

Food Safety Is a Key Determinant of Fruit and Vegetable Consumption in Urban Beninese Adolescents

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ABSTRACT

Objective: To identify the determinants of fruit and vegetable consumption in urban Beninese adolescents and elements to develop a school-based fruit and vegetable program.

Design: Sixteen focus groups conducted with a key word guide.

Setting and Participants: Two private and 2 public secondary schools in Cotonou, Benin. One hundred fifty-three students aged 13 to 19 years, 54% girls.

Analysis: The focus groups were audiotaped, transcribed, and analyzed. Three a priori categories from the Social Cognitive Theory were used for the coding: socioenvironmental, personal, and behavioral factors. Additionally, the data were checked to determine whether new categories should be created.

Results: Major determinants in the school were availability and accessibility of fruits and vegetables, nutrition education, and the competition of unhealthful foods. Food safety emerged as a strong barrier to the adolescents' fruit and vegetable consumption outside home and particularly at school.

Conclusions and Implications: Except for food safety, the determinants of fruit and vegetable intake in Beninese adolescents were similar to those in high-income countries. The food safety of fruits and vegetables outside home is a key issue to be studied in detail and integrated in any intervention in Benin and potentially other low- and middle-income countries.

Key Words: fruit, vegetables, adolescent, determinants, Benin (*J Nutr Educ Behav.* 2012;44:548-555.)

INTRODUCTION

Rapid changes in diets and lifestyles during the past decade because of urbanization, industrialization, economic development, and market globalization, are increasing the prevalence of diet-related chronic diseases worldwide.¹ The situation is more alarming in low- and middle-income countries because diet-related chronic diseases are occurring at a faster rate than in high-income countries.² Added to the burden of malnutrition, the consequences of chronic diseases on the health systems of low- and

middle-income countries are potentially huge.³

An adequate consumption of fruits and vegetables is known to protect against chronic diseases such as several types of cancer and cardiovascular disease⁴⁻⁷ and help manage weight.⁸ A minimum daily intake of 400 g of fruits and vegetables, equivalent to 5 portions of 80 g each, is recommended.^{1,9} Low intakes of fruits and vegetables are a common feature in low- and middle-income countries. In a study in 10 countries of sub-Saharan Africa, for instance, the mean per-capita consumption was far below the

minimum recommended level in all countries, and in 8 of them, 85% of households failed to reach the minimum 400 g of fruits and vegetables per day.¹⁰ In a more recent study, a prevalence of low fruit and vegetable intake higher than 70% was observed among men and women in several sub-Saharan African countries such as Burkina-Faso, Côte d'Ivoire, Senegal, Zambia, and Zimbabwe.¹¹

In Benin, 85% of urban adults aged 25 to 64 years consume less than 5 portions of fruits and vegetables per day.¹² In a previous study in Cotonou, the largest city of the country, a mean daily fruit and vegetable intake of 97 g was observed in school-going adolescents.¹³ It is important to design interventions to promote the consumption of fruits and vegetables in these adolescents because poor eating habits developed during adolescence tend to persist.^{14,15} As a first step, an insight into the factors determining the adolescents' fruit and vegetable intake is needed.

Much is known about the determinants of fruit and vegetable intake in adolescents from high-income countries: home availability and

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accessibility of fruits and vegetables, personal preferences, parental intake, sex, age, and socioeconomic status have been identified as major mediators.^{16,17} However, there is a lack of information about the predicting factors in low- and middle-income countries.¹⁸ Determinants of fruit and vegetable consumption in adolescents from high-, low-, and middle-income countries may differ because of a difference in socioeconomic and cultural context. Moreover, each population has a unique socioeconomic and cultural background, and this makes the Beninese context important. This study assessed urban Beninese adolescents' perceptions regarding the factors that influence their fruit and vegetable intake. It was hypothesized that the context-specific determinants of fruit and vegetable intake identified in urban Beninese adolescents will be different from those reported in high-income countries.

This study is expected to provide elements for the development of a school-based fruit and vegetable program. Schools are the places in which most urban adolescents gather and are considered appropriate settings for nutrition interventions in adolescents.^{19,20} Studies performed in high-income countries reported several fruit and vegetable interventions, with sustained effects years after their termination.²¹⁻²⁵

METHODS

Participants and Recruitment

Focus group discussions were used because they allow a more detailed exploration of nutrition and health issues compared with less interactive tools such as questionnaires.²⁶ A convenience sample was selected because focus groups findings are not intended for generalization.²⁶ The organization of the focus groups took into account family income and age, which are known to be important correlates of adolescents' fruit and vegetable intake.¹⁷ Moreover, family wealth was previously found to mediate the dietary patterns of urban Beninese adolescents. Adolescents from higher-income households eat more fruits and vegetables, more meat, and more sweet foods but fewer cereal

products than adolescents from poorer households (ESN, CKL, RAD, et al, unpublished data, 2010). Hence, the study sample was selected considering family income and age. Type of school (private or public) was used as a selection criterion for family income. In Benin, adolescents attending private schools are generally from wealthier families than those attending public schools. Two public secondary schools were identified, each in one of the most disadvantaged areas in Cotonou. Two private secondary schools were chosen, each from a higher-income neighborhood in the center of Cotonou. The characterization of the neighborhoods of Cotonou is performed by the city hall, using the availability of public infrastructures. Choosing the public schools from the most disadvantaged areas and the private schools from the center of Cotonou increased the likelihood of obtaining 2 groups of students at the 2 opposite edges of family income (the richest and the poorest). The school fees in the 2 private schools were 3 to 8 times higher than in the 2 public schools.

The Beninese education system has 4 cycles: nursery school, primary school, secondary school, and university. Secondary school continues from aged 11 to 18 years and corresponds to middle school and high school in the US system. It includes a first grade called *sixième* (minimum age 11 years), a second grade, or *cinquième* (aged 12 years), a third grade, or *quatrième* (aged 13 years), a fourth grade, or *troisième* (aged 14 years), a fifth grade, or *seconde* (aged 15 years), a sixth grade, or *première* (aged 16 years), and a seventh grade, or *terminale* (aged 17 years). There is no formal school food policy regulated by state institutions or by the school authorities themselves. In every school, there are street food vendors authorized to sell in the compound after a medical checkup. Their food offerings are controlled by neither the school authorities nor regular state agencies. They are free to be present every day and to stop their activity at any point. Students generally do not bring packed lunches from home.

In the 4 selected schools, third and fifth graders were informed of the study objective and invited to participate. Students at these school levels

have more free time and can easily participate in extracurricular activities. A minimum age level of 13 years was considered appropriate for participating in the focus groups. The maximum age limit of the World Health Organization for adolescence (19 years) was used. In each school, 2 focus groups were conducted per grade; this yielded 4 sessions with each category of participants: 2 with third graders from public and private school, 2 with fifth graders from public and private school. The number of focus groups was defined a priori before the survey started and considered sufficient to reach data saturation.²⁶ In total, 16 sessions were held, with 7 to 10 students per session, depending on the number of students who volunteered and based on their reported age. Before the focus groups began, participants provided their date of birth, sex, school, and grade on a form.

Before the survey, the authorization of the school authorities was obtained. Parents were informed of the study by a letter, and students who volunteered to participate were asked to sign or provide their initials on an assent form. Participants received apples as an incentive but were not informed of that before the discussions. The protocol of the study was approved by the Medical Ethics Committee of the University of Ghent. The study was conducted in May 2009.

Instrument and Procedure

A discussion guide (Supplementary Table) was developed by the research team according to Social Cognitive Theory (SCT), a commonly used method to predict dietary behavior.²⁷ Social Cognitive Theory is considered appropriate to assess factors relating to fruit and vegetable intake among children and adolescents²⁷ and has been used previously.²⁸⁻³⁰ It states that dietary behavior is influenced by socioenvironmental factors (such as availability), personal factors (such as preferences), and behavioral factors (such as meal patterns) and that those factors interact constantly. The interview guide was formulated as key words to ensure consistency from one session to another while

allowing some flexibility and adaptability to context. For some key words, sample questions were added. The guide was pilot tested in a convenience sample of 10 fifth graders from a nonparticipating school and was modified subsequently.

An experienced anthropologist moderated the group discussions. They were conducted during school hours in a quiet classroom and lasted on average 45 minutes. To make the participants feel comfortable, the discussion started with a brainstorming session on easy questions that were not used in the data analysis. The moderator moved further to key questions about the determinants of the adolescents' fruit and vegetable intake such as availability, accessibility, knowledge, and personal preferences. The questions referred particularly to the school environment and were asked separately for fruits and vegetables because their determinants could differ. At the end of the focus groups, participants were asked what they considered to be a feasible and effective school-based fruit and vegetable intervention.

An assistant audiorecorded the discussions, took notes of nonverbal signs, and wrote summaries. Both the moderator and the assistant were Beninese and had a good knowledge of the cultural context and local names of fruits and vegetables. The language used during the focus groups was French. A full transcript (in French) was made soon after each session and checked for conformity with the audiorecordings.

Data Analysis

The transcripts were analyzed in French independently by 2 French-speaking researchers using a standard procedure. Three categories, identified from SCT before the survey, served as the basis: socioenvironmental, personal, and behavioral factors. Relevant passages of transcripts were classified in these predetermined categories. To avoid missing new important themes, the constant comparison method was used additionally³¹: each passage was checked and compared with the rest of the data to determine whether it fitted one or more of the a priori categories or whether a new one was to be cre-

ated. A discussion followed until consensus was reached about the coding of the data. NVivo software (version 8, QSR International, Victoria, Australia, 2008) was used for coding and data analysis. Node and coding reports were used to determine which factors occurred more than others, and coding queries gathered quotes related to each factor. Summaries made during the interviews added to the understanding of students' ideas and to the good classification of pieces of transcripts. To present the results, quotes were translated into English. Determinants are presented per category of SCT and within a category, from the most discussed to the least mentioned by the adolescents. Examples of quotes are given for more clarity.

RESULTS

In total, 153 students participated in the sessions; 54% were girls. Adolescents from private schools represented 49% of participants and third graders (52%).

Socioenvironmental Factors: Factors Related to the School Environment

Among socioenvironmental factors, the availability and accessibility of fruits and vegetables appeared as the most discussed determinants at school, as well as in the home environment.

Availability and accessibility of fruits and vegetables. All the participants reported limited or no school availability and accessibility of fruits and vegetables. Accessibility related to the availability of fruits and vegetables in a form, at a place, and at a time facilitating their consumption. For instance, somebody said, "There is somebody selling fruits here, we have only one fruit seller; she sells oranges, mangoes and tamarinds" (private school, fifth grade).

In addition, the students pointed out that the quantity of vegetables served by the women selling prepared meals in the school compounds was small and depended on how much one could afford:

In the sauce that accompanies rice, there are things like onions, pepper,

tomatoes; but in the bread, there are carrots but not much (public school, fifth grade).

Nutrition education. There is no policy for nutrition education in Beninese schools and no nutrition education classes are incorporated in the curriculum. Hence, the adolescents said they received no information on fruits and vegetables at school.

Competition of unhealthful foods. Private school students talked about the competition of unhealthful foods with fruits and vegetables at school. They said that foods such as sweets and chocolate were more available and accessible in their schools than fruits and vegetables. In addition, these items were considered to be more attractive because they are nicely presented and packaged. The adolescents also thought that these foods are as healthful as fruits and vegetables. For instance, they would contain vitamins too. As a boy said:

I dislike eating fruits outside home, but I like eating biscuits; it's [biscuits] my preferred food. I've just eaten for 200 francs [West African currency ≈ 0.30 euro]. I prefer biscuits to mangoes because biscuits are packaged (private school, third grade).

Socioenvironmental Factors: Factors Related to the Home Environment

Availability and accessibility of fruits and vegetables. The availability and accessibility of fruits and vegetables were especially discussed with regard to the home environment. Two thirds of the participants in private schools reported having fruits at home every day because their parents were used to buying some. In public schools, fewer students reported having fruits available at home every day. Fruits were usually provided by mothers, but some students mentioned that their fathers also brought fruits home. In most cases, vegetables were available less often at home. They were generally available after mothers (or other females residents of the house) had bought some at the market.

Half of the participants in public and private schools said they had fruit trees or vegetable plots or both at home. Vegetable plants at home were essentially green leafy vegetables such as amaranth and *Vernonia* spp. However, only a few students were used to consuming home-grown fruits and vegetables. Sometimes, fruits and vegetables available at home were gifts from relatives.

Not only the home availability of fruits and vegetables was important, but greater accessibility also increased consumption by the adolescents. From the discussions, it appeared that accessibility was ensured, for instance, by serving the adolescents ready-to-eat meals with vegetables or by putting fruits at their disposal and in sight. For instance, a student said:

I have a mango tree at home, but I don't eat the fruits because I don't like picking them. Other people [fruit vendors outside home] pick fruits and I buy (private school, fifth grade).

Some public and private school students mentioned that they were used to buying fruits in their neighborhood, outside their home and their school. The public school students also said they were used to eating vegetable meals, such as maize dough with sauces of leafy vegetables, in restaurants near their house.

Parental influence. Parental influence emerged as a strong home-related determinant. Parents played an important role in the home availability and accessibility of fruits and vegetables. Parents were also influential through their own fruit and vegetable intake and the nutritional advice they gave their children and established rules regarding home meals. A girl stated:

I ate some fruit salad. ... Mummy made some at home. ... Daddy decides when we would eat some. And on evenings, I accompany mum, who is on diet. I help her by eating fruits too (private school, third grade).

Sometimes, parents rewarded their children for consuming fruits and vegetables: "I don't particularly like vegetables, but I eat some because of

my mother, and in return, I get some money or a gift" (private school, fifth grade).

The influence of parents was at times considered positively associated with the consumption of fruits and vegetables by the adolescents but at times also with a decreased consumption. A boy said:

Sometimes, if you want to eat mangoes or pineapple, daddy or mummy would tell you not to eat and when you ask them why, they would tell you not to eat or you will have diarrhea or something [another disease]. Otherwise, when I wake up and see a fruit, I eat it (private school, fifth grade).

Personal Factors

Preferences. The most discussed personal factors were preferences, mostly taste. The influence of taste was perceived as positive and made the adolescents eat more fruits and vegetables or it was considered negative at times. Most adolescents preferred sweet fruits; only few preferred acidic taste. Many participants did not appreciate bitter vegetables such as *Vernonia* spp. Some did not like particular fruits and vegetables they find tasteless, such as bush okra (*Corchorus* spp) and watermelon.

Besides taste, participants mentioned various reasons for preferring or disliking particular fruits and vegetables, such as their smell, color, or shape or a bad or good experience when eating them: "I like all kinds of fruits, except pineapple because it irritates my tongue" (private school, fifth grade); "I eat amavivè [*Vernonia* spp] because I'm ... sickly and it keeps me healthy; it also cures diabetes, but I dislike all other vegetables" (public school, third grade).

Some vegetables were appreciated or disliked because of the way they are prepared (ingredients used to cook them) or because of particular foods they are usually consumed with: "I like cassava leaves because when they are cooked with peanut paste, it's very delicious" (private school, third grade); "I don't like sauces prepared with leafy vegetables because you always eat them with dough" (public school, third grade).

Nutrition and health knowledge. The adolescents' nutrition and health knowledge was the most discussed personal determinant after their preferences. Globally, participants from the 4 schools had a good knowledge of the benefits of eating fruits and vegetables. Examples of statements are: "When you cook vegetables, there is a loss of vitamins but you just have to wash fruits and eat" (private school, fifth grade); "I like fruits because of their taste, and I also heard that fruits and vegetables contain many vitamins. Okra contains some calcium" (public school, third grade);

Fruits are good for a healthy and balanced diet. For a meal to be balanced, you should eat a fruit after it. ... Normally, we should eat 5 fruits and vegetables every day (private school, third grade).

A few students thought fruits and vegetables could also impede health or well-being:

Fruits and vegetables are good for health but sometimes they can have bad consequences for health. For instance diabetes, when you exaggerate with bananas [eat too many bananas] (public school, third grade).

Cultural beliefs. Some participants addressed the question of cultural beliefs. For instance: "When you have many problems in your life or unluckiness, it is advised to eat fruits" (private school, fifth grade); "Okra reduces the testicles and decreases memory" (public school, fifth grade).

Behavioral Factors

Eating patterns. The eating patterns of the adolescents were often mentioned. The consumption frequency of fruits and vegetables varied considerably. In most cases, fruits and vegetables were not consumed daily, except for tomatoes and onions, which are commonly used to cook everyday meals. Although students from private schools said they ate fruits and vegetables every week, those from public schools reported that some weeks they did not consume fruits.

Some adolescents mentioned a difference between weekdays and weekends. They ate more fruits and

vegetables during weekends because there was more time for preparing vegetables or because parents brought more fruits home during weekends:

Dad is used to buying fruits when he comes back home after work hours...not every day. During weekends, he buys a lot and then I eat more fruits, even apples (public school, fifth grade).

Some participants said they ate fruits at night because there are no more flies or because they digest better. Finally, most students reported to eat fruits usually as dessert:

I eat mangoes after a good meal...for instance, rice with meat, chicken, or mutton, and if there's everything inside, carrots, green peas, cabbage (private school, third grade).

Students said they ate fruits and vegetables more often at home because then they did not need to buy some themselves. Eating fruits and vegetables at home was also practiced for hygienic reasons. For instance: "I eat fruits more at home because I can wash them correctly, remove my clothes, and be at ease...and at home you can hide from flies" (private school, fifth grade).

Other Factors

Food safety, the cost of fruits and vegetables, convenience and time of preparing fruits and vegetables, medical prescription, and media influence were also mentioned during the discussions and could constitute barriers to or promoters of a fruit and vegetable intervention.

Food safety. The hygienic quality of fruits and vegetables was frequently discussed. Some adolescents talked about particular fruits and vegetables that they perceived as nonhygienic, no matter how they were cleaned or cooked. For that reason, they were reluctant to consume them:

I don't like mangoes because of flies. Even if you clean them, you can get diarrhea or cholera or you can vomit.... Sometimes, there are worms inside mangoes (private school, third grade);

Some leafy vegetables grow close to the ground, and ground worms and microbes stick to the leaves and they are cooked without cleaning (private school, fifth grade).

Some participants mentioned they did not eat particular vegetables because of the way they are prepared; for instance, the way some leafy vegetables are pulverized by hand. To them, prepared vegetables were not hygienic. Students also pointed out that they eat fruits and vegetables more often at home for hygienic reasons. They were not confident in the food safety of fruits and vegetables outside home, particularly at school and, more concerning, vegetables. For instance: "I eat vegetables at home because there, you can be sure of the hygienic quality; you know how they are cooked" (public school, fifth grade).

Cost of fruits and vegetables. Students said the price of fruits and vegetables depends on seasonal availability:

Fruits are not expensive, but it depends on the seasons, dry season or raining season. During the dry season, fruits are rare; during the raining season, they are available (private school, third grade).

For students in private schools, the price was not considered a constraint to the purchase of fruits and vegetables. The students were used to buying fruits and even exotic fruits (strawberries, raspberries, grapes), which are rare, expensive, and generally sold in the supermarkets. However, in public schools, financial means were an important constraint, which explains why public school students reported eating more fruits when they were at home than outside. "I would like to eat more fruits, yes, if I had money. If I could eat fruits every day, I would, if prices are reduced" (public school, fifth grade).

Convenience and time. The participants stated they preferred fruits to vegetables because fruits do not need cooking but only cleaning. Some fruits, such as bananas, were even considered more convenient than others and some were very inconvenient because one needs to clean

one's teeth and mouth after eating them. Some girls said they eat more vegetables during weekends because there is more time for cooking.

Medical prescription. Many public and private school students mentioned medical prescriptions as reasons for eating or not a fruit or vegetable. Examples of quotes are: "I eat bananas. I'm ulcerous and the doctor advised them to me" (public school, fifth grade); "My doctor forbade me to eat pineapples because of my hemorrhoids" (public school, fifth grade).

Media influence. Students from public and private schools reported that they mainly received information about the health and nutrition benefits of fruits and vegetables from radio, television, and journals but also through the Internet, movies, books, magazines, and Beninese theatres:

I like to eat fruits because the white [Caucasians] said that after eating some dough, one should eat dessert.... They say that in movies, also in Pipi's [a famous Beninese comedian] theatres (private school, fifth grade).

Possible Interventions

The majority of students preferred a school program on fruits only. They expressed important concerns regarding the hygienic quality of vegetable meals offered. Their first proposal for a fruit school intervention was to organize information sessions on fruits. Second, they proposed increasing school availability by installing fruit stalls with a variety of good-quality (not spoiled), well-protected, and inexpensive fruits. The adolescents considered the regular school food vendors appropriate vendors for a school intervention. Their other proposals were to organize taste-testing sessions on new fruits, distribute informative leaflets about particular fruits, and install a school garden. The participants highlighted the importance of associating their school authorities, teachers, food vendors, and parents and sensitizing all the students before starting any

program. They also proposed sending informative leaflets to their parents, although some said their parents are illiterate.

DISCUSSION

This study explored qualitatively the determinants of fruit and vegetable intake in adolescents in the context of Cotonou, an urban area in a low- and middle-income country. The study intended to provide information on the context-specific barriers and opportunities to the consumption of fruits and vegetables by the adolescents and on the appropriate design for a fruit and vegetable intervention.

Major home-related determinants retrieved from the focus groups were the availability and accessibility of fruits and vegetables and parental influence. Important factors in the school environment were availability and accessibility, nutrition education, and competition of unhealthful foods. Among the personal factors, preferences (mainly taste) and nutrition and health knowledge were the most discussed determinants. The participants also referred to some cultural beliefs. In Benin, the influence of cultural beliefs about foods, in particular fruits and vegetables, is more pronounced in rural areas but is declining with modernization. These beliefs potentially decrease or increase the consumption of certain fruits and vegetables. Eating patterns were retained as the behavioral factors. Other important factors emerged from the discussions: medical prescription, media influence, the cost of fruits and vegetables, convenience and time of preparing fruits and vegetables, and food safety.

Except food safety, the determinants from this study have already been largely discussed in studies conducted in high-income countries. For instance, the availability and accessibility of fruits and vegetables were identified as major factors influencing adolescents' fruit and vegetable consumption both at home and at school.^{16,17} Parental influence was also discussed.³² In other studies, taste also appeared among personal factors as a strong predictor of adolescents' fruit and vegetable consumption or

of their food choices in general.^{16,33} Socioeconomic differences in fruit and vegetable availability and accessibility¹⁷ were confirmed because the focus groups showed that the financial means were an essential difference between private and public schools. This might explain why public school students reported a lower home availability of fruits and vegetables compared with private school students. The higher-income parents might purchase fruits and vegetables in larger quantities or more frequently compared with parents of students in public schools. In addition to that, students in private schools had more pocket money and were used to buying more fruits themselves, even expensive exotic fruits. Consequently, a difference in the reported consumption frequency of fruits and vegetables between private and public schools was observed.

The interesting difference between the results of this study and findings from high-income countries is that, in the context of Cotonou, food safety appeared as a strong barrier to the consumption of fruits and vegetables by the adolescents, which caused a reluctance to eat fruits and vegetables sold in school settings and in general outside the home. In particular, they disliked eating vegetable meals at school and in general outside home because of bad hygiene. Provided that food safety issues would be addressed, schools were identified as appropriate settings for successful nutrition interventions in adolescents.^{19,20} This offers interesting opportunities for health promotion activities in Benin, in particular because fruit and vegetable programs previously have shown to be effective in schools in high-income countries.²¹⁻²³

To obtain some information for the development of an intervention, the participants were asked which school intervention they would like. A key constraint to set up a school program, in particular for the promotion of vegetables, was the hygienic conditions during food preparation. The adolescents also stated that fruits were more convenient than vegetables. In addition, they estimated that they already ate enough vegetables but not enough fruits. Barriers to a school fruit program that were iden-

tified were low availability and accessibility of fruits in the schools, lack of nutrition education on fruits at school, competition of sweet foods, cost of fruits in the case of students from poor households, and poor food safety. Some opportunities also exist: the adolescents' willingness to eat more fruits, their willingness to learn more about fruits, presence of natural science classes in the school curriculum in which lessons on fruits could be taught, and the presence of school food vendors who could sell fruits to students.

The use of focus groups in this study implies some limitations. Some students might have not participated well in the discussions because there were shy or not used to such activities. Therefore, the present findings may reflect only the views of dominant participants.²⁶ However, as much as possible, the moderator tried to establish a comfortable and friendly ambience by starting with easy questions. He also encouraged an active participation of all the students throughout the discussions. The moderator and his assistant were both Beninese, with a good knowledge of the cultural context and local languages, and could relate well with the participants' views and attitudes during the discussions. The same key word guide was used for all the discussions and allowed standard but still flexible data collection. The number of focus group sessions was defined a priori before the survey and was 4 per category of participants. This number was judged sufficient to reach data saturation. Transcripts were made in French soon after the focus groups and analyzed independently by 2 researchers. No statistical measure was calculated to appreciate intercoder reliability; however, a standard coding and analysis procedure was applied by the 2 researchers and extensively discussed afterward until consensus was reached.

Although these findings cannot be generalized,²⁶ they provide valuable insight into the determinants of fruit and vegetable intake in urban Beninese adolescents and for the development of a well-tailored and efficient fruit and vegetable intervention in this population. The conclusions of this study are that the promotion of fruit and vegetable consumption in

urban Beninese adolescents at school may need to focus on food vendors in and around the school, parents have a major role to play in any intervention, and adolescents from poor families should be particularly targeted. Incorporating food safety concerns in fruit and vegetable interventions is a key issue to be studied in detail for future development of interventions in Benin and potentially other low- and middle-income countries.

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SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jneb.2011.06.006>.

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