

# Association of diet with the risk of prostate cancer in Western Algeria

## Association alimentation–cancer de la prostate dans l'Ouest Algérien

A. Berroukche<sup>1,2,3,4</sup>, M. Bendahmane<sup>1,2</sup>, BA. Kandouci<sup>1</sup>

<sup>1</sup>Research Laboratory of Environment and Health (RLEH), Faculty of Medicine, University Hospital - Complex (UHC) of Sidi-Bel-Abbes, Algeria

<sup>2</sup>Department of Biology, Faculty of Sciences, University of Sidi-Bel-Abbes, Algeria

<sup>3</sup>Department of Urology, Ahmed-Medgheri Hospital, Saida, Algeria

<sup>4</sup>Department of Biology, Faculty of Sciences and Technology, University of Saida, Algeria

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**Abstract:** *Aim :* Prostate cancer (Pca) is the most common cancer in men. Etiology of Pca is unknown. However, dietary factors are suspected. A case-control study was carried out in western Algeria to assess a possible association of diet with the risk of Pca.

*Procedure :* The study population consisted of 160 patients, aged 50–74 years, with histologically confirmed Pca and controls were 160 men of the same age group.

*Results :* Positive findings were obtained for the consumption of red meat (OR: 2.1, 95% CI: 1.1–3.9) and dairy products (OR: 2.2, 95% CI: 1.2–4.1), whereas the consumption of olive oil (OR: 0.5, 95% CI: 0.3–1.1) and green tea (OR: 0.6, 95% CI: 0.3–1.1) were negatively associated with Pca.

*Conclusion :* The risk was not statistically associated with all foods selected in this study. Possible mechanisms are discussed.

**Keywords:** Prostate cancer – Dietary factors – Case-control study

**Résumé :** *Objectif :* Le cancer de la prostate (CaP) est le cancer le plus fréquent chez l'homme. Son étiologie est inconnue. Cependant, les facteurs alimentaires sont suspectés. Une étude cas-témoins a été réalisée dans l'Ouest

Algérien pour évaluer une éventuelle association entre le régime alimentaire et le risque du CaP.

*Matériel et méthodes :* La population d'étude était formée de 160 cas, âgés entre 50–74 ans, avec un CaP histologiquement confirmé et 160 témoins du même groupe d'âge.

*Résultats :* Des résultats positifs ont été obtenus pour la consommation de viande rouge (OR : 2,1 et IC 95 % : 1,1 à 3,9) et produits laitiers (OR : 2,2 et IC 95 % : 1,2 à 4,1), alors que les consommations de l'huile d'olive (OR : 0,5 et IC 95 % : 0,3 à 1,1) et de thé vert (OR : 0,6 et IC 95 % : 0,3 à 1,1) étaient inversement associées au CaP.

*Conclusion :* Le risque n'était pas statistiquement associé à tous les aliments sélectionnés pour cette étude. D'éventuels mécanismes sont à discuter.

**Mots clés :** Cancer de la prostate – Facteurs alimentaires – Étude cas-témoins

## Introduction

Prostate cancer (Pca) is not common among Algerian men. Incidence rate and mortality for Pca are low in Algeria with respectively 7.1 and 5.3 per 100 000 [6]. It is

suggested that dietary habits are involved in the development of Pca. Many studies have reported that high intakes of fat increase the risk of Pca [5], whereas high intake of polyphenols and isoflavones may reduce the risk [9]. However, the incidence rate of Pca, in Algeria, may increase if the population will be exposed to new food industries. Because of the lack of studies between dietary factors and the risk of Pca among men in African countries, we aimed to assess a possible association of diet with Pca in population of patients recruited in two hospitals of western Algeria.

## Materials and methods

The study was conducted in western Algeria from January 2007 to March 2011. Among a total of 204 incident patients, who had a confirmed histological prostate carcinoma, 44 patients could not participate in this study. The final group consisted of 160 Pca cases. Ninety-eight cases were obtained from the Department of Urology of Sidi-Bel-Abbes UHC and 62 cases from the Department of Urology of Saida Hospital. The age range was 50–74 years. The stage distribution of Pca was as follows: localized 22%, regional 74% and disseminated 4%. During the same period, a total of 160 controls were selected from the departments of respiratory diseases, ophthalmology and dermatology of the same hospitals as

the cases. Controls were matched to cases in frequency of 1:1 by age ( $\pm 5$  years). The distribution of controls by disease category was as follows: asthma (41.7%), cataract (50.2%) and dermatosis (8.1%). Exclusion criteria for controls were having other prostatic diseases or malignant tumours, being under dietary restriction and patients in critical conditions. This study was approved by the scientific committee of LREH of Sidi-Bel-Abbes UHC. Informed consent was given by all subjects.

Epidemiological and dietary data were obtained using a standard questionnaire. Dietary information was obtained by a quantitative history approach in which subjects were asked about their usual frequency of intake and portion size of a list of 20 main food items including beverages, representative of usual diet of the Algerian population. The technique was similar to the one used by Czopp and Serfati [2], although somewhat modified and adapted to suit the Algerian diet. This questionnaire was not previously validated but was studied regarding its reproducibility. For each food item, the patient indicated mean intake frequency and the amount consumed over the past year or the year prior to onset of symptoms. For a more adequate evaluation of quantities consumed, we have used in interview photographs of food items in different portion sizes of known quantity. As measurements of consumption, standard cups, spoons and slices were used. The following food groups were analyzed in this study:

- red meat, i.e. beef and lamb;
- fish, i.e. sardine;
- milk;
- dairy foods, i.e. cheese, butter and ice cream;
- olive oil;
- dry vegetables, i.e. beans and lentils;
- green-yellow vegetables, i.e. tomato and cauliflower;
- fruits, i.e. grenade and dates;

– beverages, i.e. green tea, coffee and soft beverages (soda water and lemonade).

Descriptive statistics were calculated using SPSS 11.5 package. Groups of cases and controls were described by their number, mean, median and standard deviation (SD). The characteristics of cases were compared to those of controls using the chi-square ( $\chi^2$ ) or Students *t*-test. Adjusted odds ratios (ORs) and 95% confidence intervals (CI) of foods and beverages for Pca were calculated by conditional logistic regression models with adjustment for tobacco smoking, total energy intake and a family history of Pca. *P*-value < 0.05 was considered statistically significant. Because some controls were selected from patients with smoking-related diseases, such as cataracts and respiratory diseases, we adjusted for tobacco smoking in the analyses. Energy adjustment was performed by a logistic regression model that used total energy as a confounding factor. A family history of Pca was considered as potential factor, because association with Pca risk was observed. To facilitate statistical analysis, food items and beverage intakes were classified into quartiles on the basis of their

distribution among control subjects. The lowest quartile, with an OR of 1.00, was the reference quartile throughout the analysis.

## Results

Sociodemographic characteristics of two groups of patients and family history of Pca in a first-degree relative are described in Table 1. There is no significant difference between cases and controls (*P*-value > 0.05). Cases were not much older than controls (71.6 vs. 68.3 years). Cases lived more frequently inside towns of Sidi-Bel-Abbes and Saida, and were more frequently urban residents (66.2%). Most cases had a low level of education, particularly in the primary level with a rate of 48.7%. Although these differences were not statistically significant (*P*-value > 0.05), cases were less educated than controls. For the type of occupational activity, cases show a high rate in the type of work (i.e. office work) and they worked more at office than controls (64.3 vs. 56.8%) (*P*-value < 0.05). On the other hand, family history of Pca was much more frequent among cases than controls (32.9 vs. 15%) (*P*-value = 0.01).

**Table 1. Basic and demographic characteristics of Pca cases and controls.**

Variables	Cases (n = 160)	Controls (n = 160)	P-value
<b>Age (years)</b>			
Mean ( $\pm$ SD)	71.6 $\pm$ 10	68.3 $\pm$ 9.4	0.07
Median	71	68	
<b>Residence, n (%)</b>			
Urban	106 (66.2)	113 (70.6)	0.1
Rural	54 (33.8)	47 (29.4)	
<b>Education, n (%)</b>			
Unknown	37 (23.1)	34 (21.2)	0.3
Primary	78 (48.7)	60 (37.5)	
Secondary	21 (13.1)	39 (24.3)	
University	24 (15.1)	27 (17.0)	
<b>Occupational activity, n (%)</b>			
Work at office	103 (64.3)	91 (56.8)	0.04
Manual work	57 (35.7)	69 (43.2)	
<b>Family history of Pca, n (%)</b>			
No	109 (68.1)	136 (85)	0.01
Yes	51 (32.9)	24 (15)	
<b>Tobacco smoking, n (%)</b>			
Never	55 (35.8)	64 (40)	>0.05
Former smoker	62 (43.4)	57 (35.6)	
Smoker	43 (20.8)	39 (24.4)	