Original article

Comorbidity and socio-demographic factors associated with renal lithiasis in persons aged 40 to 65: A cross-sectional study[☆]

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ABSTRACT

Background and objective: Renal lithiasis is one of the most important urological diseases. It seems to be related to different socio-demographic and climatic factors, lifestyle and pre-existing comorbidity. The aim of this study was to examine the relationship between socio-demographic variables, certain risk factors and chronic diseases and the renal lithiasis.

Patients and method: A cross-sectional population-based study was carried out, selecting the Spanish population aged from 40 to 65 years, combining 2 random samples (PreLiRenA and PreLiRenE studies). Data were collected by personal telephone surveys, gathering information on socio-demographic variables and perceived morbidity. Data on annual average temperatures in each Spanish region were also collected. A bivariate and multivariate analysis was performed.

Results: A total of 4894 subjects were surveyed; 51.3% were women; 25% were aged 40–45 years, 36% had primary school education and 31.4% were of low social class. The overall prevalence of renal lithiasis was 15.0% (95% confidence interval [95% CI] 14.5–15.5). By means of multivariate analysis, the variables that showed a strong statistical relationship with the presence of renal lithiasis were: older age (61–65 years; OR = 1.39; 95% CI 1.06–1.80), high social class (OR = 1.98; 95% CI 1.29–2.62), family history of renal lithiasis (OR = 2.22; 95% CI 1.88–2.65), high blood pressure (OR = 1.68; 95% CI 1.39–2.02) and overweight/obesity (OR = 1.31; 95% CI 1.12–1.54). A correlation was observed between renal lithiasis and average annual temperatures in the Spanish regions ($r = 0.59$; $p = 0.013$).

Conclusions: A relationship was observed between renal lithiasis and older age, belonging to higher social classes, the existence of a family history of urolithiasis, and hypertension and overweight or obesity. The prevalence of renal lithiasis is greater in warmer climate zones.

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Comorbilidad y factores sociodemográficos asociados a litiasis renal en personas de 40 a 65 años: estudio transversal

RESUMEN

Fundamento y objetivo: La litiasis renal es una de las enfermedades urológicas más importantes. Parece estar relacionada con factores sociodemográficos y climáticos, estilos de vida y comorbilidad preexistente. El objetivo de este trabajo fue examinar la relación entre variables sociodemográficas, ciertos factores de riesgo y enfermedades crónicas, y la litiasis renal.

Pacientes y método: Se realizó un estudio transversal, seleccionando a población española de 40 a 65 años, combinando 2 muestras aleatorias (PreLiRenA y PreLiRenE). Los datos fueron recogidos por encuestas telefónicas personales, recopilando información sobre variables sociodemográficas y la morbilidad percibida. También se recogieron datos sobre las temperaturas medias anuales en cada región española. Se realizó un análisis bivariado y multivariado.

Resultados: Fueron encuestados 4.894 sujetos; el 51,3% eran mujeres; el 25% tenían entre 40 y 45 años; el 36% tenían educación primaria y el 31,4% eran de clase social baja. La prevalencia global de litiasis renal fue del 15,0% (intervalo de confianza al 95% [IC 95%] 14,5–15,5). Por medio del análisis multivariado, las variables que mostraron una fuerte relación estadística con la presencia de litiasis renal fueron: edad avanzada (61-65 años, OR = 1,39; IC 95% 1,06-1,8), clase social alta (OR = 1,98; IC 95% 1,29-2,62), antecedentes familiares de litiasis renal (OR = 2,22; IC 95% 1,88-2,65), hipertensión arterial (OR = 1,68; IC 95% 1,39-2,02) y sobrepeso/obesidad (OR = 1,31; IC 95% 1,12-1,54). Se observó una correlación entre la litiasis renal y las temperaturas medias anuales en las regiones españolas (r = 0,59; p = 0,013).

Conclusiones: Existe relación entre litiasis renal y edad avanzada, pertenecer a clases sociales altas, existencia de antecedentes familiares de urolitiasis, y tener hipertensión y sobrepeso/obesidad. La prevalencia de la litiasis renal es mayor en las zonas climáticas más cálidas.

Introduction

Renal lithiasis (RL) currently represents one of the nephro-urological pathologies of greatest magnitude, with increasing prevalence and incidence, due to its clinical and social significance, its direct and indirect costs.[1,2] Although RL has traditionally been considered an exclusively kidney-related problem, there is evidence to suggest that it is a systemic disorder, being associated with epidemiological factors, other health problems such as type II diabetes mellitus (DM), high blood pressure (HBP), obesity and overweight (individually or as part of accompanying factors that constitute metabolic syndrome, with which it seems to share certain biochemical processes), gout, primary hyperparathyroidism, stress and their consequences.[3] Similarly, it seems that lifestyles (mainly diet and exercise) and environmental factors, such as the hardness of drinking water or climate, could be related to the likelihood of suffering renal lithiasis.[4] It is accepted that RL episodes occur more frequently during the warmer months of the year, due to increased perspiration, leading to a more concentrated urine and a higher probability of crystalluria. An exception to this rule has been reported in some studies conducted in countries with colder climate where these conclusions cannot be drawn.[5] Because RL is a complex disease, an understanding of the epidemiology, particularly the interactions among different factors, may help lead to approaches that reduce the risk of stone formation.[6]

The aim of this study was to determine the relationship with RL of certain epidemiological factors, both socio-demographic and comorbidity and climate-related factors, in the Spanish population aged 40–65 years. For this purpose, we based our conclusions on data from two population-based studies carried out by our team in Spain: the PreLiRenA study[7] (conducted in Andalusia, a region in southern Spain); and the PreLiRenE study[8] (a study that covered the entire country). In this way, we sought to obtain a large sample in order to check more consistent and accurate relationships from the statistical standpoint between the factors studied and RL.

Materials and methods

Design

This was an observational, cross-sectional, population-based survey conducted by telephone. The prevalence results obtained in the PreLiRenA study[7] and the PreLiRenE study[8] have been published. To analyze the relationship between average temperature by region and the prevalence of RL, an ecological correlation study was performed.

Participants

The selection criteria in both studies were similar: Spanish subjects of both sexes, aged between 40 and 65 years. The exclusion criteria were as follows: inability to communicate, foreigners, or refusal to participate in the study.

Sample size

To estimate sample size in the PreLiRenA study, consideration was given to an expected proportion of RL of 5.0% (prevalence study by Sánchez-Martín,[9] a confidence level of 95%, an accuracy of ±1.1%, and a non-response rate of 25%; the estimated size was 2432 subjects.

To calculate the sample size of the PreLiRenE study, we used the prevalence result reported in the PreLiRenA study[7]: an expected proportion of 16.4%, setting a precision level of ±1.6% and a non-response rate of 25%, yielding a sample size of 2449 subjects.

The fieldwork for these studies was conducted from September 2011 to June 2012 in the PreLiRenA study, and from May 2013 to November 2014 in the PreLiRenE study.

Sources of information and sampling

In the PreLiRenA study a stratified random sample was conducted by Andalusian provinces, sex and five-year age groups, while in the PreLiRenE study this was done by region, sex and five-year age groups. The subjects in the PreLiRenA sample were obtained from the Andalusian Health Service Users Database. The sample data from the PreLiRenE study were extracted from the continuous census of the Spanish population of the National Statistics Institute (www.ine.es). An ad hoc questionnaire was prepared; the same questionnaire was used for both studies.

To collect data on weather variables, statistics on the study of the physical environment from the National Statistics Institute were used, together with those provided by the State Meteorological Agency (www.aemet.es).

The information was obtained through personal telephone interviews using the Andalusian Health Service Users Database in the PreLiRenA study, while in the PreLiRenE study the CATI (Computer Assisted Telephone Interviewing) system was used, which makes a random selection of telephone numbers and manages data obtained in the survey using the Gandia Integra programme (http://www.tesigandia.com/en/gandia-integra-catinet/), which can be used for conducting online surveys, in addition to guaranteeing anonymity, completion of the sampling plan and improved reliability of the coding of responses. When a telephone