



Factors associated with consumption of fruits and vegetables among Community Kitchens customers in Lima, Peru

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ARTICLE INFO

Article history:

16 May 2016

15 August 2016

24 August 2016

Available online 25 August 2016

Keywords:

Fruit and vegetables

Intention to change

Community Kitchens

Peru

ABSTRACT

Community Kitchens (CKs) are one of the main food providers to low-income families in Peru and may encourage healthier diets. We aimed to determine the prevalence of fruit and vegetable consumption and associated sociodemographic and behavioral factors among CKs customers. A cross-sectional study enrolling customers of 48 CKs in two areas of Lima, Peru, was performed. The self-reported amount of fruits and vegetables consumed (<5 vs. ≥5 servings/day) was the outcome. The exposures were grouped in sociodemographic variables (i.e. age, gender, education level, etc.), and self-reported intention to change eating- and exercise-related habits in the last four weeks just prior to the interview. Prevalence ratios (PR) were estimated using Poisson regression. Data from 422 subjects were analyzed, 328 females (77.9%), mean age 43.7 (\pm 14.5) years. Only 36 (8.5%; 95% CI 5.9–11.2%) customers reported consuming ≥5 servings of fruits and vegetables daily. This pattern was 4-fold more likely among those with higher levels of education (\geq 12 vs. <7 years), and 64% less common for migrants relative to non-migrants. In terms of intentions to change habits, those who reported having tried to reduce sugar consumption or to eat more fruits were up to 90% more likely to meet the \geq 5 servings/day target. A substantial gap in the consumption of \geq 5 servings of fruits and vegetables/day was found among CKs customers that does not appear to be dependent on familial income. The profiles reported in this study can inform appropriate strategies to increase healthier eating in this population.

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1. Introduction

Worldwide, the low consumption of fruits and vegetables is considered one of the 10 leading risk factors for mortality (World Health Organization, 2004): up to 2.7 million lives could be saved annually with sufficient fruit and vegetable consumption (World Health Organization, 2003a). Despite the multiple benefits attributable to fruit and vegetable intake, their consumption is below usual recommendations (World Health Organization, 2003b), especially in resource-constrained settings.

Community Kitchens (CKs) were created in the 1960s as a survival strategy for urban populations in Peru, especially in the main cities, in response to poverty and economic crisis (Garret, 2001). Many of the CKs are located in Lima, the capital of Peru (Blondet & Trivelli, 2004), and it is estimated that around one in three families has at least one

member eating at CKs (Garret, 2001), and 60% of usual customers are poor (Mujica, 1994).

Although CKs are considered one of the main channels for the supply of food to families of lower socioeconomic levels, only a third of the ingredients used in food preparation are provided by the local government: the remaining ingredients are obtained through the limited earnings from the daily sales at the CKs (Blondet & Trivelli, 2004). According to the World Health Organization (WHO), a healthy diet should include at least five servings of fruits and/or vegetables (i.e. 400 g of fruits or vegetables) per day (World Health Organization, 2003a; World Health Organization, 2003b). However, fruits and fresh vegetables are not regularly included in the menus of CKs. Moreover, a survey reported that the lowest prevalence of fruit and vegetable consumption was among users of CKs in Lima, the capital of Peru, as compared to CKs from other regions (Grupo de Opinion Publica de la Universidad de Lima, 2009). This situation can be complicated by perceptions and behaviors of the customers regarding fruits and vegetables, as information and awareness alone may not translate into behavior change (Raats et al., 1998). As a result, there is a need to determine what demographic

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and behavioral factors could be important when implementing interventions promoting healthy eating habits to tackle chronic diseases.

This study aims to explore the sociodemographic and behavioral factors, assessed by the intention to change eating and exercise-related habits, associated with greater fruit and vegetable consumption in a sample of customers of CKs.

2. Materials and methods

2.1. Design and study setting

A cross-sectional study, involving usual customers of Community Kitchens in Lima, Peru, was performed. Two different areas were considered: Las Pampas de San Juan de Miraflores, located in Southern Lima, and the Cercado, located in the center of Lima. This study was conducted between July and December 2013 and was part of the formative research related to a feasibility community intervention to introduce healthy items, including fruits and vegetables, into the usual menus prepared by CKs (Buttorff et al., 2015).

2.2. Study population

This study included men and women aged ≥ 18 years, who reported having purchased a meal from the CKs at least once during the previous week, and who consented to participate. Those who did not pay for their food (cooks and those who cannot afford a meal but receive one as part of the activities of the CKs) were excluded. Only one person per household was enrolled. Only nine customers per Community Kitchen were selected in consecutive order during sales.

2.3. Study variables

The outcome of interest was the self-reported consumption of fruits and vegetables measured using questions of the STEPwise approach to surveillance of the World Health Organization (WHO STEPs) (World Health Organization, 2008). Questions were based on the number of days per week, over the last four weeks, during which the participant reported eating fruits and vegetables, and the number of servings eaten per day. Information was then categorized according to the WHO recommendation, i.e. ≥ 5 or < 5 servings of fruits and vegetables per day (World Health Organization, 2003a; World Health Organization, 2003b).

The exposures of interest were evaluated in two groups: sociodemographic characteristics and those related to intention to change to healthier lifestyle behaviors in the previous four weeks. Sociodemographic information included gender, age (< 30 , 30–59, and ≥ 60 years), education level (< 7 years, 7–11 years, ≥ 12 years), socioeconomic status (assessed by the monthly familial income, based on the Peruvian minimum wage (up to 750 NS, 751–1500 NS and > 1500 NS)), marital status (married/cohabitating partner, single, and separated/widowed), and place of birth (Lima vs. migrant).

Intention to change to better eating and exercise-related behaviors was evaluated by using questions related to the Stages of Change theory (Krummel et al., 2004; Prochaska et al., 1992). For this analysis, we used the self-report of the intention over the last four weeks to (a) lose or not gain weight, (b) do more exercise or physical activity, (c) reduce the amount of salt in foods, (d) eat less fats or fried foods, (e) consume less sugar, sweets or sodas, (f) eat more fruits, and (g) eat more vegetables. Each of these changes in behavioral intentions was assessed individually based on information of the previous four weeks, and only two response options were available: yes or no.

2.4. Procedure and data collection

Data was collected as part of a study to assess the preferences of customers of the CKs to evaluate the feasibility of implementing an

intervention to increase availability of fruits and vegetables in the menus provided by CKs (Buttorff et al., 2015). Fieldworkers were trained before starting research activities. During their visits to the Community Kitchens, potential participants were informed about the nature of the study and were asked to participate. If participants were not able to respond to the questionnaire at that time, a subsequent visit was scheduled. Completing the questionnaire took approximately 20 min. Only nine customers were interviewed at each Community Kitchen, and once the number was reached, enrollment commenced in a new CK.

2.5. Sample size

Assuming a level of significance of 5% and a prevalence of 10% of recommended consumption of fruits and vegetables (Jack et al., 2013), with 420 participants, there was a power over 80% to detect a strength of association of 2.5 or more when the exposure variable of interest (demographic or change in behavioral intention) was $> 25\%$.

2.6. Statistical analysis

All analyses were conducted using STATA 13.0 for Windows (STATA Corp, College Station, TX, US). Initially, descriptive characteristics of the study population were tabulated according to the WHO-recommended consumption of fruits and vegetables. Relative frequencies were reported and comparisons were performed using the Chi-square test. In addition, prevalence of variables of interest and 95% confidence intervals (95% CI) were estimated.

Poisson regression models with robust standard errors (Barros & Hirakata, 2003; Coutinho et al., 2008) were created to estimate prevalence ratios (PR) and 95% CI. Two different models were generated in order to verify the associations of interest. The first model identified sociodemographic factors independently associated with the WHO-recommended consumption of fruits and vegetables, while the second model was used to assess the association between changes of behavioral intention and the outcome of interest adjusting for potential confounders including gender, age, education level, socioeconomic status, and place of birth. To control for potential similarities among participants from the same Community Kitchen, the regression standard errors in clustered samples in STATA was used (Rogers, 1993).

2.7. Ethics

This study and informed consent forms were reviewed and approved by the Institutional Review Board at the Universidad Peruana Cayetano Heredia, Lima, Peru.

3. Results

3.1. Characteristics of the study population

A total of 432 participants from 48 Community Kitchens (24 from each study area) were enrolled. Of these, data from 10 subjects (2.3%) were excluded due to lack of information regarding the outcome of interest. Thus, a total of 422 records were analyzed: 328 (77.9%) were from women, and the mean age of all analyzed records was 43.7 (SD: 14.5).

3.2. Consumption of fruits and vegetables

Only 36 (8.5%; 95% CI: 5.9%–11.2%) participants reported consuming ≥ 5 servings of fruits or vegetables per day. The characteristics of the study population according to the consumption of fruits and vegetables are detailed in Table 1. Education level and place of birth, but not familial income, were associated with a greater consumption of fruits and vegetables. Among the intention to change variables, those reporting a consumption of ≥ 5 servings of fruits or vegetables per day also reported

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