STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	P.1	Title: "Association of a nurse-led structured insulin management program with glycemic control and medication safety in patients with type 2 diabetes"; Abstract: "To retrospectively evaluate..."
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	P.1	Abstract reports background, objectives, retrospective methods, sample size (120; 60 per group), intervention, outcomes at baseline and 3 months, main results, and cautious conclusion.
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	P.1-2	Introduction explains T2DM burden, insulin as a high-alert medication, barriers to safe insulin use, MTM principles, and gaps in evidence for nurse-led MTM-based insulin management.
Objectives	3	State specific objectives, including any prespecified hypotheses	P.2	Objective stated: to determine whether nurse-led MTM-based structured insulin management was associated with better short-term glycemic control, fewer hypoglycemic episodes/medication errors, and higher adherence, self-management and satisfaction.
Methods				
Study design	4	Present key elements of study design early in the paper	P.2	Study design: "This was a single-center retrospective comparative study based on medical records and nursing follow-up data..."
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	P.2	Setting/relevant dates: endocrinology outpatient service and nursing follow-up system of a tertiary hospital; patients treated between January 2024 and December 2024; baseline and 3-month follow-up data.
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	P.2	Eligibility criteria and source of participants are provided: adult

		Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants		T2DM patients receiving insulin therapy, baseline HbA1c >=8.0%, available baseline and 3-month data and follow-up records; exclusion criteria are listed.
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A	Not applicable. This was not a matched cohort study; no matching criteria were used. Patients were classified according to routine care model documentation.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	P.3	Primary outcomes: HbA1c, fasting blood glucose, recorded hypoglycemic episodes and insulin-related medication errors. Secondary outcomes: adherence, self-management ability and patient satisfaction. Definitions for hypoglycemia, recurrent hypoglycemia and medication errors are given.
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	P.3	Data sources/measurement: HbA1c and fasting blood glucose from hospital laboratory records; hypoglycemia from self-monitoring, nursing follow-up and medical records; medication errors from follow-up records, insulin diaries and medical records; questionnaire scores from nursing assessment forms.
Bias	9	Describe any efforts to address potential sources of bias	P.2-3	Bias control: group identity was coded as Group A/B during data cleaning and statistical analysis; limitations of retrospective records and non-random allocation are acknowledged.
Study size	10	Explain how the study size was arrived at	P.3	No formal sample size calculation was performed. Sample size was determined by eligible patient records available during the study period; findings considered exploratory.

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Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	P.3	Continuous variables were expressed as mean +/- SD or median (IQR); categorical variables as frequency and percentage. Self-management score was converted to a 0-100 scale.
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	P.3	Statistical analysis: SPSS 26.0; Shapiro-Wilk test and histograms; independent-samples t test/Mann-Whitney U test; chi-square/Fisher exact test; repeated-measures ANOVA or linear mixed-effects model; two-sided $p<0.05$.
		(*b*) Describe any methods used to examine subgroups and interactions	N/A	No subgroup or interaction analyses were reported.
		(*c*) Explain how missing data were addressed	P.3	Missing data were handled using complete-case analysis. No missing data were reported for primary glycemic outcomes.
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	P.2-4	Follow-up addressed through inclusion criterion requiring available baseline and 3-month HbA1c/FBG data; outcomes extracted after 3-month observation. No records were excluded after eligibility confirmation.
		(*e*) Describe any sensitivity analyses	P.3	Sensitivity analysis was not performed; manuscript states that sensitivity analysis may be considered in future studies if missing data are substantial.
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	P.4; Fig. S1	Results report 120 eligible patient records, 60 in structured management and 60 in usual care; Fig. S1 flow diagram shows 143 screened, 23 excluded, and 120 included/analyzed.
		(b) Give reasons for non-participation at each stage	Fig. S1	Excluded records: n=23. Reasons: incomplete data, non-eligible diabetes type, severe organ failure, and other exclusion criteria.
		(c) Consider use of a flow diagram	Fig. S1	A participant record flow diagram is provided as Fig. S1.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P.4; Table 1	Baseline demographic and clinical characteristics are shown in Table 1, including age, sex, diabetes duration, BMI, baseline HbA1c, baseline FBG, and insulin regimen.

		(b) Indicate number of participants with missing data for each variable of interest	P.4	The manuscript states no missing data were reported for the primary glycemic outcomes. Detailed socioeconomic characteristics and comorbidities were not comprehensively available.
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	P.2-4	Follow-up period was 3 months; outcomes were extracted at baseline and after the 3-month observation period.
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	P.4-7; Tables 2-7	Outcome data reported over time: HbA1c (Table 2), FBG at baseline/1/2/3 months (Table 3), hypoglycemia (Table 4), medication errors (Table 5), adherence/self-management (Table 6), and satisfaction (Table 7).
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A	Not applicable. This was not a case-control study.
		Cross-sectional study—Report numbers of outcome events or summary measures	N/A	Not applicable. This was not a cross-sectional study.
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	P.4-7; Tables 2-7	Main results include between-group estimates and 95% CIs where appropriate, e.g., HbA1c difference -0.9 percentage points (95% CI -1.24 to -0.56), FBG difference -1.4 mmol/L (95% CI -1.93 to -0.87), and risk differences for hypoglycemia and medication errors.
		(*b*) Report category boundaries when continuous variables were categorized	N/A	No continuous variables were categorized for the main analyses.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	P.4-6; Tables 4-5	Absolute risk differences are reported for hypoglycemia and insulin-related medication errors over the 3-month observation period.

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Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A	No subgroup, interaction, or sensitivity analyses were reported.
Discussion				
Key results	18	Summarise key results with reference to study objectives	P.7-8	Discussion summarizes key results: nurse-led structured insulin management was associated with improved short-term glycemic outcomes and fewer documented insulin-related safety events.
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	P.8	Limitations discussed: single-center retrospective design, selection/information bias, dependence on record quality, unmeasured socioeconomic/comorbidity/diet/activity/medication confounders, self-designed scales, short follow-up, and multi-component intervention.
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	P.7-9	Interpretation is cautious: benefits are possible but exploratory; mechanisms are discussed as possible rather than definite; findings should be confirmed in prospective randomized studies.
Generalisability	21	Discuss the generalisability (external validity) of the study results	P.8	Generalisability addressed in future directions/limitations: multicenter studies and evaluation of cost-effectiveness, staffing model and implementation feasibility are needed.
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	P.9	Funding statement: “There was no funding.” No funder role is applicable.

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.