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Association between DDT or its byproducts and T2DM: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 15 August 2025 and was last updated on 15 August 2025.

INTRODUCTION

Review question / Objective We conducted a systematic review and meta-analysis to quantify the association between DDT or its byproducts and T2DM.

Condition being studied Type 2 Diabetes Mellitus (T2DM), also known as adult-onset diabetes, represents 90%-95% of all diabetes cases. Numerous risk factors, such as environmental toxins including DDT and its byproducts, have an impact on T2DM. Epidemiological studies in many groups have demonstrated a stronger link between the risk of T2DM and exposure to organochlorine insecticides, among of p,p′-DDT may play an important role in the aetiology of T2DM(12, 13). Exposure to p,p′-DDT and p,p′-DDE may affect glucose metabolism, cause insulin resistance, interfere with body thermogenesis, and affect the regulation of lipids and glucose, according to experimental animal research, in vitro and vivo evidence.

METHODS

Participant or population People with diabetes and DDT exposure.

Intervention NA.

Comparator NA.

Study designs to be included Cohort studies and case-control studies.

Eligibility criteria Inclusion criteria
The literature must include cohort or case-control studies that adhere to the PECOS principles (Population, Exposure, Comparability, Outcome, and Study Design). Study subjects must be selected based on their exposure to DDT and its byproducts, as well as whether they have been diagnosed with T2DM (gold standard for confirmed diagnosis of T2DM: fasting blood glucose ≥ 7.0 mmol/L, 2-hour glucose ≥ 11.1 mmol/L after glucose tolerance test or HbA1≥6.5%). Outcome indicators should be obtained through

standardized measurements of biological specimens, such as serum or adipose tissue.
Exclusion criteria
Non-English, such as reviews, expert commentaries, conference papers, and case studies; control populations with conditions other than T2DM, such as other renal diseases or insulin resistance; animal studies; studies with insufficient information on outcome effect indicators or those relying on environmental data or other indirect methods (questionnaires, lifestyle assessments) and studies where the full text is unavailable.

Information sources Electronic databases(PubMed, Web of science, Embase and so on).

Main outcome(s) NA.

Quality assessment / Risk of bias analysis The Risk Of Bias In Non-randomised Studies - of Exposure model.

Strategy of data synthesis We adopt stata17.0 for statistical analysis. We performed risk ratio (RR) or odds ratio (OR) and their associated 95% confidence interval (95% CI) to assess the risk of association between DDT or its byproducts exposure and T2DM, and considered a P value less than 0.05 to be statistically significant.

Subgroup analysis We used I2 to assess their heterogeneity (when significant heterogeneity was not present (I2<50%), we used fixed effects models; we used random effects models when significant heterogeneity was present (I2≥50%). We performed forest plot to evaluate the exist of heterogeneity.

Sensitivity analysis We performed sensitive analysis to evaluate the robustness and reliability of the combined results.

Country(ies) involved China.

Keywords DDT, byproducts, meta-analysis, T2DM, quantitative evidence.

Contributions of each author

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