

School neighborhood food environments in Greater Tunis: Predominance of unhealthy food retailers and food advertisements

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Introduction & Research Rationale

- Childhood overweight and obesity have dramatically increased over the past decades.
- School neighborhood food environments** have been shown to influence children's weight status. However, scarce evidence on food environments exists in low and middle-income countries (LMICs).
- We thus aimed to describe the school neighborhood food environments in Greater Tunis, in Tunisia – **an LMIC of the Middle East and North Africa region which is experiencing a rapid nutrition transition.**

Methods: Geospatial static methods

- In this cross-sectional study, a random sample of 50 schools was selected.
- Between September and October 2020, data collectors collected pictures and geographic coordinates of all food retailers/advertisements available within 800-meter road network buffer of each school using two applications (Collector Classic and Survey123 (ESRI Inc., Redlands, CA) on their mobile phones ([ground-truthing](#)).



800-meter road network buffer

- Food retailers were categorized by typology (e.g., supermarket, pastry shops, etc.) and food advertisements by food groups (e.g., fresh fruits and vegetables, processed meats, etc).
- They were all further classified based on the NOVA classification (Monteiro et al, 2016) – which is a system that classifies foods by their processing level. For this, findings of a previous in-store/restaurant audit were used to categorize food retailers.

Adapted NOVA-based classification system

Retailers selling mostly: | Ads promoting solely:

Unprocessed foods & processed culinary ingredients (NOVA groups 1 & 2) = **Healthy foods**

E.g., **Retailers** (Butcher, poultry, and fish stores, fruits and vegetables markets, etc.); **Ads** (fresh fruits and vegetables, fresh / frozen meat, yoghurt without sugar, oil, etc.)

Processed & Ultra-processed foods (NOVA groups 3 & 4) = **Unhealthy foods**

E.g., **Retailers** (Limited-service restaurants, kiosks, bakeries and pastries stores, etc.); **Ads** (soft drinks, sweetened yogurts, chips, chocolates, cookies, etc.)

Retailers with: | Ads promoting :

A wide range of food products spanning across all the four NOVA groups (1, 2, 3 & 4) = **Mixed foods**

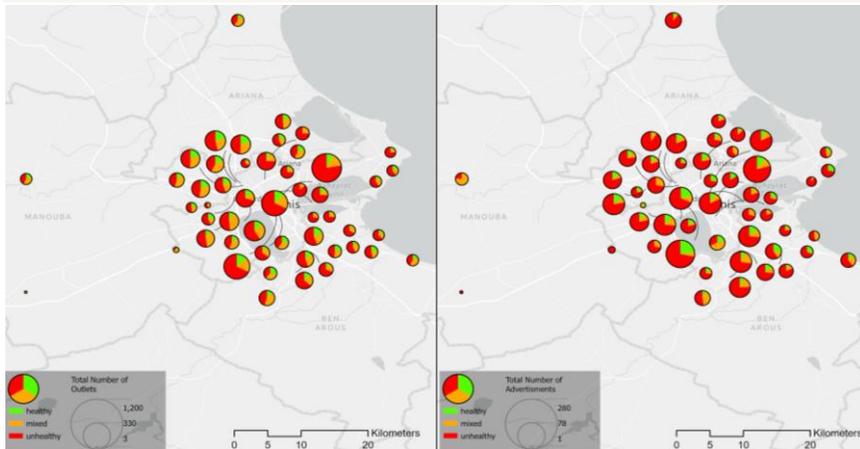
E.g., **Retailers** (Super/mini-markets, corner shops, full-service restaurants, etc.); **Ads** (promoting foods from NOVA groups 1 and/or 2 with groups 3 and/or 4)

- Count and density of food retailers and food advertisements were generated.
- Association between characteristics of the schools' areas and the types of food retailers and food advertisements were assessed using multinomial regression models, accounting for the clustered sample.

Results & Discussion

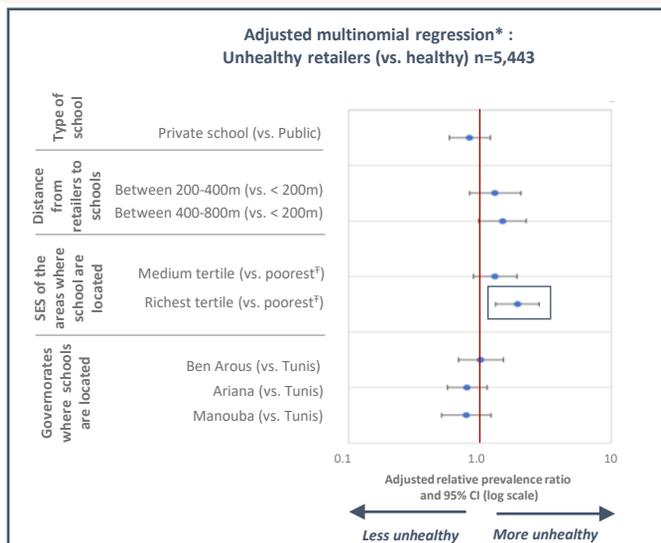
- A total of 5,443 food retailers and 1,393 food advertisements were mapped around the 50 schools.
- Median counts per school were 88 (interquartile range=62-140) and 24 (interquartile range =16-37) for food retailers and food advertisements, respectively.

Predominance of unhealthy food retailers and food advertisements



- Around 2/3 of food retailers and 3/4 of food advertisements available in the surroundings of schools were labeled as unhealthy.
- Most retailers consisted of corner stores (21%) and desserts/coffee/tea places (21%). Only 6% of food retailers were fruits and vegetables stores/markets.
- Among food advertisements, 36.8% promoted sweet snacks and 36.6% promoted carbonated and/or sugar sweetened beverages, while only 2% promoted fresh fruits and vegetables.

Unhealthy food retailers more prevalent in the richest vs. poorest areas



Higher probability of having unhealthy retailers (vs. healthy retailers) in the richest areas.

This is consistent with stage 4 of the **nutrition transition model** which posits that obesogenic environments increase as income rises.

Limitations and Conclusion

- Classification of food retailers as healthy/unhealthy was challenging** due to the multitude of food retailers constructs definitions and scopes available in the literature, as well as the lack of consensus on a food retailer classification system to use.
- School neighborhood food environments in Greater Tunis included predominantly **unhealthy** food retailers and food advertisements, all the more around schools located in the **richest areas**. This highlights **the need to promote healthy environments** around Tunisian schools.
- Our study collected monitoring data on the external food environments and will identify policy and program levers for intervention with the potential to reduce children's obesity in Tunisia and the region.