

STROBE Statement - Updated Checklist for Cross-Sectional Study

Article: Seasonal Variation in Vitamin D Levels and Association With Albuminuria in Patients With Diabetic Nephropathy: A Retrospective Cross-Sectional Study (IJVNR54395)

Page numbers refer to the manuscript PDF. The checklist is mapped only to content actually reported in the article; unsupported inferences have been removed. Items only partly covered, not reported, or not applicable are explicitly marked.

Section	Item	STROBE recommendation	Location in manuscript / corresponding content	Status
Title and abstract	1(a)	Indicate the study design with a commonly used term in the title or abstract.	Title and Abstract, p. 1: the title states "A Retrospective Cross-Sectional Study"; the Methods sentence in the abstract also identifies the design as retrospective cross-sectional.	Reported
Title and abstract	1(b)	Provide in the abstract an informative and balanced summary of what was done and what was found.	Abstract, p. 1: Background, Methods, Results, and Conclusions summarize the population (n=298), seasonal grouping, 25(OH)D, albuminuria, statistical analyses, main findings, and the need for prospective studies.	Reported
Introduction	2	Explain the scientific background and rationale for the investigation being reported.	Introduction, pp. 1-2: DN burden, albuminuria, RAAS, Vitamin D biology, seasonal variation, and the evidence gap are described.	Reported
Introduction	3	State specific objectives, including any prespecified hypotheses.	End of Introduction, p. 2: the study aims to compare Vitamin D levels among patients attending in different seasons and evaluate associations with metabolic and renal parameters, particularly albuminuria. No prespecified hypothesis is stated, but the objective is explicit.	Reported
Methods	4	Present key elements of study design early in the paper.	Section 2.1 Study Population, p. 2: electronic health records were retrospectively reviewed; the title and abstract identify the cross-sectional design.	Reported
Methods	5	Describe the setting, locations, and relevant dates, including periods of recruitment/exposure/follow-up/data collection.	Section 2.1, p. 2: outpatient clinics of Suleyman Demirel University Research and Application Hospital; records from 1 Jan 2017 to 31 Dec 2023.	Reported
Methods	6(a)	Give eligibility criteria, and the sources and methods of selection of participants.	Sections 2.1-2.2 and Fig. 1, p. 2: adults with type 2 diabetes and predefined DN criteria were screened from electronic records; exclusion criteria are listed, including eGFR <30/active dialysis, stage IV heart failure, malignancy, persistent UTI, uncontrolled hypertension, and recent Vitamin D replacement.	Reported
Methods	7	Clearly define outcomes, exposures, predictors, potential confounders, and effect modifiers; give diagnostic criteria if applicable.	Sections 2.1 and 2.3, pp. 2-3: DN diagnostic criteria, season definitions, 25(OH)D categories, UACR/albuminuria, demographic/biochemical variables, and ACEI/ARB use are defined or described. However, potential confounders and effect modifiers are not explicitly prespecified or defined as such.	Partial
Methods	8*	For each variable of interest, give data sources and measurement methods; describe comparability if there is more than one group.	Section 2.3, pp. 2-3: the hospital information system is the data source; AU5800, Tosoh HLC-723G8, and Siemens Atellica analyzers are specified. Measurement methods are described for the cohort as a whole; no separate group-specific measurement method is reported.	Reported
Methods	9	Describe efforts to address potential sources of bias.	Sections 2.1-2.4, pp. 2-3: only the first eligible visit was analyzed to avoid duplicate observations; predefined eligibility/exclusion criteria and calendar-based season definitions were used; missing-data procedures are stated. Limitations, pp. 8-9, acknowledge residual confounding. A dedicated strategy addressing selection/information bias is not described.	Partial
Methods	10	Explain how the study size was arrived at.	Section 2.1 and Fig. 1, p. 2: records from the defined 2017-2023 period were screened (n=3008), and 298 patients meeting eligibility criteria remained after exclusions. This explains the realized study size for the retrospective record review; no prospective sample-size calculation is reported.	Reported
Methods	11	Explain how quantitative variables were handled in the analyses and, if applicable, which groupings were chosen and why.	Sections 2.3-2.4, pp. 2-3: seasons are defined by calendar dates; 25(OH)D is categorized as <12, >=12 to <20, and >=20 ng/mL; normal and non-normal continuous variables are summarized and analyzed with different methods.	Reported
Methods	12(a)	Describe all statistical methods, including those used to control for confounding.	Section 2.4, p. 3: normality assessment; t-test/Mann-Whitney U; ANOVA/Tukey HSD; Kruskal-Wallis/pairwise Mann-Whitney with Bonferroni; Pearson/Spearman correlations; and multiple linear regression with season dummy variables and selected covariates.	Reported
Methods	12(b)	Describe methods used to examine subgroups and interactions.	Sections 2.3-2.4, pp. 2-3: methods are given for comparisons across seasonal groups, Vitamin D categories, and two-group comparisons; a sex-based UACR comparison is reported in Results/Fig. 2. No formal interaction analysis is described.	Partial
Methods	12(c)	Explain how missing data were addressed.	Section 2.4, p. 3: variable-specific data availability is given; missing data were not imputed; available-case analysis was used for group comparisons and complete-case analysis for regression; PTH was excluded from the multivariable model because of extensive missingness.	Reported

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Methods	12(d)	If applicable, describe analytical methods taking account of sampling strategy.	Not applicable: this is a retrospective single-center clinical record review; no complex or probability sampling design is described.	Not applicable
Methods	12(e)	Describe any sensitivity analyses.	No sensitivity analysis is described in the Methods or Results.	Not reported
Results	13(a)*	Report numbers of individuals at each stage of study.	Fig. 1 and Section 2.1, p. 2: 3008 records screened, 2710 excluded, 298 included; seasonal groups: winter 70, spring 73, summer 80, autumn 75.	Reported
Results	13(b)*	Give reasons for non-participation at each stage.	Fig. 1, p. 2 lists the reasons for exclusion (DN criteria, low eGFR/active dialysis, stage IV heart failure or malignancy, persistent UTI, uncontrolled hypertension, and recent Vitamin D replacement). The total excluded is n=2710; separate counts by individual reason are not shown.	Reported
Results	13(c)*	Consider use of a flow diagram.	Fig. 1, p. 2 presents the patient-selection and seasonal-grouping flowchart.	Reported
Results	14(a)*	Give participant characteristics and information on exposures and potential confounders.	Section 3.1, p. 3 and Tables 1-2, pp. 4-5: sex, age, diabetes duration, BMI, blood pressure, ACEI/ARB use, renal/metabolic laboratory measures, and seasonal/Vitamin D group characteristics are reported.	Reported
Results	14(b)*	Indicate number of participants with missing data for each variable of interest.	Section 2.4, p. 3 gives the available n for PTH, LDL, calcium, phosphorus, FPG, uric acid, total cholesterol, HDL, triglycerides, and TSH; the remaining variables are stated to have complete data. Tables 1-3 also show variable-specific n.	Reported
Results	15*	Report numbers of outcome events or summary measures.	Sections 3.1-3.4, pp. 3-8; Tables 1-5 and Figs. 2-3 report 25(OH)D summary values, seasonal/Vitamin D-group comparisons, UACR/albuminuria distributions, correlations, and regression results.	Reported
Results	16(a)	Give unadjusted estimates and, if applicable, confounder-adjusted estimates with precision; make clear what was adjusted for and why.	Table 3, p. 6 provides unadjusted correlations. Tables 4-5, pp. 7-8 provide adjusted regression results; Table 5 reports B, standard error, standardized beta, t, and p, and identifies the adjusted variables. Section 2.4 states that variables significant in univariate analyses were entered and season was modeled with dummy variables. 95% CIs are not shown.	Reported
Results	16(b)	Report category boundaries when continuous variables were categorized.	Section 2.3, pp. 2-3: 25(OH)D categories are <12, >=12 to <20, and >=20 ng/mL; seasonal date boundaries are explicitly defined.	Reported
Results	16(c)	If relevant, translate estimates of relative risk into absolute risk for a meaningful time period.	Not applicable: no relative-risk or time-to-event effect estimate is reported in this cross-sectional analysis.	Not applicable
Results	17	Report other analyses, e.g., subgroups, interactions, and sensitivity analyses.	Section 3.3, pp. 3 and 6 reports the sex-based UACR comparison (Fig. 2); Tables 1-2 report Bonferroni-adjusted pairwise comparisons. These additional analyses are reported. No interaction or sensitivity analysis is reported elsewhere.	Reported
Discussion	18	Summarize key results with reference to study objectives.	Discussion, pp. 6-8 and Conclusions, p. 9: seasonal differences in 25(OH)D and the inverse cross-sectional association with albuminuria are summarized and linked to the study aim.	Reported
Discussion	19	Discuss limitations, including sources of potential bias or imprecision and their likely direction/magnitude.	Limitations, pp. 8-9: single-center retrospective design, different patients across seasons, lack of temporality, unstandardized diet/sun exposure, unmeasured confounders, missing PTH and other clinical data, and residual confounding are discussed. The likely direction/magnitude of these biases is not explicitly evaluated.	Partial
Discussion	20	Give a cautious overall interpretation considering objectives, limitations, multiplicity, similar studies, and other evidence.	Discussion, pp. 6-9 and Conclusions, p. 9: results are interpreted as cross-sectional associations; Bonferroni-adjusted pairwise findings and prior literature are discussed; causal or treatment effects are explicitly not claimed.	Reported
Discussion	21	Discuss generalisability (external validity) of the study results.	Limitations, pp. 8-9 identify the single-center retrospective design and incomplete confounder data, which bear on external validity, but generalisability is not explicitly discussed in a dedicated statement.	Partial
Other information	22	Give the source of funding and the role of the funders, if applicable.	Funding, p. 9: "This research received no external funding." With no external funder, a funder-role statement is not applicable.	Reported

Correction note: After direct comparison with the manuscript, Item 7 was changed from Reported to Partial because potential confounders/effect modifiers are not explicitly defined. Items 10, 13(b), 16(a), and 17 were changed to Reported because the manuscript does report how the realized study size was obtained, the exclusion reasons, adjusted estimates with standard errors and adjustment variables, and the additional analyses actually performed. Items 9, 12(b), 19, and 21 remain Partial; Item 12(e) remains Not reported.