

CASE STUDY

Monitoring and surveillance of street food vendors to prevent noncommunicable diseases: the FEEDCities project

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ABSTRACT

Background: As a result of the major shifts in lifestyle occurring throughout the world, more and more people consume meals outside the home. Although in high-income countries the average experience of eating food prepared outside home is based on fast foods, restaurants and delivery from licensed food establishments, in many low- and middle-income countries a significant percentage of the population relies heavily on food bought in the streets from unlicensed or informal vendors. Street foods are traditionally energy dense, with a high content of saturated fats, sugar and salt. There is an urgent need to improve and consolidate the scientific knowledge available on the health effects of regular consumption of street food.

Methods: FEEDCities is a research project aimed at describing the street food environment and assessing its nutritional value in several capital cities in central Asia and eastern Europe. The project is based on a cross-sectional evaluation of street food vending sites, including an analysis of food composition and characterization, customers, food items purchased and food product advertising in public spaces.

Results: Bromatological analyses show that quantity of sodium and trans fatty acids (TFAs) in a single serving (i.e. the average portion usually sold) of some of the most readily available homemade and industrial foods exceeds the maximum recommended daily intake. Of the most commonly available foods, the mean TFA content per serving was highest for industrial wafers, homemade dishes, cakes and pastries: up to 3.8, 2.9, 1.8 and 1.6 g, respectively, corresponding to 170%, 129%, 83% and 71%, respectively, of the recommended maximum daily TFA intake.

Conclusion: Given that street food is the main source of nutrition for a large share of the world's population, health policies focusing on these foods should be considered an additional important measure for preventing noncommunicable diseases. Our experience from a pilot research project on urban nutrition highlights the need to include street food in systematic assessments of the dietary habits of populations.

Keywords: NONCOMMUNICABLE DISEASES, NUTRITION, NUTRITION MONITORING AND SURVEILLANCE, STREET FOOD

INTRODUCTION

Noncommunicable diseases (NCDs) – such as cancer, cardiovascular disease and diabetes – represent the leading causes of death worldwide (1). The surge in NCD incidence has been defined as a global epidemic (2), resulting from the complex interplay of factors such as demographic and epidemiological shifts, technological advancements and economic development (3). Poor diet is a risk factor for NCDs (4), in particular the

consumption of foods high in saturated and trans fatty acids (TFAs) (5), salt (6) and sugar (7).

Of the six major regions into which WHO Member States are divided, the European Region is the one most strongly affected by NCDs. Between 1990 and 2015, the highest death rates were in central Asia and eastern Europe. In response to this situation, many European countries have made it a priority to promote healthy diets and obesity prevention policies. The European food and nutrition action plan 2015–2020 recommends policy actions

to ameliorate health problems associated with the modern food environment by reversing the increased availability and affordability of sugar-sweetened beverages and foods high in saturated fats, sugars and/or salt (8).

If countries are to effectively curb the NCD epidemic by promoting dietary improvement, they need to establish robust monitoring and surveillance systems that collect valid and relevant data on dietary intake and food composition. Nutrition monitoring and surveillance are fundamental activities that enable policy-makers and public health authorities to reliably estimate the main nutritional changes within populations and quantitatively assess the outcomes of policies and interventions. In total, 19 of the 53 Member States of the WHO European Region currently have no national nutrition survey. In this group of Member States, mainly concentrated in central and eastern Europe, lack of reliable and precise information on the dietary habits of the population might hamper the implementation of effective nutritional policies.¹ However, even when common tools for nutritional monitoring and surveillance (such as national nutrition surveys) are in use, information on dietary habits, particularly those linked to eating meals away from home, remains incomplete. In recent decades, there has been a steady increase in the percentage of meals consumed outside the home (9, 10), possibly as a consequence of dramatic changes in lifestyle and dietary habits (11). Consumption of food prepared outside home has been associated with increased body mass index and risk of obesity (12–14). However, many studies are context specific because they are conducted in high-income countries and have a particular focus on fast foods and restaurants. Despite being understudied in low- and middle-income countries, street food represents a large proportion of out-of-home food consumption and is an important source of inexpensive food. In fact, street food eating is widespread in the general population and is not only confined to poorer groups (15). The few in-depth studies into street food purchasing habits have highlighted specific low-income groups that rely heavily on street food for their daily food intake (16, 17). In general, street food has poor nutritional quality (18): the desire for quick profits and preference for low-quality ingredients mean that food commonly sold by street vendors is characterized by a high content of TFAs, sugar and sodium (19). These food types are all risk factors for diet-related NCDs: high consumption of TFAs is associated with an increased risk of cardiovascular diseases (20); high intake of sugar-sweetened beverages is associated with weight gain and obesity (21); and

high sodium intake is linked to an increased risk of hypertension (22). Given its notable contribution to the diet of urban residents and low-income groups, street food should be considered an important risk factor for NCDs and a target for their prevention. Moreover, routine data collection on street food consumption is essential for providing a more comprehensive assessment of exposure to diet-related risk factors for NCDs, especially in settings where street food is widely available.

METHODS

In 2015 the WHO Regional Office for Europe, together with researchers at the University of Porto, launched the FEEDCities research project aimed at describing the street food environment and assessing the nutritional value of street foods in several capital cities in central Asia and eastern Europe. Historically, street trade has been a well-developed activity in this part of the world, with street food commonly sold in central Asian bazaars; the local dietary habits certainly reflect this.

The first phase of the investigation, completed in 2016, was carried out in four cities: Ashgabat (Turkmenistan), Bishkek (Kyrgyzstan), Chisinau (Republic of Moldova) and Dushanbe (Tajikistan). The FEEDCities project is based on a cross-sectional evaluation of street food vending sites, including an analysis of food composition and characterization of customers, food items purchased, and food product advertising in public spaces. The research targeted different types of vending sites, including both formal and improvised informal set-ups, selling ready-to-eat food directly on the street. According to the United Nations Food and Agriculture Organization, street food is “ready-to-eat foods and beverages prepared and/or sold by vendors or hawkers especially in the streets and other similar places” (17). For each street food vendor, interviewers collect information on the type of food offered, the main features of food preparation and general socioeconomic variables related to the vending activities. Data were mainly obtained by direct observation of vending sites and their customers, although the cooperation of street food vendors was usually requested. In contrast, samples of the most commonly available foods were purchased in the usual way (i.e. the specific cooperation of street food vendors was not needed) for laboratory analysis of the nutritional composition. Regarding food advertisement, citywide billboard advertising was characterized by direct observation and classified according to the type of product/service being advertised (food or non-food related) and, if food related, to the specific type of food item. The investigation was carried out in the streets and other publicly accessible spaces in the selected cities. All data collection and much of the fieldwork

¹ Rippin HL et al. How much do we know about dietary intake across Europe? A review and characterisation of national surveys. University of Leeds/WHO Regional Office for Europe, 2017; unpublished report.

were carried out by local staff (after receiving specific training from partner scientific institutions) using inexpensive tools such as tablets and smartphones (23). Analysis of food samples was done at the local level if national laboratories had the necessary skills and equipment. Some analyses were quite specific; therefore, for those countries lacking the appropriate laboratory equipment or skills, the analyses were usually done abroad at partner institutions.

RESULTS

Data from the first two countries in which FEEDCities was implemented, Kyrgyzstan and Tajikistan, show that commonly available street foods include beverages, bread, cakes, cookies, sandwiches, savoury and sweet pastries, snacks, and traditional main dishes. Despite some variability, bromatological analyses showed that quantity of sodium and TFAs in a single serving (i.e. the average portion usually sold) of some of the most readily available homemade and industrial foods exceeds the maximum recommended daily intake. Of the most commonly available foods, the mean TFA content per serving was highest for industrial wafers, homemade dishes, cakes and pastries: up to 3.8, 2.9, 1.8 and 1.6 g, respectively, corresponding to 170%, 129%, 83% and 71%, respectively, of the recommended maximum daily TFA intake. These values were calculated based on a reference daily intake of 2000 kcal (approximately 8.4 MJ) for an average adult. The highest mean sodium content per serving was found in main dishes and industrial snacks: up to 2.5 and 1.5 g, respectively, corresponding to 124% and 85%, respectively, of the maximum recommended daily intake. Furthermore, these surveys found that homemade foods sold in the streets were highly variable across different food types and different samples of the same product. The results of this study should stimulate discussion around the need to implement and enforce policies focused on street food with the objective of reducing the salt content of food and eliminating TFAs from the food supply chain, in line with international guidance and as already highlighted by the European food and nutrition action plan 2015–2020 (8).

DISCUSSION

The FEEDCities project provides two main lessons: the first relates to study methodology and the second to its contribution to nutrition monitoring and surveillance within each national setting. The first lesson is that the study methodology needs to be easily implemented and replicated in different countries and at different time intervals. So far, implementation of the

FEEDCities pilot in the first set of four countries has shown that the approach is feasible. The project was designed to be implemented with a relatively small financial investment (it does not include the cost of improving laboratory facilities) and can be adapted by policy-makers and public health authorities to serve the needs of large-scale investigations that have a wider scope and geographical coverage. However, the cost of FEEDCities surveys will increase with increased area coverage and amount of information collected, especially for bromatological analyses. Financial sustainability has proven to be one of the most challenging aspects of the project. In fact, several of the countries in which the FEEDCities pilot was implemented do not have the necessary laboratory competencies and equipment to perform all of the necessary analyses. The FEEDCities project includes training activities for personnel at national laboratories and ongoing collaboration with referral centres from partner institutions. Despite this, if the nutritional analysis of street food is to form part of a wider process of nutrition monitoring and surveillance, then countries will need to make an appropriate initial investment.

The second lesson relates to data gathered via assessing dietary exposure in the urban context. This pilot FEEDCities study highlights the relevance of street food consumption as both an important food source and a marker for nutritional trends. Street food can therefore be considered a sentinel for the quality of urban diets and for the extent of exposure to diet-related risk factors for NCDs. Although a nutritional monitoring and surveillance system would provide more comprehensive data, the FEEDCities project nevertheless increases our knowledge on the foods most commonly available to urban populations, and specifically on the nutritional character of street food. The project can provide relevant insight to governments and public authorities into street food composition and thus inform policy-making processes. This type of study is particularly useful for central Asia and eastern Europe, where very little information is available on food composition, availability and consumption, as well as on the dietary habits of the population. Although not currently planned, we believe that incorporation of the FEEDCities toolbox (including original methodology and innovative analytical tools) into the overall strategies for nutrition surveillance could provide a valid, evidence-based system for supporting decision-making and assessing food policy interventions. In fact, by analysing distinct food systems within cities or urban areas, the FEEDCities tool can increase our knowledge of an understudied nutrition source such as street food with remarkable spatial precision. Even as a stand-alone tool, FEEDCities can provide salient guidance to policy-makers and health authorities. Where no national nutrition survey is currently available – this is the case for more than one

third of the 53 Member States of the WHO European Region – FEEDCities can be adapted to serve as a valuable tool for data collection and monitoring of dietary habits.

CONCLUSION

In the four countries where it has been implemented so far, the FEEDCities project has collected data on a vast array of topics, from the geographical coordinates of street vendors to visual records (pictures and videos) and the dietary composition of food items. By building on its methodological and technological features, the FEEDCities tool could be converted into an open platform (electronic and cloud based) for both customers and sellers to directly upload relevant information. This could include, for example, information on food consumption and preferences or detailed updates on the ingredients used in food preparation. This development would broaden the potential sources of information, ease the process of data collection and provide an up-to-date overview of street food characteristics.

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