacaba, Bolivië. De dataverzameling omvatte BMI-metingen (n=906), voedingsvragenlijsten (n=166) en semigestructureerde interviews met adolescenten, ouders, leerkrachten en zorgverleners (n=24). De kwalitatieve data werden thematisch geanalyseerd aan de hand van het sociaal-ecologisch model, waarbij inductieve en gerichte inhoudsanalyse werden gecombineerd.

Resultaten

In deze casestudy had ongeveer één op de vier leerlingen van de stedelijke school overgewicht of obesitas, terwijl de meerderheid van de leerlingen op de landelijke school een normaal gewicht had. Het eetgedrag was over de scholen heen grotendeels vergelijkbaar. Uit de interviews bleek dat adolescenten zich bewust zijn van gezonde voeding, maar praktische obstakels — zoals tijdgebrek en financiële beperkingen — alsook smaakvoorkeuren belemmerden hen in het omzetten van deze kennis naar gedrag. De thuis- en schoolomgeving kwamen naar voren als belangrijke determinanten: de ruime beschikbaarheid van ongezond voedsel via schoolkantines en straatverkopers stimuleerde de consumptie van energierijk voedsel. Op maatschappelijk niveau speelden de verschuiving in het voedingspatroon richting bewerkte voedingsmiddelen, blootstelling aan media en veranderende werkroosters — die leidden tot verminderde aanwezigheid van ouders — een belangrijke rol. Financiële middelen en de woonomgeving (landelijk versus stedelijk) fungeerden als modererende factoren die de determinanten op alle niveaus beïnvloedden.

Discussie

Hoewel individuele factoren relevant bleken, oefenden de school- en thuisomgeving de grootste invloed uit op het eetgedrag van adolescenten. Interventies dienen dan ook verder te reiken dan individueel gerichte benaderingen en zich te richten op de voedselomgeving in brede zin, waaronder schoolbeleid, de beschikbaarheid van voedsel en sociaaleconomische randvoorwaarden. Cultureel verankerde strategieën die traditionele voedingspatronen bevorderen en de samenwerking tussen scholen, gezinnen en lokale stakeholders versterken, kunnen gezonder eetgedrag ondersteunen. Aanvullend onderzoek met grotere en meer diverse steekproeven is noodzakelijk om contextspecifiek beleid in Bolivia verder te onderbouwen.

Introduction

Childhood overweight and obesity prevalences are rising rapidly worldwide, putting pressure on healthcare systems and increasing disease risks. Overweight and obese children and adolescents are about five times more likely to be obese in adulthood and are at a higher risk to develop non-communicable diseases (NCDs) and mental health problems such as depression (1-3).

The prevalence of overweight among school-aged children and adolescents has more than doubled since 2000. Based on the latest estimates, UNICEF published that in 2025, one in five adolescents worldwide were living with overweight, and that obesity in the 5-19-year age group exceeded underweight for the first time (9.4% versus 9.2%). The most pronounced increases in overweight are occurring in low- and middle-income countries (3).

In 2017, approximately 42.5 million (20%) of Latin American children aged 0 – 19 years were estimated to be overweight or obese, and this rate is expected to rise (4, 5). A phenomenon known as the 'nutrition transition' has been described globally as being associated with this rising prevalence of overweight and obesity (3, 4, 6, 7). This trend, characterized by a dietary shift from locally sourced foods toward energy-dense, processed foods is increasingly evident in Latin America (4,5,8).

Across Latin America, the growing epidemic of childhood obesity exists alongside the enduring problems of undernutrition and stunting, together constituting a double burden of malnutrition (4, 5). Wasting (i.e., low weight for height) reflects acute undernutrition, while stunting (i.e., low height for age) is caused by chronic undernutrition especially during the first 1000 days of life (9).

This double burden is clearly evident in Bolivia, where both forms of nutritional imbalance continue to affect children's growth and health outcomes (10,11,12). Efforts over the past decades have primarily focused on undernutrition, reflected in a reduction in child stunting from 33% in 2000 to 11.1% in 2022, and underweight from 5.8% in 2003 to 3.4% in 2016 (13). Nevertheless, new nutritional challenges have emerged: childhood (0-5 year) overweight raised from 9.2% in 2003 to 10.1% in 2016 (13). In a 2020 report by UNICEF and the Bolivian Ministry of Health, which included 5,268 children aged 5–19 years, 22% were classified as overweight, 13% as obese, and 8% as stunted (14). Urban areas showed a higher prevalence of overweight (23.7% vs. 18.4%) and obesity (15.6% vs. 8.3%) compared to rural areas. In the Cochabamba region, 34.7% of children were reported to be affected by overweight or obesity, with only 1% showing signs of undernutrition (14).

The initiatives previously implemented in Bolivia to combat undernutrition should now be complemented with targeted actions to prevent and reduce obesity in children and adolescents. Understanding personal and environmental factors influencing adolescent eating habits, is key in the development of effective, context-specific policies and interventions (2, 15, 16).

Existing research on nutrition in Bolivia has primarily relied on quantitative methods, focusing largely on BMI data—especially among children under five—and on general dietary patterns (8, 10-14). For instance, a cross-sectional study conducted in Cochabamba in 2023 identified two

main dietary patterns: a diet based on whole grains and plant-based foods (37%) and a calorie-rich, nutrient-poor diet (63%) (8). While these studies provide epidemiological insights, they may fail to capture the culturally specific factors that shape eating behaviors. Qualitative research could offer a deeper understanding by mapping the social, cultural, and environmental determinants of adolescent eating behavior in order to get a comprehensive view on the factors influencing these behaviors (15-16, 20). While such determinants have been explored in qualitative studies from other South American countries (18,19), comparable research from Bolivia is scarce. In addition, previous studies were either restricted to small, urban samples, or relied on a single perspective, without including healthcare providers views. Therefore, this study explores the factors influencing eating behavior among adolescents from the perspective of different actors from both a rural an suburban school in Sacaba, Bolivia, through qualitative research.

We focused on adolescents aged 10 to 18 years because, compared to younger children, they are more in control over their food selection, consume more food outside their home and may be more susceptible to interventions that influence food choices (20). Parents (especially mothers) were interviewed because of their central role in acquiring and preparing food (21, 22). Teachers and healthcare providers of both rural and suburban areas were interviewed given their important role in health education and preventive health visits (18).

Materials and methods

The study received ethical approval from the Ethical Committee of Ghent University Hospital (THE-2023-0132). The COREQ checklist (see Appendix) was consulted to guide the reporting of this study (23).

Study setting

Data collection was done between March 2023 and April 2024 in two public schools in Sacaba, Bolivia, serving children aged 4 to 19 years. Sacaba is a rapidly growing mixed rural–urban municipality in the department of Cochabamba, located in an Andean transition zone between the urban valley and tropical region. The population in Cochabamba is socioeconomically diverse, with lower-income groups concentrated in peripheral areas, particularly in the south, where a higher prevalence of calorie-rich diets has been observed (8).

According to governmental data from 2018, approximately 532,000 children aged 5 to 18 years are enrolled in schools in Cochabamba, of whom 69% attend urban schools (14). The rural school is located in the community of Larati, situated at 3,500 meters above sea level, and enrolls approximately 200 students. The suburban school is located in the Guadalupe neighborhood at 2,600 meters above sea level and enrolls around 800 students.1

Research team and reflexivity

This study was conducted as part of a larger research project on cardiometabolic health in Sacaba, Bolivia, a collaboration between Ghent University and the Universidad Mayor de San Simón, funded by VLIR-UOS. The research team consisted of three female Belgian researchers (JDV, SC, CL), one of them residing in Bolivia (CL), and one female Bolivian researcher (SR). It was supervised by two Belgian professors (PDC and MV), both holding PhDs.

The lead researcher (JDV) worked as a general practitioner in Belgium, while SC had a background in psychology and health promotion. As such, they were well-versed in health behavior, but lacked insight into the local cultural and health context. This was remediated by the Bolivian researcher (SR), a native Spanish and Quechua speaker, active as a sociologist and knowledgeable about the municipality of Sacaba.

Study design and data collection

Data collection comprised three components: semi-structured interviews, diet questionnaires and BMI measurements.

Semi-structured interviews were conducted with adolescents, parents, teachers, and healthcare providers to explore factors influencing adolescents' eating behaviors in depth. In addition, self-administered questionnaires with open-ended questions were used to capture students' dietary behaviors, complementing the interview data (27,28). BMI measurements were conducted among all students older than 5 years to assess weight status in both schools.

[1] Derived from: https://sites.google.com/view/ueguadalupesacaba/

First, the research was presented at the school's parent and teacher committee meetings, to provide information and build trust with stakeholders. Following written informed consent from these committees, school visits were organized to conduct interviews with teachers and adolescents, perform BMI measurements and distribute questionnaires among adolescents. These were complemented with interviews with parents attending the participating schools, conducted at the school gate, as well as with healthcare providers from the nearby health center. After data collection, educational sessions on healthy eating and cardiovascular prevention were conducted at both schools. These sessions aimed to share preliminary findings related to BMI measurements and dietary behaviors. Parents of students with undernutrition or obesity were notified individually through the healthcare center.

Diet questionnaires were distributed to primary and secondary school students from classes randomly selected by teachers. Older students completed the questionnaires independently, while younger students were assisted by their teachers. Additionally, researches distributed questionnaires during break times to students willing to participate.

Interview participants were recruited using convenience sampling, with efforts to ensure variation in age and gender. Adults were approached directly, while adolescents were invited by teachers or members of the research team. Data collection continued until thematic saturation was reached. Interviews were conducted in Spanish and Quechua by JDV, SC, and SR, and lasted approximately 30 minutes.

Measurements

Anthropometric data (weight, height, age, and sex) were collected for all students present on a fixed project day for each school by a team of nursing students and the school's physical education teacher. Equipment was calibrated and the nursing students were trained beforehand. Regarding the anthropometric measurements, 0.5 kg was subtracted to account for the weight of clothing, and 0.5 cm was subtracted to correct for the thickness of the shoe soles. Gender and age data were provided by the school's official students lists.

The diet questionnaire (see Appendix) assessed foods consumed during each meal the previous day, the location of where the meals were eaten, with who, and whether respondents perceived these food choices as healthy or not.

A semi-structured interview guide was developed to explore adolescents' dietary habits (e.g., foods consumed the previous day) and adults' perceptions of adolescents' eating habits. The influencing factors were examined by probing reasons for food choices and the social and physical contexts in which meals were consumed. Following topics were addressed: nutrition-related knowledge, home and school food availability, sociocultural food practices, and perceived facilitators of healthier eating.

Data analysis

BMI was calculated applying the standard formula. For children 0-11 years, weight classifications were based on gender-specific BMI-for-age z-scores according to the WHO Child Growth Reference, with > +1 SD indicating overweight, > +2 SD indicating obesity, between –2 SD

and +1 SD indicating normal weight, and < –2 SD indicating wasting. Stunting was defined as a height-for-age z-score < –2 SD (24). For adolescents 12-19 years, BMI references were derived from the Bolivian Anthropometric Standards for adolescents 12-19 years (25,26). Statistical analysis was performed in R version 4.2.2., using R Studio software. Welsh's t-tests were used to correct for the unequal sample sizes. In age groups where normality of BMI distribution was uncertain, Wilcoxon Rank-Sum tests were used. To compare the prevalence of weight categories between the rural and suburban school, Chi-square tests were performed. A p-value less than 0.05 was considered to be statistically significant.

All interviews were audio-recorded, pseudonymized, and transcribed verbatim. Interview transcripts were analyzed using NVivo software (version 14). The questionnaires' responses were analyzed qualitatively, using Microsoft Excel. Data analysis was guided by the socio-ecological model, which considers individuals as part of larger social systems and highlight the interactions between individuals and their environments that influence health outcomes. This model has been widely applied to study dietary behavior including different interacting levels ranging from the individual to the macro level (17, 29-32). An initial coding tree was developed through conventional content analysis, with codes inductively derived from the data by two independent researchers (JDV and SC), in collaboration with the wider research team (CL, PD, MV). Subsequently, directed content analysis was applied by comparing the identified categories with an existing conceptual framework on adolescent eating behavior, developed and validated in Ecuador through a comparable qualitative study (47).

Results

BMI measurements

All students who were present on the day of measurement were included in the BMI measurements. A total of 906 students were included in the final analysis: 167 from the rural school (45.5% male, 54.5% female) and 739 from the suburban school (53.4% male, 46.6% female).

The mean BMI (kg/m^2) in age groups 12, 13 and 14 years was significantly higher in the suburban school compared to the rural school (21.3 vs 17.2; 21 vs 18.4 and 22.2 vs 17.9 ; p-value <0.001) (Table 1).

A higher overall prevalence of obesity among males (15.3% vs 2.6%, p<0.001) and overweight among both females (17.8% vs 6.6%) and males (16.5% vs 1.3%, p<0.001) was found in the suburban school of Guadalupe compared to the rural school of Larati (Table 2).

Regarding undernutrition, the prevalences of stunting and wasting were 6.6% and 9.6% in rural Larati versus 2% and 5.3% in suburban Guadalupe. A higher proportion of children in the rural school had a normal weight compared to the suburban school (82.4% vs 67.7% among females and 84.2% vs 62.1% among males, p <0.001) (Table 2).

Table 2: Nutritional status according to gender and school

	Stunting (%)		*Wasting (%)*		*Normal weight (%)*		*Overweight (%)*		*Obesity (%)*	
Gender	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*
Suburban (Guadalupe) *N female: 359* *N male: 412*	1.1	0.9	3.3	4.1	67.7	62.1	17.8	16.5	10.0	15.3
Rural (Larati) *N female: 91* *N male: 76*	3.6	3	3.3	9.2	82.4	84.2	6.6	1.3	3.3	2.6
P-value	*Not calculated*		0.342	0.116	0.009	P<0.001	0.013	P<0.001	0.067	0.005

Dietary behaviors of adolescents

A total of 166 questionnaires about dietary behavior were completed by children between the age of 9 and 19 years (91 in the suburban and 75 in the rural school).

Breakfast typically consisted of hot beverages like tea or coffee, bread, or a hot meal such as soup or rice. Morning snacks included the desayuno escolar (snacks provided by the government) as well as cookies, fries and empanadas (pastry), bought from the school's food shop or street vendors. Fruits, sweets and fries were often mentioned as afternoon snacks. Lunch and dinner were often consumed at home, and primarily consisted of meal soups and carbohydrate-rich dishes based on rice, potatoes, and noodles.

Dietary behaviors in both schools were similar (see Table 3). However, in the suburban school, fast foods like fried chicken, pique macho2 and pizza were more commonly reported compared to the rural school. In the suburban school, the free school snack ('desayuno escolar') consumption was lower compared to the rural school (75% vs 92%), and both regions had a high rate of breakfast skipping (approximately 20%). Adolescents from the suburban school reported a slightly higher meat consumption (mainly poultry) during lunch and dinner (55 vs 43%). In the rural school, 25% of the respondents identified traditional dishes like chuño, papa huiaco and papalisa3 as healthy (in the suburban school, this was 5%). Fruit and vegetables, and "natural" products were given as other examples of healthy foods.

Factors influencing eating behaviors

A total of 24 participants were included across 22 interviews. In the rural area, nine interviews were carried out involving four adolescents, two teachers, two parents, and one nurse. In the suburban area, twelve interviews were conducted with four adolescents (including two dyadic interviews), two teachers, six parents, the school's janitor, and one nurse. In addition, the municipal education officer of Sacaba was interviewed. Findings from these different participant groups and settings are presented collectively, structured according to societal, environmental, and individual factors, as well as broader moderating influences on eating behavior (Figure 1).

1. Individual factors

Attitudinal beliefs: perceived benefits

Across all participant groups, diets based on natural and minimally processed foods were consistently perceived as healthy. Adolescents from both schools emphasized the importance of balanced meals rich in fruits and vegetables and low in fats and added sugars, and many linked healthy eating to physical growth and development.

> *"It also helps our body, and if we don't always eat healthy food, the body does not develop properly. If we eat healthy, we develop well, strong and healthy." (Girl 3, 11 years, Guadalupe)*

[2] Pique macho: French fries topped with beef or sausages, eggs, tomatoes, mayonnaise, ketchup

[3] Chuño: Freeze-dried Andean potatoes. Papa huiaco: Traditional potato and meat stew. Papalisa: Mashed or boiled potato dish with herbs. *Traditional foods/Chuño.* FAO. https://www.fao.org/4/i1466e/i1466e.pdf

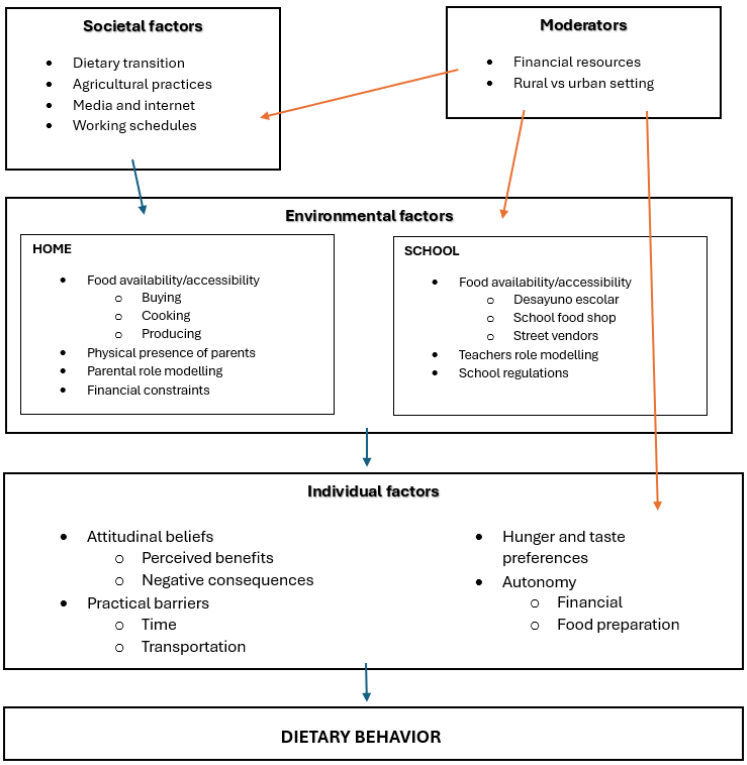


Figure 1: Factors influencing dietary behavior among children and adolescents in Sacaba, Bolivia

Attitudinal beliefs: negative consequences

Concerns about the health consequences of unhealthy dietary habits were frequently expressed by adolescents. In the suburban school, some students additionally perceived street foods as harmful due to uncertainty about hygiene and preparation methods.

> *"It [eating healthily] can even lead to high blood sugar, developing diabetes from drinking soda, and in addition, drinking too much can affect your lungs and damage them." (Boy 2, 18 years, Larati)*

Practical barriers

Despite this awareness, all participant groups acknowledged that adolescents commonly consume junk food and sugar-sweetened beverages in place of healthier options such as fruit or salads. Time constraints emerged as a key barrier to healthy eating, as both students and teachers reported frequently breakfast skipping and reliance on quick, less nutritious foods due to late waking times or insufficient time to return home during school breaks.

> *"There's no time because we have classes in the morning, and shortly after, we have them in the afternoon. So, sometimes there's no time to go home for lunch, and I simply don't eat anything." (Girl 4, 17 years, Guadalupe)*

Hunger and taste preferences

Experience of hunger during school time was frequently reported as a reason to purchase

snacks and street food. Additionally, many adolescents expressed a preference for junk food and sugary drinks over healthier options like fruits or salads.

> *"[I bought this] because I was hungry. Because I didn't like anything. I only like jelly, which I know, so I eat it. I don't eat anything I don't know." (Girl 1, 11 years, Larati)*

Autonomy
Participants from both schools reported that children receive pocket money from their parents or, in a minority, earn it themselves, allowing them to buy foods at school and in nearby food shops.

> *"The older kids already have their own money and buy whatever food they like: hot dogs, sandwiches, soda, while the younger ones go more for sweets." (Father 1, Guadalupe)*

Additionally, adolescents demonstrated self-reliance in cooking, independently or with siblings.

> *"Sometimes my mom isn't home and I make the food."* ... *"Eh, rice, potatoes, and meat." (Boy 3, 11 years, Guadalupe)*

Peer influences
Peer influence was mentioned by a few participants. Some older students reported consuming unhealthy foods such as fast food and alcoholic or sugary drinks, when eating out with friends.

> *"On weekends, I sometimes go out, and I go to eat with my friends, and we eat ice cream." (Girl 1, 11 years, Larati)*

One student who had participated in educational sessions organized by a local NGO (CENDA4), reported actively sharing nutrition-related knowledge with peers.

2. Environmental factors

From the interviews, adolescents' home and school emerged as the main environments where foods are eaten and food choices are made.

2.1. Home environment

Availability and accessibility
Across both schools, most students reported eating whatever food was served at home, highlighting the central role of the household in shaping adolescents' diets. The availability of food at home roughly depends on what families are able to buy, cook or produce themselves, with mothers most often responsible for food preparation.

> *"Because sometimes there isn't enough to make soup, so she [my mom] makes rice. And likewise, when there isn't any rice, she makes soup." (Boy 3, 11 years, Guadalupe)*

[4] CENDA is a Bolivian non-governmental organization that promotes food sovereignty, agroecological practices, and collective land and water rights among rural and Indigenous communities through research, advocacy, and participatory action. https://www.cenda.org/

Physical presence of parents

The physical presence of parents was identified as a key determinant of adolescents' food choices. However, since many parents work away from home during daytime, adolescents often have to prepare food themselves or rely on siblings, typically resulting in simple dishes such as rice or fries. In the rural area, the same evening-cooked meal is sometimes reheated and eaten at breakfast and lunchtime, as families engaging in agricultural activities experience time and transportation constraints.

> *"When my children were little and I wasn't working, I took care of them and cooked for them. I made sure they were well fed. Now that I work, we can no longer return to our healthy diet." (Mother 6, Guadalupe)*

Parental role modelling

Teachers and healthcare providers expressed concern about the limited dietary diversity provided to children, particularly insufficient vegetable intake. They attributed this to a combination of limited nutritional knowledge among parents and practical considerations such as time or financial constraints. Parents from both regions nonetheless stressed their intention to provide healthy diets through home-cooked meals whenever possible.

> *"It depends on the family, but in my family, I cook as healthily as I can." (Mother 5, Guadalupe)*

Financial constraints

Financial constraints emerged as a recurrent theme across interviews. Teachers and healthcare providers reported that many families struggle to prepare varied and healthy meals due to limited incomes, unstable employment, large household sizes, and demanding work schedules. Some parents, especially from the rural area, also mentioned restricted access to fresh food markets because of transportation costs and distance. At the same time, healthcare providers in the rural school noted that families' financial situations appeared to have improved in recent years, partly facilitated by better access to transport and periodic local markets.

> *"It depends. I cook special meals only when we have money, when my husband gets paid, which is once a month. Otherwise, we eat the same thing every day: lentils, meat stew with potatoes. That's how it is." (Mother 4, Guadalupe)*

2.2. School environment

Availability and accessibility

During school hours, most food consumed by adolescents originates from the school food shop, nearby shops or street vendors, and the school breakfast program (desayuno escolar), while a minority brings food from home.

At both schools, no lunch is provided. However, a small food shop operated by the school's janitor is available, primarily selling energy-dense snacks and sugary beverages. In the school surroundings -mainly around the suburban school- street vendors and shops sell snacks such as fries and chicken. Additionally, the desayuno escolar program provides students with a daily complementary snack consisting of a solid (e.g. cookies or fruit) and a liquid component (e.g.

yoghurt or juice). Teachers and healthcare providers from both schools emphasized its importance, particularly for students from food-insecure households. Nevertheless, some students reported rejecting these snacks because they found them unappealing, and adult participants raised concerns about their nutritional value.

Role modelling of school staff

In both schools, teachers emphasized the importance of healthy nutrition, while expressing concern about the unhealthy eating habits observed among their students. In the rural school in particular, some teachers also highlighted the continued presence of undernutrition. To address these issues, nutrition education was provided by teachers in both settings. In the suburban school, school staff organized group meals and cooking workshops, while in the rural community of Larati, a local NGO established vegetable gardens to promote the consumption of traditional, locally grown foods.

> *"Nowadays they don't eat healthily, and those who live nearby eat salchipapas*[5]*. They eat foods with a lot of fat, which they like more; healthier foods don't appeal to them as much." (Secondary teacher, Guadalupe)*

Although the school's janitor acknowledged the unhealthy nature of many products, she preferred to sell unhealthier snacks that children liked over healthier alternatives they would discard.

> *"... if it were about improving, if there was someone to guide me or tell me how it could be done, I would do it. In the end, I want what's best for them." (Janitor, Guadalupe)*

School regulations

Importantly, school's janitors are free to decide which products to sell, and street vendors often operate without the awareness of official authorities. This creates competition between vendors and the schools' food shop, encouraging low-cost, profit-driven sales and further constraining the availability of healthier options. Some teachers suggested to address this by starting a collaboration between the school staff, janitor and street vendors to promote healthier snacks.

> *"Mostly, the chicken is sold outside; here not so much because it's expensive for us since we pay the cook. I pay, so... buying things at a high cost and selling them cheaply doesn't work. We still have to pay her. And in this way, we do it. We earn more from an empanada, mortadella, or sausages." (Janitor, Guadalupe)*

> *Interviewer: "Is there any cooperation with the janitor regarding what she sells or prepares?"*
> *Municipal education officer: "We don't control that, no. Because the parents, in one way or another, approve what the janitors sell."*

[5] Salchipapa: South American fast-food dish consisting of pan-fried sausages and French fries

3. Societal factors

As noted earlier regarding individual and environmental influences, the broader societal and cultural context also shapes adolescents' dietary behaviors.

Dietary transition
Shifts in dietary patterns and traditional food practices are perceived. Adult participants, particularly from the suburban school, stated that traditional diets are increasingly being replaced by convenience foods. Across all groups, traditional meals, rich in vegetables, grains, and occasional meat, were associated with better health, whereas modern meals were viewed as less healthy, often fried, highly processed, and containing more chemicals.

> *"You will rarely find a house where a mother prepares quinoa, corn or wheat drink—nutritious things. But generally, nowadays, we Bolivians, or I believe a large part of the world, follow a routine diet. We eat noodles, pasta, rice—all of that. And one part of our heritage that we may still have from our ancestors is the custom of eating quinoa, peeled wheat, and the traditional dishes we prepare." (Nurse of health center, Guadalupe)*

> *"They should teach us mothers how we can go back to cooking like before so that our children are better nourished." (Mother 1, Larati)*

Agricultural practices
Participants expressed concerns about the impact of fertilizers and other chemicals on soil productivity and the quality of their food.

> *"Agriculture is no longer what it used to be. Everything is produced with chemicals, either in the soil or above ground. They use a lot of chemicals, which is why I think things have changed." (Mother 5, Guadalupe)*

Media
Participants across all groups indicated that adolescents sometimes rely on the internet, television, and social media for guidance on healthy eating habits, while also being negatively influenced by advertising for unhealthy foods.

> *"The internet and television have the greatest influence on young people's diets. When they are young, we control what our children watch, but when they are teenagers, they control themselves." (Mother 4, Guadalupe)*

Changed working schedules
Several adult participants identified an increased parental workload as an important factor shaping adolescents' diets, as parents have limited time to prepare healthy meals, and children often have to prepare their own food or rely on ready-made meals. Participants attributed this increased workload to the growing economic need for households to secure income outside the home.

> *"Before, only fathers went to work and mothers stayed at home to take care of the children. Nowadays times have changed; both parents go out to work and there is no one*

to cook. Most students at the school are boarded. Even young people finish secondary school and go straight to work if they don't continue studying. We all have to earn a living, and this clearly affects our diet." (Father 2, Guadalupe)

4. Distal moderators

Across the interviews, recurring themes emerged, which were conceptualized as moderators, as they shape influencing factors across all levels of the socio-ecological framework.

Financial resources

Some students reported not receiving pocket money, and several parents expressed that they could not afford healthier food options. Some rural families reported selling the vegetables and grains they produce rather than consuming them themselves, for financial reasons. Teachers and healthcare providers indicated that increased governmental financial support could enable schools to tackle obesity, for example by offering healthy meals through a school cafeteria or by integrating professional nutritional guidance for students and school staff.

Rural vs urban setting

Fruits and vegetables were usually purchased in the nearby town of Sacaba, which has become more accessible in recent years due to improved transportation. Nevertheless, some rural families reported limited access to fresh food markets, leading them to rely on locally grown foods such as potatoes, corn, and tarwi6. Consistent with this, street vendors and food shops were scarce around the rural school.

"It can be seen that every day more and more people are consuming junk food, macaroni, chicken—it's no longer the same diet as before, like wheat sticks and corn. This used to be a rural area, but now it's becoming urbanized. It was once more forested, and now it's filling up with people from all over." (Father 2, Guadalupe)

[6] Tarwi is an edible lupin bean, native to South America

Discussion

This study aimed to explore the factors influencing adolescent eating behavior in Sacaba, Bolivia, through the lens of the socio-ecological model. As the study was conducted in only two schools, the adolescent sample is not representative and the findings cannot be generalized to a broader population. Notwithstanding, several factors identified in this study arose in similar studies in Bolivia and the broader south American region.

In our case study, stunting was observed in 6.6% of rural students and 1.9% of suburban students. In contrast, overweight and obesity were more prevalent, particularly in the suburban school, where approximately one in four boys and girls were affected. In the rural school, lower rates were observed, although the smaller sample size should be taken into account. These findings align with existing evidence indicating that overweight and obesity are emerging as a dominant nutritional concern, surpassing stunting, which was historically more prevalent in Bolivia (10, 14). National data from UNICEF (2020) and previous Bolivian studies report similar prevalences of overweight and obesity among children and adolescents, with higher rates of overweight and obesity in urban versus rural areas, alongside differences in dietary patterns (4, 11,14). In rural areas, homemade meals and noodle soups were more commonly consumed, while in urban areas, sugar-sweetened beverages and processed snacks were more prevalent (14). A study conducted in Chuquisaca (Bolivia) found that urban students (9-15 years) consumed more fruits, vegetables, milk, and cereals, while rural students had higher intakes of staple foods such as eggs and corn, with no significant differences in meat, fish, or fast-food consumption (11). However, in our case study, reported dietary habits and perceived influencing factors were largely similar across both settings. Moreover, research examining adolescents' dietary behavior in Bolivia remains scarce, limiting the ability to draw firm conclusions about regional disparities or the underlying determinants of dietary habits.

Regarding the factors influencing adolescents' eating behavior, our findings revealed categories similar to those identified in qualitative studies among Peruvian and Ecuadorian adolescents (18,19). Accordingly, our analytical framework was informed by a 2014 conceptual model linking individual and environmental determinants to dietary behavior among Ecuadorian adolescents aged 10–16 years (18). While some factors described in the Ecuadorian context—such as adolescents' tendency to disobey parental dietary rules—were less prominent in our data, additional factors emerged, including the physical presence of parents, agricultural practices, and media exposure. In contrast to the Ecuadorian study, where individual-level factors were more prominent, home and school environmental factors predominated in our findings.

At the individual level, adolescents demonstrated awareness of healthy eating and its importance for growth and development. Nevertheless, practical barriers constraints—such as time limitations, long travel distances between home and school, and the widespread availability of unhealthy snacks— limited their ability to act on this knowledge. In addition, many adolescents expressed a preference for sugary and fatty foods. This is consistent with evidence indicating that children have an innate preference for sweet tastes, and that early and repeated exposure to ultra-processed foods and sugar-sweetened beverages can reinforce long-term preferences for sweet, salty, and artificially flavored products (48, 49). Together, these findings

support existing literature indicating that focusing on increasing awareness alone is insufficient to ensure healthy dietary behaviors (50).

A key environmental factor was the widespread availability of unhealthy foods sold in the school food shop and by street vendors. This finding is consistent with evidence from across Latin America, where street-food vending is common and contributes to adolescents' dietary intake (3, 22). For example, a study in rural Bolivia found that 44% of adolescents' caloric intake came from food prepared and consumed outside the home, partly due to long distances between schools and homes (11). Another study conducted in Cochabamba attributed the adherence to a calorie-rich diet to the high density of fast-food restaurants and shops that offer low-cost processed foods (8). Another quantitative study from Mexico associated a higher density of snack shops around schools with higher mean BMI among students (34). Although Bolivia's School Feeding Law (Law No. 622) from 2014, promotes local and non-processed foods in school meals, its implementation is decentralized, and municipalities vary in enforcement (35). Additionally, the law does not restrict the commercial sale of snacks or fast foods around schools. Consistent with this, both schools in our study reported the absence of regulations governing food sales within or near school premises. To address this, future research could explore strategies to engage street vendors in promoting healthier food options.

Interestingly, teachers and health professionals across both regions exhibited a predominantly negative perception of children's dietary habits. However, many continued to express concern about undernutrition, despite our BMI measurements indicating a higher prevalence of overweight and obesity in both schools. This finding may point to a misperception rooted in their own experiences growing up during a time when stunting and undernutrition were more widespread in Bolivia. Limited awareness of the rising obesity burden may also contribute (18, 40). Teachers and healthcare providers predominantly attributed children's unhealthy eating habits to parents, citing low nutritional knowledge and financial constraints. In contrast, parents expressed a strong intention to provide healthy meals but emphasized barriers, such as increased workload, limited income, and long distances to fresh food markets A qualitative study conducted in Cochabamba in 2015 found that even higher-income families increasingly relied on fast foods to save time and money, as women became more engaged in non-agricultural work outside the home (22). This highlights a tension suggesting that economic growth and urbanization do not inherently lead to healthy diets. Many parents, teachers and the school shop vendor showed willingness to support healthier eating habits, suggesting to organize cooking workshops, implement school policies, or establishing school canteens. The Peruvian study similarly observed that family members positively influenced adolescent diets, suggesting to target the whole household when developing interventions (19). Schools, in particular, represent a key entry point for promoting healthy eating, not only among students but also among parents and staff (50). Such efforts can build on the motivation to eat healthily and should be adapted to local traditional foods and dietary practices (19, 23).

However, educational strategies alone are unlikely to address the rising burden of childhood obesity. As highlighted in the Child Nutrition Report by UNICEF (2025) (3):

> *"One persistent myth is that nutrient-poor, unhealthy diets are primarily due to dietary decisions – a view that places blame unfairly on children, adolescents and their parents and families, and frames these diets as a moral failure of the individual rather than a failure of society to protect the environments that children grow up in. These misleading narratives misdirect attention and resources towards individual lifestyle factors – such as individual nutrition choices or physical activity – while obscuring the far more powerful force: food environments. The worldwide deterioration in children's and adolescents' diets, along with the rise in overweight and obesity, is driven primarily by profound changes in the food environments in which children, adolescents and families eat, live, learn and play."*

Another important finding in this study is the perception that traditional diets contain healthier, locally grown products and are being replaced by processed and unhealthier foods. A study in the Bolivian Andes noted that both mothers and healthcare providers viewed "natural" and "indigenous" foods from rural areas as healthy, but less accessible in their urban environment (36). The authors emphasized the need for an intercultural approach to nutrition promotion, combining scientific knowledge with culturally appropriate and locally relevant education, for example by promoting healthy traditional dishes. However, there is limited evidence regarding the nutritional value of 'traditional' Bolivian foods, and nutritional assessments could help to determine whether these diets are indeed healthier.

Throughout Latin America, including Bolivia, dietary patterns have shifted substantially (4-8, 22). In Bolivia, an increase of total caloric intake derived from processed foods and food consumption outside the home has been described (10,11). Similar trends have been documented elsewhere; for example, among Brazilian adolescents, consumption of traditional staple foods such as rice and beans has decreased, while intake of processed products has risen (37).

In our study, families continued to value locally produced and home-cooked foods rooted in cultural traditions. At the same time, improved transportation, greater market integration, and increasing financial autonomy among adolescents expanded access to processed and convenience foods (22). This shift is concerning, given the established link between ultra-processed food consumption and adverse health outcomes, including overweight and obesity (3, 41).

Participants' concerns about the impact of chemicals and fertilizers on the soil productivity and food quality are consistent with broader evidence linking intensive fertilizer use to impaired soil biodiversity, reduced food quality and affected human health (42,43). Bolivia's pesticide use per cultivated area has indeed increased over recent decades (44). Local organizations such as CENDA already support producers to adopt agroecological practices. These producers could be linked to local markets or school canteens with fresh, culturally appropriate foods. In this way, local food-systems resilience could be restored while addressing obesogenic food environments and support food sovereignty (3, 43).

Finally, our interviews revealed that (lack of) financial resources influenced food-related behaviors at all levels. Bolivia has experienced a period of moderate economic growth,

particularly since the early 21st century. This may be translated into the decrease of stunting (from 33% in 2000 to 11.1% in 2021) and underweight (from 5.8% in 2003 to 3.4% in 2016) in children under 5 years old (38). Despite this growth, poverty alleviation remains a challenge, with 36.4% of the population living below the national poverty line and 26% of households reported being unable to afford basic food items (HFPS, 2021) (38). In a recent study conducted in the Bolivian department Cochabamba, belonging to a medium–low socioeconomic stratum, poor housing conditions and informal employment were significantly associated with a higher likelihood of adopting a calorie-rich, nutrient-poor diet (8).

Ensuring the availability of healthy and fresh foods at affordable prices and within close proximity requires governmental support and policies assisting local farmers, schools, and food vendors (3,22). Moreover, the high prevalence of overweight and obesity observed in the suburban school highlights the importance of public health policies assisting schools and health centers in the prevention, detection and management of childhood obesity.

To our knowledge, this one of the first studies to examine both dietary behavior and their influencing factors among adolescents in Bolivia, and the first to be conducted in the Cochabamba region. Previous Bolivian studies were conducted in other regions and were predominantly quantitative, focusing mainly on BMI measurements and dietary patterns (8,10-14). Another strength was that multiple perspectives were included, from adolescents as well as parents, teachers and healthcare providers, which allowed for a comprehensive understanding of influencing factors. However, several limitations need to be acknowledged. Data were collected in only two schools, which does not allow for general conclusions regarding urban-rural differences. Furthermore, the qualitative sample was relatively small, compromising 24 interview participants, of whom only eight were adolescents. These findings are context-specific, and generalization to the broader Bolivian adolescent population is not possible, thus limiting the transferability principle in qualitative research (45,46).

Cultural and language differences between researchers and participants may have introduced bias. Additionally, the researchers' background as foreign health professionals may have influenced data interpretation, potentially affecting confirmability and introducing social desirability bias (45). However, collaboration between local and Belgian researchers helped to mitigate positional bias.

Finally, BMI is well correlated with excess body fat and is the most commonly used measure for assessing obesity in children, however additional measures such as waist circumference could provide a more detailed assessment (39). Variations in physical activity levels were not examined. Nevertheless, it is important to note that physical activity cannot compensate for the harmful effects of nutrient-poor, unhealthy diets (3).

Conclusion

This study found that while individual factors such as taste preferences and nutritional knowledge were relevant, school and home environments emerged as the most influential factors shaping adolescent's dietary behavior in two schools in Sacaba. Adolescents, teachers, parents and health professionals identified the wide availability of unhealthy foods around schools, financial and time constraints as barriers to healthy eating. However, adolescents expressed willingness to eat healthier, and adults showed interest in providing more nutritious meals.

In the Bolivian context, culturally grounded strategies, such as improving nutrition through the promotion of "natural" and "indigenous" foods, could serve as approaches for intervention (36). Introducing school policies that restrict the sales of unhealthy snacks and promote healthier food options at and around schools are needed. Strengthening collaboration between schools, families, farmers, local organizations, and health centers could provide sustainable, culturally grounded strategies to counteract obesity and promote adolescent health in Bolivia.

Future studies should include larger and more diverse samples, link anthropometric and behavioral data for mixed-methods analysis, and explore regional differences to guide comprehensive, context-specific interventions for adolescent nutrition in Bolivia.

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Appendices

Table 1: Mean BMI (kg/m^2) per age and school

Age	Suburban school (Guadalupe)	Rural school (Larati)
5	16.24087 (n=55)	16.13116 (n=6)
6	16.09353 (n=73)	15.74541 (n=4)
7	16.66386 (n=34)	15.96384 (n=10)
8	16.28532 (n=54)	15.65997 (n=9)
9	17.77573 (n=89)	16.42470 (n=15)
10	19.23799 (n=61)	16.88961 (n=11)
11	19.73459 (n=72)	18.39601 (n=10)
12	21.35056 (n=47)	17.16943 (n=13)
13	21.04160 (n=55)	18.42322 (n=20)
14	22.19053 (n=57)	17.89805 (n=14)
15	21.50091 (n=48)	21.72004 (n=15)
16	22.02543 (n=56)	22.22124 (n=18)
17	22.73158 (n=40)	21.27309 (n=16)
18	22.69561 (n=7)	22.69127 (n=4)

Table 1: Data from questionnaires on dietary behavior. Denominators reflect the number of completed responses per item (excluding missing data)

	Rural school (Larati)	**Suburban school (Guadalupe)**
Yesterday I had…		
Breakfast	82.4% (56/68)	76.1% (67/88)
Desayuno escolar	91.0% (61/67)	75.0% (63/84)
Lunch	78.6% (55/70)	95.1% (78/82)
Dinner	96.4% (53/55)	79.8% (67/84)
Yesterday I ate…		
Vegetables	17.9% (12/67)	41% (34/83)
Fruits	44.8% (30/67)	36.1% (30/83)
Dairy products (yoghurt, milk, eggs)	50.7% (34/67)	54% (45/83)
Meat	41.8% (28/67)	55% (46/83)
Carbohydrates (pasta, rice, fries, bread…)	74.6% (50/67)	77% (64/83)
Soup	44.8% (30/67)	66% (55/83)
What do you consider to be healthy food?		
Vegetables and/or fruits	17.5%	48.5%
Soup	12.5%	5.5%
Typical food (chuño, papalisa, papa huaico…)	25%	4%
Natural foods	5%	*Not mentioned*
Food that nourishes us, helps us grow	5%	14.9%
No answer	26.3%	15.3%

Table 2: Interview participants

	Rural school (Larati)	**Suburban school (Guadalupe)**
Adolescents	Girl 1, female, 11 years Girl 2, female, 13 years Boy 1, male, 13 years Boy 2, male, 18 years	Girl 3, female, 11 years Boy 3, male, 11 years Girl 4, female, 17 years Boy 4, male, 17 years
School personnel	Primary school teacher, female, Secondary school teacher, male *No information regarding age*	Primary school teacher, female Secondary school teacher, female School's janitor, female *No information regarding age*
Parents	Mother 1, female, 32 years Mother 2, female, 40 years	Mother 3, female, age unknown Father 1, male, 34 years Father 2, male, 30 years Mother 4, female, 26 years Mother 5, female, 53 years Mother 6, female, 46 years
Health personnel	Nurse of local health centre, female *No information regarding age*	Nurse of local health centre, female *No information regarding age*
Other	Municipal education officer of Sacaba, male *No information regarding age*	

Appendix 1: Approval by the Ethics Committee of Ghent University

contact	telefoon	e-mail
Commissie voor medische ethiek	+32 (0)9 332 33 36	Ethisch.comite@uzgent.be
Aanvrager	**datum**	**pagina**
janne Devestele	14/04/2023	1/6
Onze referentie:	**EudraCT-nr:**	**Belg. Regnr:**
THE-2023-0132	nvt	nvt

Betreft:
Factoren die de voeding van jongeren beïnvloeden in Sacaba, Bolivia. – Scriptie janne Devestele
Factors influencing nutrition in young people in Sacaba, Bolivia

Positief advies

Beste collega

De Commissie Medische Ethiek (CME) verbonden aan de Universiteit Gent (Ugent) en het Universitair Ziekenhuis Gent (UZ Gent) heeft het bovenvermelde dossier onderzocht.
De CME geeft op 14/04/2023 een gunstig advies over deze studie.

De Commissie voor Medische Ethiek beklemtoont dat een gunstig advies niet betekent dat de Commissie voor Medische Ethiek de verantwoordelijkheid voor het onderzoek op zich neemt.
De promotor en de hoofdonderzoeker dragen de verantwoordelijkheid voor het correcte ethische en wettelijke verloop van het onderzoek.

Dit project valt niet onder de bevoegdheid van de wet van 7/5/2004.

Ingediende documenten: zie bijlage 1
Ledenlijst: zie Bijlage 2
Aandachtspunten: zie Bijlage 3a

Met vriendelijke groeten,



Prof. dr. Philippe Deron
Voorzitter
Commissie voor Medische Ethiek U(Z) Gent

ALGEMENE DIRECTIE
Commissie voor Medische Ethiek

VOORZITTER:
Prof.dr. P. Deron

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Appendix 2: Studieprotocol goedgekeurd door etisch comité van Universiteit Gent

Ingediende studieprotocol, goedgekeurd door ethisch comité

Dit onderzoek is gelinkt aan een groter project "Ontwerp van een transdisciplinair persoonsgericht interventieplan om de gevolgen van cardiometabole ziekten bij lokale actoren in de voedselketen in Sacaba, Bolivia te verminderen".

Overgewicht komt steeds vaker voor bij kinderen en jongeren in Zuid-Amerika, en op jongere leeftijd is men vatbaarder voor de impact van eventuele interventies. In dit onderzoek worden de voedingsgewoonten van jongeren tussen 6 en 18 jaar in Sacaba onderzocht, de beïnvloedende factoren en mogelijke oplossingen worden geïdentificeerd.

Om preventieve interventies te kunnen ontwikkelen die leiden tot een gezonder dieet en een betere mentale en fysieke gezondheid, is het belangrijk eerst te weten wat de voedingsgewoontes zijn en de achterliggende redenen (sociale determinanten van gezondheid over de verschillende niveaus). Ook wordt de gezondheidskennis van de jongeren onderzocht.

Hiervoor zullen kwalitatieve onderzoeksmethodes gebruikt worden. In de eerste exploratieve fase worden individuele diepte-interviews met schoolleerlingen en hun leerkrachten gevoerd. Ook worden enkele korte interviews gevoerd met gezondheidspersoneel van de gezondheidscentra in de regio van de scholen. In de tweede fase worden klassikale focusgroepsgesprekken gevoerd. In een derde fase worden mogelijke oplossingen aangebracht door de jongeren zelf, door middel van de Concept Mapping techniek van Trochim, tijdens opnieuw klassikale groepsgesprekken.

Het doel van het onderzoek is het verkrijgen van volgende resultaten, op een participatieve, persoonsgerichte manier:

- Inzicht in de voedingsgewoontes van jongeren tussen 6 en 18 jaar in stedelijke en landelijke gemeentes in Sacaba, Bolivia

- Inzicht krijgen in factoren die deze voedingsgewoontes beïnvloeden

- Inzicht krijgen in de 'food literacy' en 'health literacy' van deze jongeren

- Het genereren van een lijst en aanzet tot actieplan voor een 'gezondere school', met mogelijke manieren om gezonder te eten, aangebracht door de jongeren zelf.

Appendix 3: COREQ checklist

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	4
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	3
Occupation	3	What was their occupation at the time of the study?	2
Gender	4	Was the researcher male or female?	3
Experience and training	5	What experience or training did the researcher have?	3
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	4
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	4
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	16
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	5
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	4
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	4
Sample size	12	How many participants were in the study?	5-7
Non-participation	13	How many people refused to participate or dropped out? Reasons?	no
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	4
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	4
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	4-6
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	4,5
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	no
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	5
Field notes	20	Were field notes made during and/or after the inter view or focus group?	no
Duration	21	What was the duration of the inter views or focus group?	4
Data saturation	22	Was data saturation discussed?	4
Transcripts returned	23	Were transcripts returned to participants for comment and/or	no
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	5
Description of the coding tree	25	Did authors provide a description of the coding tree?	5
Derivation of themes	26	Were themes identified in advance or derived from the data?	5
Software	27	What software, if applicable, was used to manage the data?	5
Participant checking	28	Did participants provide feedback on the findings?	no
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	7-12
Data and findings consistent	30	Was there consistency between the data presented and the findings?	12-16
Clarity of major themes	31	Were major themes clearly presented in the findings?	12-16
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	12-16

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Appendix 4: Questionnaire on dietary behavior (translated from Spanish into English)

Hello!

We are researchers from Belgium.

We'd like to know what kinds of food the children at this school like to eat and why they eat them. That way, we can help create healthy and delicious meals.



Can I ask you a few questions?

Think about **what you actually eat**, not what you should be eating.

The answers you give us are just for us.

We won't tell your classmates, teachers, or parents

what you've told us.

Thank you very much for your help!

What grade are you in? ..... ¿ Are you a boy or a girl? .....
How old are you? .....
Who do you live with (parents, siblings, grandparents, aunts and uncles)?.....

What did you eat and drink yesterday? Why did you eat that?

	What did you eat and drink yesterday?	Where and with whom did you eat?	Why did you choose to eat this?	Whas it healthy?
Before school 	☐ I didn't eat anything			☐ Yes ☐ No
Desayuno escolar (10 a.m.) 	☐ I didn't eat anything			☐ Yes ☐ No
Recess (8-10 a.m. )	☐ I didn't eat anything			☐ Yes ☐ No
Lunch (1-3 p.m.) 	☐ I didn't eat anything			☐ Yes ☐ No
Afternoon snack (3-5 p.m.) 	☐ I didn't eat anything			☐ Yes ☐ No
Dinner (6-10 p.m.) 	☐ I didn't eat anything			☐ Yes ☐ No

What do you consider to be healthy food?.....
Why do you think this food is healthy? .....

Appendix 5: Interview guide for interviews with adolescents (in Dutch)

Interview guide met de jongeren

Titel van de studie: Factoren die de voeding van jongeren beïnvloeden in Sacaba, Bolivia.

1. **INTRODUCTIE**

- Geef het algemene doel van de studie en het interview: informatie inwinnen over de eetgewoonten van jongeren in Sacaba, vanuit het standpunt van de jongeren zelf.
- Uitvoering van het interview (ongeveer 30 minuten), waarbij de anonimiteit en de vrijwillige deelname worden gewaarborgd.
- Er zijn geen goede of foute antwoorden, het gaat om je eigen perceptie, interesse in je eigen ervaringen en ideeën.

2. **HOOFDVRAGEN**

Thema's	Voorbeeldvragen	Probes
24-uurs dieetherinneringslijst	Wat heb je gisteren gegeten voor - ontbijt; - schoolontbijt; - lunch - snack; - avondeten?	- - Waar eet je, met wie, wanneer? - - Wat waren de porties? - - Eet je door de week anders dan in het weekend en zo ja, hoe?
	Wat heb je gisteren gedronken?	- - Hoeveel glazen heb je hiervan gedronken? - - Drink je doordeweeks anders dan in het weekend en zo ja, wat/hoe?

Thema's	Voorbeeldvragen	Probes
Factoren die de voeding beïnvloeden	Waar maakt dat je dit hebt gegeten (als ontbijt/lunch/diner/snack)? Wat maakt dat je dit hebt gedronken?	- *Vragen "waarom" en "kun je andere redenen bedenken" tot het een antwoord opgeleverd over onderliggende redenen voor de voedselkeuzes* - *Als je al je eten mocht kiezen, wat zou je dan eten? Waarom kies je hiervoor?*

		- Hebben je vrienden, familie, school, televisie, enz. invloed op wat je eet? - Is wat je eet veranderd in de afgelopen jaren?

Vat kort samen wat de deelnemer eet en om welke redenen, vraag hem/haar of hij/zij Thema'nog iets wil toevoegen.

Thema's	Voorbeeldvragen	Probes
Voedselgelettterdheid, gezondheidsgeletterdheid	Wat is volgens jou gezond voedsel/een gezond dieet?	- - Wat betekent 'gezond eten' voor jou? - - Is wat je gisteren hebt gegeten gezond? - - Hoe weet je of het eten gezond is of niet? - - Hoe kom je aan informatie over gezond eten? - - Wat zijn volgens jou de gevolgen van gezond eten? - - Denk je dat andere jongeren van jouw leeftijd gezond eten? Waarom (niet)? - - Is gezond eten belangrijk voor jou? Waarom (niet)? - - Welke dingen helpen je al om gezonder te eten? - - Kun je dingen bedenken die je kunnen helpen om gezonder te eten?

3. **AFSLUITING**

Is er nog iets dat je wilt zeggen waar we het nog niet over gehad hebben?

- Bedank de deelnemer
- Het interview wordt uitgetypt, privacy is verzekerd.

Addendum: Aanpak van overgewicht en obesitas bij kinderen en adolescenten in de huisartsenpraktijk

Inleiding

Overgewicht en obesitas bij kinderen worden gedefinieerd op basis van een verhoogde body mass index (BMI) afhankelijk van leeftijd en geslacht, volgens de WHO-groeicurven (1). Obesitas is een chronische, multifactoriële aandoening die voortvloeit uit een complexe wisselwerking tussen genetische, metabole, psychologische, sociaaleconomische en omgevingsfactoren (2-4). Overgewicht is een voorstadium hiervan. Kinderen met obesitas lopen een verhoogd risico op de ontwikkeling van cardiovasculair lijden, type 2 diabetes en kanker , op volwassen- én op kinderleeftijd (3,5). Overgewicht en obesitas bij kinderen leidt vaak tot een verminderde levenskwaliteit, door onder andere gewrichtsproblemen, slaapstoornissen en psychologische klachten (3-5).

Vroege detectie en interventie zijn cruciaal. Gegevens van UZ Brussel tonen dat kinderen met obesitas bij aanvang van opvolging al in 38% van de gevallen een verhoogde bloeddruk hebben, 54% insulineresistentie vertoont en 61% kampt met mentale problemen (6). Vroege interventie tussen 2 en 17 jaar is dan ook noodzakelijk.

Recente cijfers bevestigen de omvang van het problem (7). Volgens de Vlaamse CLB's kampte 23.44% van de schoolgaande jongeren (3-18 jaar) met overgewicht (incl. obesitas) in het schooljaar 2023-2024, er werd een stijging voor alle leeftijden opgemerkt in vergelijking met 2011. De cijfers voor Brussel (2024–2025) liggen nog hoger: 18,2% heeft overgewicht en 8,3% obesitas (7, 8). De Belgische Voedselconsumptiepeiling van 2022 rapporteert bij kinderen van 3–9 jaar 14,4% overgewicht en 4,1% obesitas; bij 10–17-jarigen 14,1% overgewicht en 6,7% obesitas (9).

Deze hoge prevalentiecijfers zetten aan tot actie op verschillende niveaus. De aanpak door zorgverleners is nog te vaak culpabiliserend en stigmatiserend, met de nadruk op het eet- en beweeggedrag van het kind en de verantwoordelijkheid van de ouders (3, 10). Gewicht en lengte worden in de huisartsenpraktijk onvoldoende systematisch gemeten, omdat "het CLB dit al doet". De verwijzing vanuit het CLB naar de huisarts komt echter zelden tot stand. Kinderen worden daardoor vaak pas opgepikt wanneer er al sprake is van obesitas of comorbiditeiten.

Er zijn goede richtlijnen en tools voorhanden, zoals het stappenplan van Eetexpert (11), en de overheid stimuleert een multidisciplinaire aanpak via het zorgtraject en de terugbetaling van diëtiek en eerstelijnspsychologie (12-13). De bekendheid van deze instrumenten blijft echter beperkt, en er is ruimte voor meer samenwerking tussen de CLB's, de eerstelijnszorg en het Pediatrisch Multidisciplinair Obesitascentrum (PMOC).

Praktijk verbeterend project

Eetgedrag wordt voor een groot deel bepaald door de omgeving, en een effectieve aanpak vraagt om kennis van de lokale context (2-4). Een multidisciplinaire forfaitaire praktijk, die zicht heeft op de wijk en diens zorgnetwerk, biedt daarvoor een ideale structuur. Preventie hoeft niet noodzakelijk door de huisarts te worden uitgevoerd, maar vraagt wel coördinatie en samenwerking tussen de eerste- en tweedelijnsactoren. Deze visie leunt aan bij de evolutie ziekte- en patiëntgerichte naar persoons- en gemeenschapsgerichte huisartsgeneeskunde (14).

Onze praktijk, Medisch Centrum De Horizon, is gelegen in Jette (Brussel), vlak naast UZ Brussel waar het PMOC gevestigd is. De praktijk telt 4556 ingeschreven patiënten in een stedelijke, multiculturele omgeving. Hier werken momenteel 4 huisartsen, 1 HAIO, 3 verpleegkundigen, 1 secretariaatsmedewerker en 1 coördinator.[7]

Uit het elektronisch patiëntendossier (CareConnect, februari 2026) bleek dat 910 kinderen tussen 2 en 17 jaar ingeschreven zijn in de praktijk. Van 262 kinderen ontbreken gewichts- en lengteparameters. Van de 648 kinderen met geregistreerde parameters zijn er 23 (3,5%) gekend met overgewicht en 9 (1,3%) met obesitas. Dit is, gelet op de Brusselse en nationale cijfers, een onderschatting van de werkelijke prevalentie.

Dit project omvatte twee doelen: (1) uitwerking van een gestructureerd zorgpad binnen de praktijk, en (2) opmaak van een sociale kaart met verwijsadressen en opstart van samenwerking met relevante zorgverleners.

Hiervoor werd overlegd met Eetexpert, de CLB's, de dienst Gezond in Brussel, het PMOC, alsook met diëtisten, psychologen en kinesisten in de regio Jette. Tussen maart en mei 2026 werd een pilootproject opgestart waarbij een drietal kinderen werd opgenomen in het zorgpad.

Het zorgpad is gebaseerd op de richtlijn van Eetexpert (11), met de huisarts als coördinator en de verpleegkundige als uitvoerder (Figuur 1). Motivationele gespreksvoering staat centraal; responsabilisering wordt vermeden en het hele gezin wordt betrokken (10).

Fase 1 : Detectie

Kinderen tussen 2 en 17 jaar worden éénmaal per jaar gewogen en gemeten door huisarts of verpleegkundige. De BMI wordt uitgezet op de Vlaamse groeicurven (11) in het medisch dossier (Careconnect) van de patiënt. Op basis van het percentiel wordt een zorgelement 'overgewicht' (P90-97) of 'obesitas' (>P97) aangemaakt in het dossier (1).

Bij vaststelling wordt het kind en de ouders of voogd op een neutrale, niet-stigmatiserende manier aangesproken door de huisarts, bij voorkeur aansluitend op een bestaande hulpvraag. Bij interesse wordt een verpleegkundig intakeconsult van 30 minuten gepland.

> *Voorbeelden van gespreksopeners:*
> *“Om je gezondheid goed op te volgen is het ook belangrijk om te meten hoe jij groeit.”*
> *“Is het goed als we jouw gewicht/het gewicht van jouw kind even bespreken?”*

[7] https://www.horizon-dr.be/

Fase 2 — Diagnostiek

De verpleegkundige voert een nuchtere bloedafname uit en neemt een leefstijlanamnese af in aanwezigheid van de ouders of voogd. Dit omvat voedingsgedrag, beweging, slaappatroon en emotieregulatie.

Bloedonderzoek: glucose en insuline, ALT, gammaGT, lipidenspectrum (totaal cholesterol, LDL, HDL, triglyceriden), TSH en fT4, en perifeer bloedbeeld.

Klinisch onderzoek: bloeddruk, hart- en longauscultatie, palpatie van schildklier, abdomen (lever) en borstweefsel; aandacht voor huid- en urineafwijkingen.

Op basis van deze gegevens stelt de verpleegkundige de EOSS-P-score op (Edmonton Obesity Staging System – Pediatric, 15), die het gezondheidsrisico inschat op vier domeinen: metabool, mechanisch, mentaal en milieu (Figuur 2). De score wordt teruggekoppeld aan de huisarts, die de vervolgaanpak bepaalt:

- EOSS-P 0 of 1: ambulante begeleiding in de praktijk, en/of verwijzing naar diëtist, eerstelijnspsycholoog, kinesist, beweegcoach, CLB of OCMW/CAW (Tabel 1)
- EOSS-P 2 of 3: verwijzing naar het PMOC (UZ Brussel in Jette) binnen het RIZIV-zorgtraject voor obesitas bij kinderen (12) (Tabel 2)
- Bij twijfel: laagdrempelig overleg met PMOC (kinderendocrinoloog) of samenwerkende zorgverleners.

De huisarts koppelt 1 tot 7 dagen na het intakeconsult terug aan het gezin — via consult, telefoon of mail — met een voorstel voor behandelplan.

Zorgverlener	**Rol**
Huisarts	Detectie, medische triage, doorverwijzing en opvolging
Verpleegkundige	Leefstijlanamnese, klinisch onderzoek, bloedonderzoek, EOSS-P, begeleiding en opvolging
CLB	Primaire screening, signalisatie, doorverwijzing naar huisarts of PMOC, aanleveren groeicurven
Diëtist	Voedingsbegeleiding (terugbetaling via RIZIV, 13)
Eerstelijnspsycholoog	Mentaal welzijn, zelfbeeld, emotieregulatie, opvoedingskwesties
Kinesitherapeut	Beweging en motoriek
CAW / OCMW	Psychosociale en administratieve ondersteuning

Fase 3 — Behandeling en opvolging

Bij ambulante behandeling in de praktijk wordt het kind om de 4 à 8 weken gezien door de verpleegkundige, afhankelijk van de nood. De motivatie en hulpvraag van het kind en de ouders wordt verkend. Er wordt gewerkt met een voedingsdagboek, educatie op maat, concrete doelen en kleine haalbare aanpassingen.

Na ongeveer zes maanden (of vroeger bij problemen of twijfel) volgt overleg tussen de verpleegkundige en huisarts met een stand van zaken en nazicht van de groeicurve. Het streefdoel is niet gewichtsverlies, maar gezondheidsverbetering (levenskwaliteit) en gewichtsbeheersing, waarbij stagnering of een gewichtstoename kleiner dan de lengtegroei als succes wordt beschouwd.

Ter evaluatie van het zorgpad, worden jaarlijks CareConnect-gegevens bevraagd op het aantal geregistreerde BMI's en zorgelementen overgewicht/obesitas bij kinderen tussen 2 en 17 jaar. Tijdens het teamoverleg worden de kinderen opgenomen in het zorgpad overlopen, de impact op de consultatie-agenda's wordt afgezet tegenover de output in cijfers en de feedback van de verpleegkundigen.

Bedenkingen en toekomstperspectief

CareConnect biedt geen automatische interpretatie van BMI op groeicurven,er kan geen zorgelement toegevoegd worden bij alle kinderen met een te hoog BMI volgens hun groeicurve. De focus ligt voorlopig op jaarlijkse metingen en manuele registratie.
Bovendien worden patiënten momenteel 'ad hoc' aangesproken. Een opportunistische screening door een uitnodiging per mail voor gewichtscontrole, is een optie voor de toekomst.

De aanpak werkt het best wanneer zowel kind als ouders gemotiveerd zijn, en er kan ingepikt worden op een hulpvraag. Wanneer alleen de ouders bezorgd zijn om het gewicht van hun kind, of omgekeerd, wanneer er bij het kind een probleem vastgesteld wordt maar de ouders niet ingaan op begeleiding, ontstaan ethische spanningsvelden die zorgvuldige afstemming vereisen.

Daarnaast is cultuursensitiviteit een belangrijk thema. Een groot deel van onze patiënten is Franstalig of heeft een diverse culturele achtergrond. Educatiemateriaal en gespreksstijl moeten hierop afgestemd zijn. Momenteel focust dit zorgpad zich vooral op Nederlandstalige patiënten.

Tenslotte verdient de financiering een aparte beschouwing. Enerzijds is preventie aantrekkelijk: tijdige interventie vermijdt dure verwijzingen naar de overbezette tweede lijn, en comorbiditeiten op latere leeftijd. Anderzijds vraagt dit zorgpad een grote tijdsinvestering, door de hoge prevalentie van overgewicht, intakeconsulten van 30 à 60 minuten, en opvolgconsulten om de één à twee maanden. In de huisartsenpraktijk lopen verschillende zorgpaden rond chronische zorg simultaan, zorgverleners hebben hiernaast dus veel andere taken. Een forfaitaire praktijk is interessant voor de patiënt, aangezien consulten kosteloos en laagdrempelig zijn. Hoe en hoeveel gezinnen haalbaar begeleid kunnen worden, is een vraag die binnen de praktijk maar ook op beleidsniveau bekeken moet worden. Uiteindelijk is de structurele financiering en organisatie van zorg rond overgewicht een verantwoordelijkheid van de overheid, gezien de groeiende omvang en de maatschappelijke impact van het probleem.

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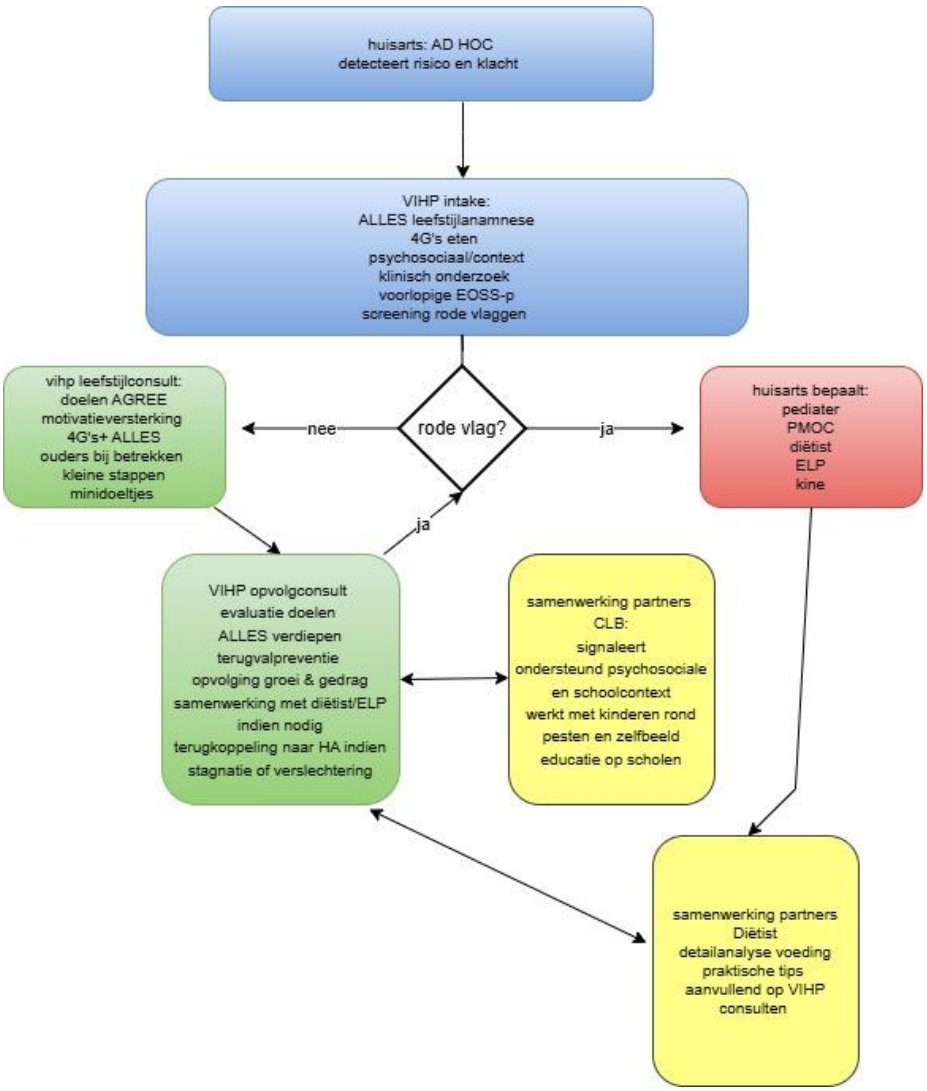
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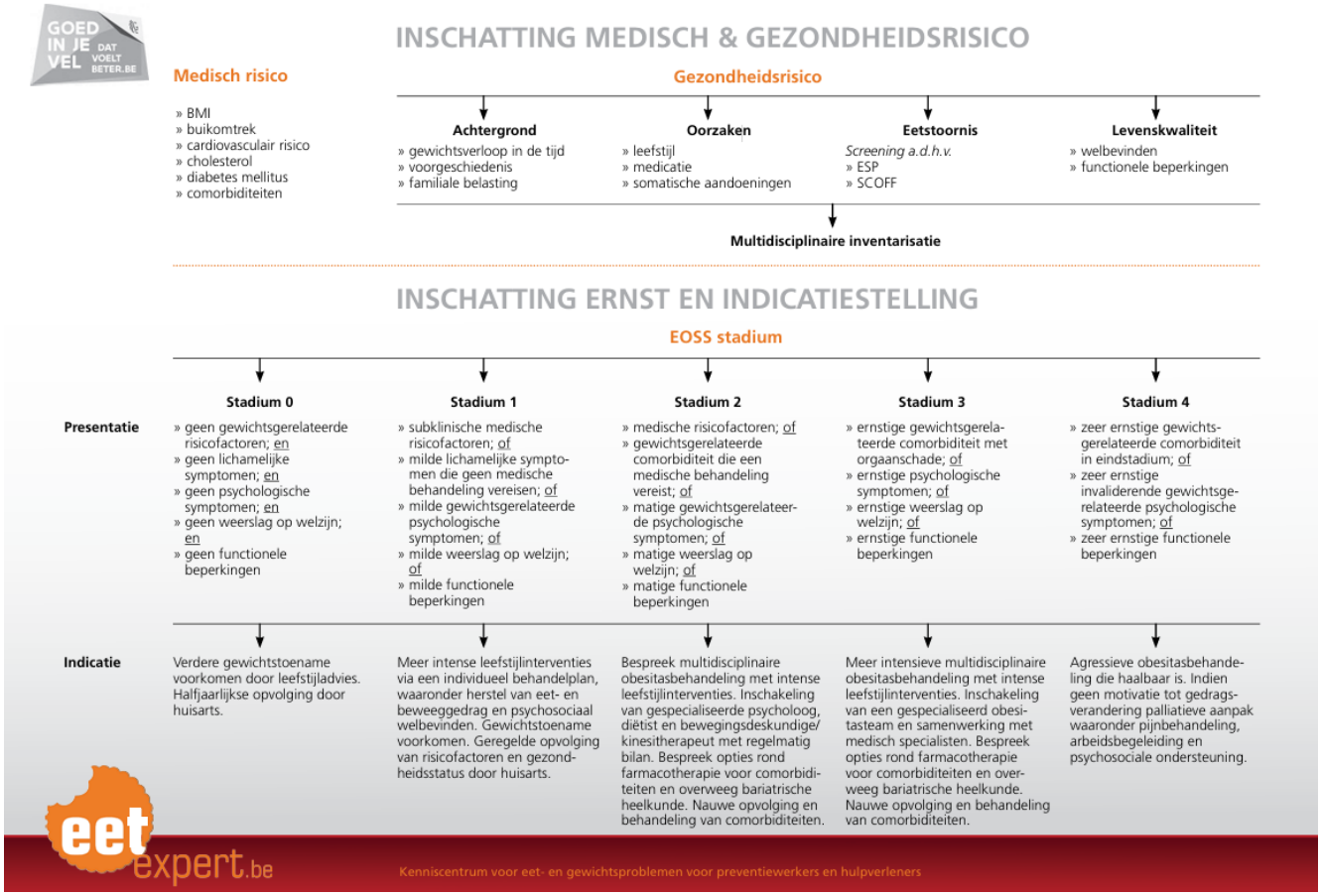
Bijlagen



Figuur 1: Flowchart van het zorgpad

Beroep	Naam	Specialisatie	Leeftijdsgroep	Locatie	Bijzonderheden
Diëtist	Sandra Renders	Voedingsproblemen, overgewicht en obesitas, eetstoornissen	Vanaf 15 jaar	Lennik / Buizingen	Samenwerking met PMOC UZ Brussel. Terugbetaling via zorgtraject.
Diëtist (ambulant & PAAZ)	Helena Sofia	Eetstoornissen, intuitief eten, complexe problematiek, overgewicht	Vanaf 12 jaar	Vorst / online	Online sessies mogelijk.
Diëtist	Lieselot Sablon	Voedingsproblemen, overgewicht en obesitas	Vanaf 6 jaar	Strombeek-Bever	Werkzaam in HA-praktijk Acacia en PMOC UZ Brussel. Deels terugbetaling via mutualiteit.
Diëtist	Ann Van Buggenhout	Voedingsproblemen, overgewicht en obesitas, eetstoornissen	Vanaf 6 jaar		
Psycholoog (ambulant)	Laetitia Fischetti	Voedingsproblemen, zelfbeeld, overgewicht	Vanaf 6 jaar	Strombeek-Bever	Geen ELP-statuut. Deels terugbetaling via mutualiteit. Online agenda beschikbaar.
Psycholoog ELP (ambulant)	Karolien Raeymaekers	Voedingsproblemen, overgewicht, eetstoornissen	Vanaf 6 jaar	Asse	Wachtlijst. Gedragstherapeutische aanpak, gespecialiseerd in jonge kinderen.

Tabel 1: Overzicht van ambulante zorgverleners voor doorverwijzing vanuit MC De Horizon, Jette



Figuur 2: Ernstingschatting van overgewicht bij kinderen (bron: Eetexpert, https://eetexpert.be/infofiche-overgewicht-ernstinschatting-eoss/)

Mechanisch	– Obstructieve slaapapneu die BiPAP/CPAP vereist – Musculoskeletale pijn of complicatie die het activiteitsniveau belemmert – Kortademigheid die minstens matige beperkingen in dagdagelijkse activiteiten geeft – Gastro-oesofagale refluxziekte – Perifeer oedeem
Mentaal	– Comorbide psychische stoornis bv. depressie, angststoornis, eetstoornis… – Significant verstoord lichaamsbeeld – Frequente eetbuien – Ontwikkelingsvertraging met matige impact op gewichtsmanagement
Milieu	– Significante problemen op school: significant pestgedrag, spijbelen, in extremis schoolweigering – Significante conflicten in het gezin, problemen in de gezinsrelaties (ouder-kind, met broers/zussen,…), in extremis familiaal geweld – Opvoedingsproblemen: Ondersteuning in opvoedingsvaardigheden noodzakelijk (bv. door beperkte kennis en vaardigheden bij zorgfiguren, problematiek bij het kind); Pathologie bij de zorgfiguur interfereert met de opvoeding (bv. medisch/fysieke, mentale, afhankelijkheids- of ontwikkelingsproblemen) – Matige tot ernstige problemen om het huishouden te organiseren in functie van de noden van het kind; in extremis dakloosheid, gevaarlijke thuisomgeving – Matige tot ernstige financiële problemen

Tabel 2: Verwijsindicaties PMOC op de andere domeinen (vanaf 1 kenmerk) (Bron: Eetexpert, https://eetexpert.be/stappenplan-overgewicht-kinderen-en-jongeren-huisarts-ernstinschatting/)