

INPLASY

Propensity Score Matching in Liver Transplantation Research: Applications, Limitations, and Future Directions

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ADMINISTRATIVE INFORMATION**Support** - No support.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202680025**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 5 August 2026 and was last updated on 5 August 2026.**INTRODUCTION**

Review question / Objective This review provides a comprehensive methodological evaluation of propensity score (PS) use in LT research. Using a structured quantitative framework, we characterize how PS methods are implemented, assess the frequency of key methodological practices and reporting standards, identify common deficiencies in causal-inference diagnostics and post-matching analyses, and highlight opportunities for methodological improvement. Our aim is to help transplant surgeons, hepatologists, and clinical researchers critically appraise PS-based evidence and to promote greater methodological rigor, transparency, and reproducibility in future transplantation research.

Rationale No comprehensive information is available on the implementation of propensity score matching in liver transplantation.

Condition being studied Implementation of propensity score matching in liver transplantation research.

METHODS

Search strategy Electronic databases: PubMed/MEDLINE, Embase, Scopus, Web of Science, the Cochrane Library, and Google Scholar. From inception to March, 31 2026.

Participant or population Liver transplant studies.

Intervention Propensity score matching.

Comparator None applicable.

Study designs to be included Observational.

Eligibility criteria Eligible studies are original LT studies that used PSM, PS weighting, or closely related propensity-score methods to compare recipient, donor, graft, perioperative, preservation, oncologic, psychosocial, or health-economic

exposures. Studies are eligible if they include adult or pediatric liver transplantation populations and explicitly reported using a PS approach. Exclusion criteria are non-transplant studies, non-liver solid-organ transplantation studies unless used exclusively for methodological comparison, reviews without original data, editorials, letters without analyzable methods, animal studies, conference abstracts, and articles not available in English.

Information sources Electronic databases only. No conference abstracts. No grey literature.

Main outcome(s) - Propensity score estimated with logistic regression

- Nearest-neighbor matching used
- 1:1 ratio
- Caliper reported
- SMDs reported before and after matching
- Overlap/common support assessed
- Sensitivity analysis performed
- Matched-design analysis used
- Missing data strategy reported
- Use of IPTW or weighting rather than matching
- Use of ML or flexible PS estimation.

Additional outcome(s) None.

Data management All articles are stored in the Rayyan platform.

Quality assessment / Risk of bias analysis None applicable due to the methodological nature of the review.

Strategy of data synthesis Cross-tabulation.

Subgroup analysis None anticipated. Will be performed based on extracted information.

Sensitivity analysis None applicable due to the study design.

Language restriction English.

Country(ies) involved Italy.

Other relevant information None

Keywords Liver transplantation; Propensity score matching; Observational studies; Causal inference; Comparative effectiveness.

Dissemination plans Publication in peer reviewed journal.

Contributions of each author

Author 1 - Paolo De Simone - Study design.

Manuscript drafting and validation.

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Author 2 - Michael Ginesini - Data retrieval and extraction.

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