Methodology used in studies reporting chronic kidney disease prevalence: a systematic literature review

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SysKid Collaborative Project
Systems Biology towards Novel Chronic Kidney Disease Diagnosis and Treatment

Leading European Nephrology
ERA-EDTA Registry

Background

Many publications report chronic kidney disease (CKD) prevalence in the general population. Comparisons across studies are hampered as CKD prevalence estimations are influenced by study population characteristics and laboratory methods.

Methods

For this systematic review, two researchers independently searched PubMed, MEDLINE and EMBASE to identify all original research articles reporting the prevalence of CKD in the European adult general population, which were published between January 1st 2003 and November 1st 2014. Data on study methodology and reporting of CKD prevalence results were independently extracted by two researchers.

Results

General-population sampling

There was considerable variation in population sample selection.
54% did not report the sampling frame used.

65% reported the response.
The reported response ranged from 10% to 87%.

Assessment of kidney function

67% used a Jaffe creatinine assay.
13% used the enzymatic creatinine assay.
29% used Isotope dilute mass spectrometry (IDMS) calibration.
60% assessed urinary markers of CKD.

The CKD-EPI (52%) and MDRD (75%) equation were most often used to estimate Glomerular Filtration Rate (eGFR).

95% reported CKD stage 3-5 prevalence.
38% reported CKD stage 1-5 prevalence.

Presentation of results

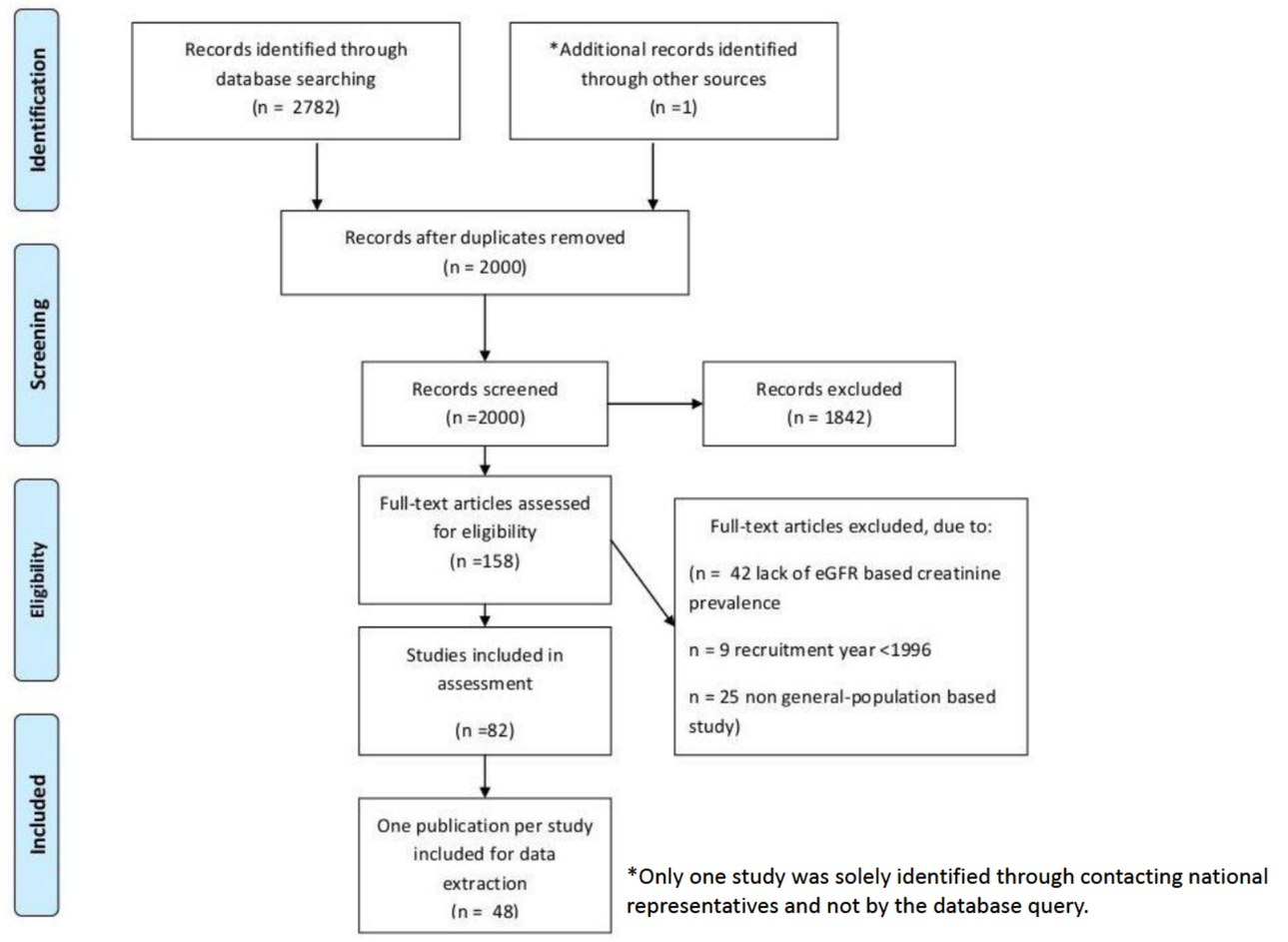
CKD prevalence was reported by sex and age strata in 54% and 50% of studies, respectively.

39% of papers with a primary objective of reporting CKD prevalence, reported a 95% confidence interval.

Conclusions

The findings from this systematic review showed considerable variation in methods for sampling the general population and assessment of kidney function across studies reporting CKD prevalence. These results are utilized to provide recommendations to help optimize both the design and the reporting of future CKD prevalence studies, which will enhance comparability of study results.

Flow chart of publication selection



*Only one study was solely identified through contacting national representatives and not by the database query.

Recommended methodology for comparison of CKD prevalence results

Recommended tools	Details
1.General-population sampling	
Sampling methods	Describe: -sampling frame, i.e. source used to identify subjects -sample design, i.e. method of subject selection (e.g. age stratified, random etc.)
Response	Report the response in percentages
2.Assessment of kidney function	
Serum creatinine assay	Describe assay used, i.e. Jaffe or enzymatic
Albuminuria assay	Describe assay used, e.g. immunoassay, dipstick etc.
IDMS calibration standardization	Describe if IDMS calibration standardization was used (yes/ no)
CKD definition	Use of the same definition of CKD: CKD stage 1-5: eGFR <60ml/min/1·73m² calculated by the CKD-EPI equation and /or ACR > 30mg/g CKD stage 3-5: eGFR <60ml/min/1·73m² calculated by CKD- EPI equation
3.Presentation of results	
CKD prevalence estimate	Report: - unadjusted and adjusted CKD prevalence (e.g. standardized to the EU27 population) - 95% confidence interval
CKD prevalence estimate by strata	Report: - stratified by age group: 20-44, 45-64, 65-74 and 75-84 years - stratified by diabetic, hypertension, and obesity status
Serum creatinine determination	Indicate in tables and figures which studies use: - Jaffe or enzymatic assay - IDMS calibration standardization

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J3) Chronic Kidney Disease. Clinical Epidemiology.
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DOI: 10.3252/pso.eu.52era.2015
ePosters supported by F. Hoffmann- La Roche Ltd.
52nd ERA-EDTA CONGRESS London 2015 United Kingdom MAY 28th
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