

Research Article



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Frequency of Complications of Renal Transplantation in Iranian patients: A systematic review and meta analysis

Dadkhoda Soofi¹

Faculty of Medicine, Zabol University of Medical Sciences, Zabol, Iran

Abstract

Objective : the aim of this study was to evaluate the frequency of post-transplantation complications among patients experiencing kidney transplant in Iran.

Method: Two separate researchers conducted studies until November 2018 at international (PubMed, Google Scholar, and WOS) and national (SID and Magiran) databases in English and Persian, without any time limit. The key words used in the research strategy included: complication, renal transplantation, prevalence , frequency and Iran, which were combined with Boolean agents such as AND, OR, NOT. The final data extracted using the STAT 14.0 statistical software.

Result: 4 studies were conducted on 552 Iranian renal transplant patients were included. the overall prevalence of Complications of Renal Transplantation in Iranian patients was 20.4% (95% CI: 17.4, 23.3; $I^2 = 98.3\%$)

Discussion and conclusion: The present study clearly shows the role of complications in mortality and pathogenicity during post-transplantation period. Patients who have higher levels of creatinine and are prescribed higher doses of immunosuppressive agents at the time of discharge (after transplantation) are high risk patients and they must be kept under examination for possible complications.

Keywords: complication, renal transplantation, prevalence

Introduction

End-stage Renal Disorder (ESRD) is an irreversible kidney disorder, in which the body's ability to maintain fluid balance and electrolyte is eliminated, leading to uremia or azotemia(1). Various factors affect the development of systemic ESRD, including diabetes (the most common cause), hypertension, chronic glomerulonephritis, pyelonephritis, urinary tract obstruction, hereditary lesions, such as multiple cystic kidney disease, vascular disorders, infections, drugs, or toxins; multi-cystic kidney disease accounts for 8-10% of end-stage renal complications in the United States and Europe(2-5). Diseases that develop during ESRD exacerbate the present status quo. When the kidney function reaches 10% of its normal size, it no longer removes water, salt or waste out of the body(6). Usually, dialysis is the first possible treatment during kidney failure; but, when dialysis seems to be longer

functioning, kidney transplant is introduced as an alternative, with the main benefits being releasing the patient from consistent dialysis and the possibility of a free and comfortable life(7,8). This is an inevitable situation in patients with ESRD, and in fact, if the patient does not respond to dialysis, the only way to survive is kidney transplant; on the other hand, kidney transplantation has several complications, including renal disorders, cardiac complications and infection; the incidence of these complications leads to the loss of transplanted organ and direct harm to the patient(9,10). Therefore, the development of these long-term complications leads to a decrease in the survival rate of renal transplant patients(11). After transplantation, infectious complications are associated with significant pathogenesis and mortality and are the most common causes of death in the early stages after organ transplantation(12,13). The present

systematic and meta-analysis study was conducted to determine the frequency of post-transplantation complications among patients experiencing kidney transplant in Iran.

Materials and Methods

The present systematic investigation applies developed methods that are consistent with the accurate instructions in the PRISMA check list.

Inclusion and exclusion criteria

Observational studies, including posting to editors, publications, poor quality articles (based on the Hoy's tool) and studies on adult subjects were only excluded from the study. Only articles in English and Persian are included.

Sampling methods and sample size

All observational studies with any sampling and statistical surveys were included in the present systematic study.

Research strategy

Two separate researchers conducted studies until November 2018 at international (PubMed, Google Scholar, and WOS) and national (SID and Magiran) databases in English and Persian, without any time limit. We examined a list of available articles sources for further related article searches. Specific research strategies have been developed using the MESH vocabulary explorer and free vocabularies, according to the PRESS standard, by a Health scientist librarian specializing in research on systematic review. We used the MEDLINE research strategy to investigate other databases. The key words used in the research strategy included: complication, renal transplantation, prevalence, frequency and Iran, which were combined with Boolean agents such as AND, OR, NOT.

Selection of research and data extraction:

Two separate researchers examined the titles and abstracts by considering qualifying criteria. After removing the repetitive research, the full text of the research was examined depending on the qualifying criteria and the required data was extracted.

To answer questions regarding qualifications, additional research information was obtained from the authors in case it is required. The general information (first author, province, and year of publication), research characteristics (sampling method, research design, location, sample size and bias risk), and the measurement of results (frequency of renal transplant complications) were also collected.

Quality assessment and abstraction:

Hoy's et al. tool was used to assess the methodological quality and the risk of getting away from the truth (bias) for each one of the observational studies. This tool evaluates 10 items for assessing the quality of studies in two dimensions such as foreign (items 1-4, target population, sampling frame, sampling method and the minimum deviation from response) and domestic credits (the issues 5-9 of the data collection method, case definition, research tool, data collection mode were assessed while the issue 10 of the bias evaluation was related to data analysis). The higher index indicated that the bias is likely to reduce and the lower index indicated the risk of more bias. The separate bias risk was investigated by two researchers. Consensus was used to solve the disagreements.

Data combination: The final data extracted using the STAT 14.0 statistical software, including studies combined with stock diagram and the frequency of renal transplant complications, were assessed with random effect of the model.

Results

Selection of research:

A total of 342 primary studies were reviewed from PubMed, Google scholar, SID, Magiran, and Web of Science from the beginning to November 1, 2018. Out of the 153 non-repetitive studies in the title and abstract of the screening process, 142 were excluded since their titles were unrelated. Out of the 11 studies, 4 had qualifying criteria. Out of 7 removed cases, 3 were reviews, 1 was letter to the editor, and 3 had no quality to be included [Figure 1].

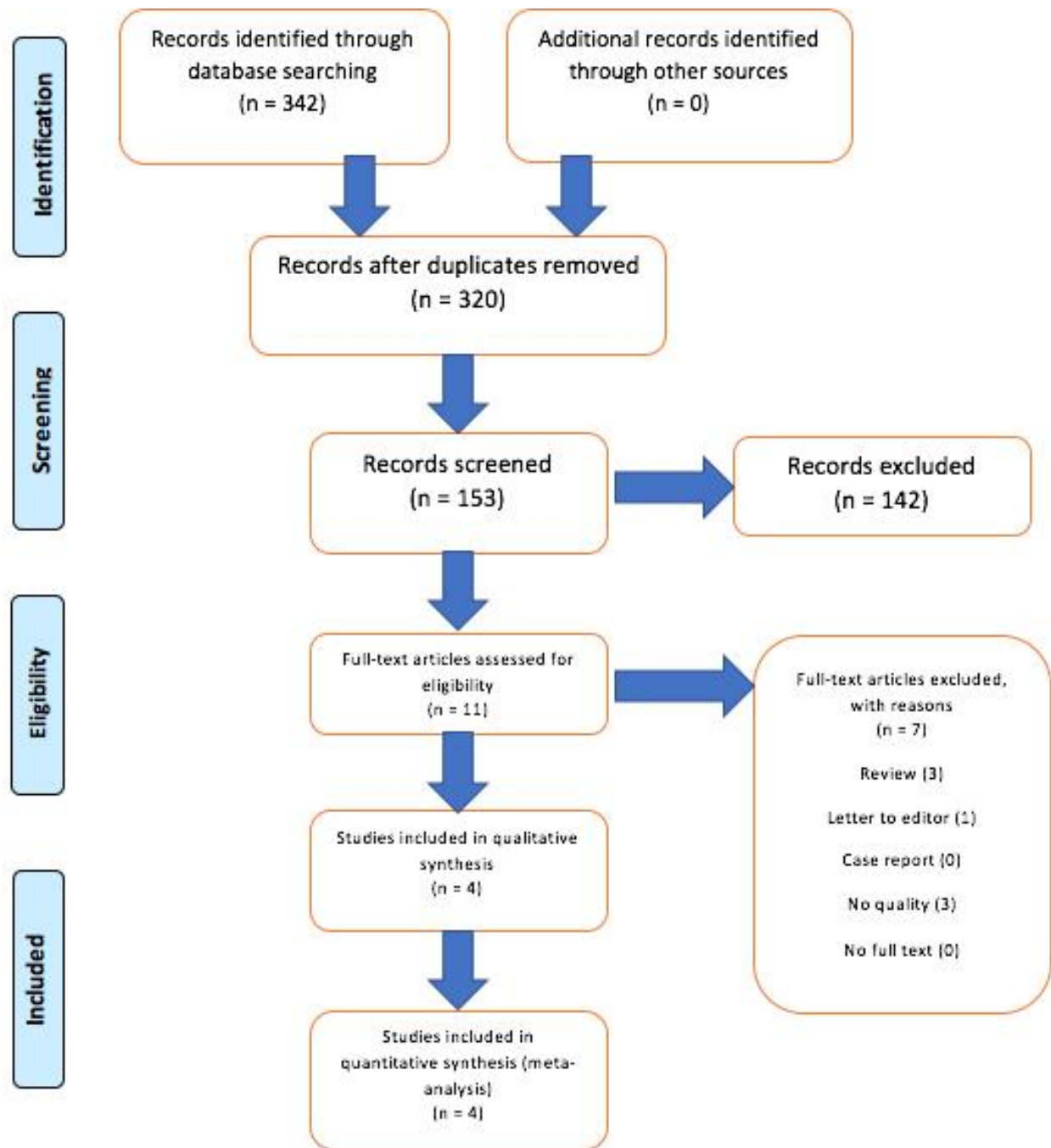


Fig 1. Study selection process

Research characteristics

These 4 studies were conducted on 552 Iranian renal transplant patients. All of the 4 studies provided cross-sectional data. Out of the 4 studies, one was from Ahvaz province, one from Tehran, and two were from

Isfahan and Mashhad province. The most commonly used sampling method was convenience (easiness), (n = 4). About 75% of the studies had a low bias risk. The most common place to conduct the studies was in the hospital (n = 4). All of the four research studies were included in the final analysis context. (Table 1).

Table 1 : Studies included in the systematic review

First Author	year	Provence	Sample size	Female-male	Risk of bias
Tabatabaei ^[19]	2010	Esfehan	130	0.47	Low
Zafardanesh ^[20]	2016	Mashhad	143	0.50	Low
Javadnia ^[21]	2002	Ahvaz	100	0.47	Low
Pourmand ^[22]	2006	Tehran	179	0.79	Moderate

Frequency of Complications of Renal Transplantation in Iranian patients:

4 studies conducted on 552 renal transplant patients were included in the meta-analysis. the overall

frequency of Complications of Renal Transplantation in Iranian patients was 20.4% (95% CI: 17.4, 23.3; $I^2 = 98.3\%$) [Table 2].

Table 2: Frequency of Complications of Renal Transplantation in Iranian patients

ID	First Author	Year	Province	ES	95% CI for ES		% Wight
					low	up	
1	Tabatabaei	2010		0.338	0.258	0.418	13.18
2	Zafardanesh	2016		0.055	0.018	0.092	61.39
3	Javadnia	2002		0.410	0.314	0.506	9.23
4	Pourmand	2006		0.540	0.467	0.613	16.19
Sub-total Random pooled ES	-----	-----		0.204	0.174	0.233	100

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Study	ES	[95% Conf. Interval]	% Weight
-----+-----			
Tabatabaei (2010)	0.338	0.258 0.418	13.18
Zafardanesh (2016)	0.055	0.018 0.092	61.39
Javadnia (2002)	0.410	0.314 0.506	9.23
Pourmand (2006)	0.540	0.467 0.613	16.19
-----+-----			
I-V pooled ES	0.204	0.174 0.233	100.00
-----+-----			

Heterogeneity chi-squared = 172.32 (d.f. = 3) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 98.3%

Test of ES=0 : z= 13.68 p = 0.000

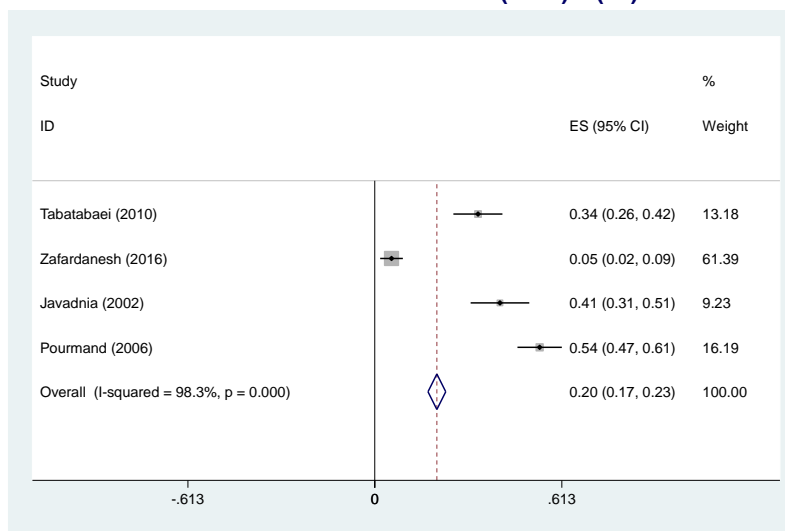


Fig. 2 : The Frequency of Complications of Renal Transplantation in Iranian patients and its 95% interval for the studied cases according to the year and the city where the study was conducted based on the model of the random effects model. The midpoint of each section of the line estimates the % value and the length of the lines showing the 95% confidence interval in each study. The oval sign shows Frequency of Complications of Renal Transplantation in Iranian patients for all studies.

Discussion

The overall prevalence of Complications of Renal Transplantation in Iranian patients was 20.4% (95% CI: 17.4, 23.3; $I^2 = 98.3\%$). In spite of all the measures taken to prevent complications of renal transplantation, the patient is in some cases confronted with a lot of problems (14). However, only a small percentage of patients are forced to undergo surgical or medical treatment (15). Nowadays, infections have been proven to be an important risk factor causing mortality (16). The role of infection, as a risk factor in the mortality and survival of patients with dialysis, has been proven in several studies. Currently, the number of patients awaiting kidney transplantation outnumbers the number of kidney donors (17). It is, therefore, desirable to take the best and most advantage from any possible donor. Brain death patients and corpses are more likely to be used for transplantation; however, according to available evidence, only living donors have so far been used for kidney transplantation in Iran. The number of volunteers has increased after a course of general education and training programs and kidney transplantation surgeries become increasingly successful for both the donor and the receiver and many studies have reported better survival of the kidney transplant and fewer complications in the donors (18,19).

The present study has some limitations, including the small sample size, which can affect the strength of the study. Secondly, this systematic study did not examine the effect of the patient's medical history and other factors on the receiver of the kidney. The factors affecting kidney transplantation, such as kidney

weight, etc., were also not very effective in the survival of the transplant.

The present study clearly shows the role of complications in mortality and pathogenicity during post-transplantation period. Patients who have higher levels of creatinine and are prescribed higher doses of immunosuppressive agents at the time of discharge (after transplantation) are high risk patients and they must be kept under examination for possible complications.

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