

Development of a school-based intervention to improve the daily diet of adolescents in urban Benin

Houefa Eunice Sorel Nago

Supervisor: Patrick Kolsteren

Department of Food Safety and Food Quality, Ghent University

Public defence: 12 December 2011

Low- and middle-income countries (LMIC) are facing increasing rates of overweight and obesity, like high-income countries (HIC). This trend is associated with rapid urbanization and subsequent changes in diet and lifestyles and is observed in various population groups. Particularly, adolescents are subjected to these contemporary nutrition and health problems.

Adolescents' well-being has long been neglected in LMIC although they are vulnerable and represent a large share of the population. The present PhD research targeted adolescents in Benin, a West-African low-income country where they constitute 23% of the total population. The purpose of the research was to provide evidence for the development of a school-based intervention to improve adolescents' diet in urban Benin. Specific objectives were to:

- review the association of out-of-home eating with the risk of overweight and obesity and anthropometric changes,
- evaluate the importance of out-of-home eating in the daily diet of school adolescents in urban Benin,
- assess socioeconomic and demographic differences in the diet of school adolescents in urban Benin,
- identify the determinants of fruit and vegetable consumption in school adolescents in urban Benin and
- test a school-based intervention aiming at increasing the daily fruit intake of adolescents in urban Benin.

The 1st chapter of this document explains the background and justification of the research. Chapter 2 systematically reviews the evidence on the link between out-of-home eating and anthropometric changes and reports a positive association of frequent out-of-home eating, in the broad sense, with the risk of overweight, obesity and weight change.

Chapter 3 measured the daily food, energy, macronutrient intakes and the contribution of out-of-home prepared foods in school-going adolescents on school days in Cotonou, the largest city in Benin. Two face-to-face 24-hour dietary recalls were used

for this purpose. Out-of-home prepared foods represented 40% and more in the adolescents' daily intakes. Low and high out-of-home consumers, respectively defined as the 1st and 3rd tertiles of the sample's mean percent energy from out-of-home prepared foods, had a comparable nutrition status. They were also similar with regard to the overall daily diet, except for the consumption of sweet foods, fruits and vegetables. High out-of-home consumers had higher intakes of sweet foods, fruits and vegetables than low consumers. However, both categories had a fruit and vegetable intake which was far below the minimum 400g recommended daily, a high intake of sweet foods and a high fat intake. Chapter 3 concludes that a fruit and vegetable school-based program is urgently needed in adolescents in urban Benin. It was expected that such a program would affect the overall diet and, particularly, would lower the consumption of sweet foods of school-going adolescents.

In chapter 4, socioeconomic and demographic correlates of food groups consumed by school adolescents in Cotonou were identified using a questionnaire. The findings show that household wealth, sex and age mediate the adolescents' food consumption. Adolescents from wealthier households consume more fruits and vegetables, sweet foods and meat but less cereals than those from poor households. Females had a higher intake of meat and meat products and a lower intake of cereal and cereal products than males. Younger adolescents consume more sweet foods and less cereals and cereals products than the older. Hence, the diet of younger females from wealthier households was more indicative of current dietary changes in LMIC, which are conducive to overweight and obesity.

Chapter 5 used focus group discussions to appraise views and perceptions of urban Beninese adolescents about factors influencing their fruit and vegetable consumption. Participants were selected from 2 private and 2 public schools in Cotonou. Sixteen sessions were conducted with 153 students. The more frequently discussed school-related determinants were availability and accessibility of fruits and vegetables, which have already been reported by studies from HIC. Cost of fruits and vegetables was also important for the adolescents. The food safety of fruits and vegetable meals outside home and particularly at school was a key context-specific barrier to their consumption by the adolescents. The participants had a higher preference for fruits than vegetables and made proposals for school-based fruit interventions.

Findings from the focus groups were used to design a school-based fruit program which was pilot-tested. This is presented in Chapter 6. The intervention consisted in operating a fruit stall, under strict hygiene conditions, in a school selected by convenience in Cotonou. It was conducted during a period when fruits were expensive and less available and it lasted for 2 months. The intervention increased mean daily fruit intake of students who consumed fruits from the stall by 166g. At the same time, mean fiber intake increased and mean percent energy from fat declined from 33 to 28%, a level in the recommended range (15-30%). Although, these subjects represented only 22% of the study sample, it was concluded that the results were promising since the intervention was novel and was implemented in a short time frame and during a period where fruits were expensive.

In Chapter 7, the implications for public health practice are elaborated. The present research suggests that formal school canteens providing healthy foods, like fruits, be installed progressively in secondary schools in Cotonou and over Beninese cities as a means to improve adolescents' diet. This strategy would be a formal expansion of the fruit stall and hygiene conditions could more easily be controlled in canteens operated by registered school staff. Suggestions for future research are also made in this chapter.