

BACKGROUND

Kidney transplantation is the preferred renal replacement therapy modality for end-stage kidney disease and have shown to be more cost-effective compared to dialysis. Nevertheless, this treatment option is still very much expensive, and costs incurred by the development of post-kidney transplant events can create significant economic burden. Many published studies described the cost of post-kidney transplant events and of post-kidney transplant care. However, to date, no studies systematically reviewed these costs.

STUDY OBJECTIVES

- To describe the costs of post-kidney transplant events.
- To identify the cost components associated with post-kidney transplant events and post-kidney transplant care and which cost components contribute the most.

METHODS

SEARCH STRATEGIES

- Three databases (MEDLINE, Embase, Econlit) from January 2012 to June 2022.
- Two concepts: economic burden and kidney transplants.
- Search strategies adapted from other systematic reviews which looked at either concepts [2-6].

STUDY SELECTION

- Two researchers independently screened the title / abstracts articles for eligibility, followed by single researcher screening the full texts

Inclusion criteria

- Studies that reported any cost of an event or complication incurred post-kidney transplant, either by the patients, their family members, or the healthcare system.
- Studies with a mixed population (i.e., patients who underwent kidney transplant and other operations / other conditions) were only included if they reported costs relating to events post kidney transplant separately.

Exclusion criteria

- Qualitative studies.
- Opinion articles.
- Budget impact analysis, cost effectiveness analyses, and HTA reports were excluded unless they reported the original sources of costs inputs.
- Studies that reported healthcare resource utilisation, without the cost.
- Studies with a study population below 18 years of age.
- Conference, meeting, or poster abstracts.
- Simulations & costing Studies

DATA EXTRACTION

- Study Characteristics:** (i) first and last name of the 'first' author, (ii) publication year, (iii) sample size, (iv) statistical analysis utilised, (v) payer perspective, (vi) country, (vii) study setting, (viii) follow-up time, (ix) study design, (x) data source.
- Cost Data:** (i) first and last name of the first author, (ii) publication year, (iii) type of cost (absolute, attributable, marginal), (iv) event type, (v) description of cost items, (vi) cost year, (vii) cost items, (viii) type of direct cost, (ix) cost-time point, (x) currency, (xi) mean cost (uninflated and inflated to 2021 USD).

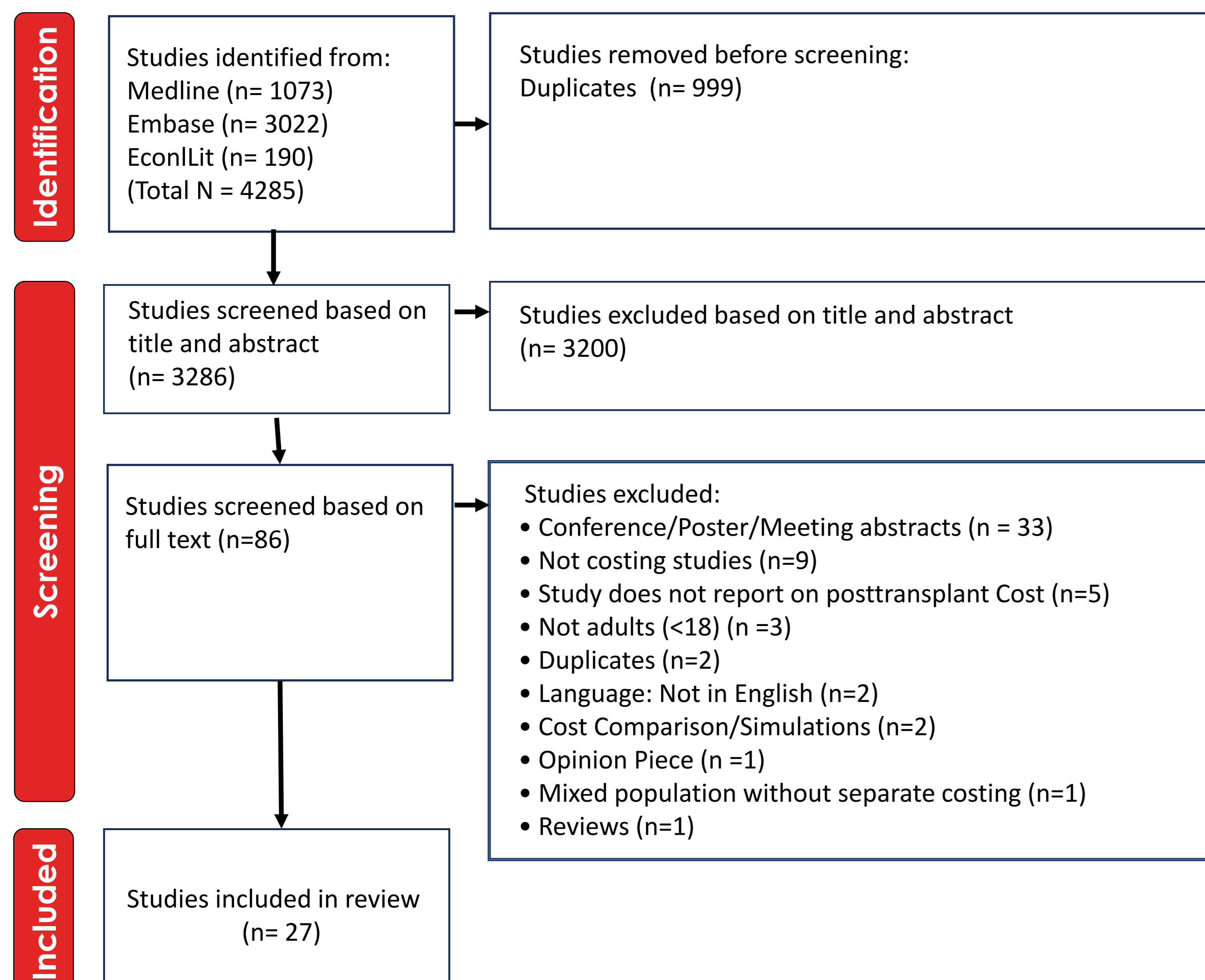
DATA ANALYSIS & PRESENTATION

- Narrative synthesis was used due to heterogeneity of data from the included studies.
- Costs were standardised to 2021 USD price, currency exchange was carried out using FRED economic data and then inflated to 2021 USD. Costs were presented as a mean unless stated otherwise.

QUALITY ASSESSMENT

- Using a modified reporting checklist from Ubrich et al. (2020) comprising three domains: (i) Study design (adequate reporting of objectives, study population etc) (ii) Data collection (methods and information reported), (iii) Analysis and Interpretation (process of analysis and interpretation of results).
- Each item was rated as adequately /not adequately/not reported

RESULTS: Study inclusion / exclusion flowchart



RESULTS: Characteristics of Included Studies

- Of 3286 unique articles screened, 27 studies were included. These were mostly cohort studies (62%) conducted in hospitals (37%), community (33%) or transplant centres (26%) from high-income countries (78%) published between 2018-2022 (78%).

RESULTS: Costs Associated with Specific Events

	Costs (USD 2021) per patient post-kidney transplant (PKT) or post-diagnosis (PD)					
	Inpatient			Outpatient		
	<1 year	1 year	> 1 year	<1 year	1 year	> 1 year
Graft Failure	-	175k	-	-	35k	-
Lympho-proliferative Disorder	-	99k	19k	-	29k	-
Surgical Complications	10k	14k	39k	-	-	-
Early Cancer	-	33k	12-15k	-	33k	-
Rejection	-	1k-13k	30k	-	-	10-14K
Cytomegalovirus Infection	1k	-	-	1.8k	-	-

- Majority studies reported healthcare cost (93%) for specific events (56%) including infection (19%), graft failure/delayed graft function (15%), antibody-mediated rejection (11%), and surgical complications (7%).
- Inpatient cost was the highest with graft failure, followed by lymphoproliferative disorder, surgical complications, early cancer, rejection and infection.
- Meanwhile, outpatient cost was the highest for graft failure, followed by early cancer, lymphoproliferative disorder, rejection and cytomegalovirus infection.

RESULTS: Costs Not Associated with Specific Events

Cost (USD 2021) per patient		
Inpatient	Outpatient	Travel
18 – 58k	26 – 11k	135

- Where cost reported were not event-specific, inpatient cost ranged USD18-USD58k, outpatient USD26-USD11k, and travel USD135 1-year PKT.

RESULTS: Quality Assessment

- While most studies reported follow-up duration, 48% did not report methods for cost estimation.

DISCUSSIONS

OVERVIEW

- Both inpatient and outpatient costs were the highest in the year immediately after transplant but decreases after.
- Direct medical costs made up majority costs associated with non-specific events.
- Graft failure, lymphoproliferative disorder, rejection:** inpatient costs more than outpatient.
- Early cancer:** inpatient costs similar as outpatient.
- Surgical complications:** Only inpatient costs have been studied.
- Cytomegalovirus infection:** Only outpatient costs have been studied.

STRENGTHS

- Double screening of abstract
- Studies were included from various countries, both high-income and middle-income countries, which provided broad perspectives.

LIMITATIONS

- No studies from low-income countries, hence findings not generalisable to them.
- Studies did not adopt consistent study design or reporting or cost; the heterogeneity made comparison of costs based on events difficult.

CONCLUSION

Cost PKT varied widely according to time periods, events, and resource categories. Most cost estimates came from single or a small number of studies, hence the findings may not be generalizable to all settings.

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