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Elevated serum alkaline phosphatase levels and risk of all-cause mortality in dialysis patients

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Objectives: Conflicting evidence exists on the association of all-cause mortality and serum ALP levels. So, this study is aimed to understand the risk of all-cause mortality associated with elevated serum ALP levels.

Methods: An extensive literature was searched in PubMed, and Embase database by two independent investigator till January 2020. All those studies were qualified for inclusion which assessed the all-cause mortality risk due to elevated ALP levels in dialysis patients. The primary outcome was to compute the pooled risk of all-cause mortality due to elevated serum ALP levels. The secondary outcome was to compute the all-cause mortality risk due to dialysis modalities, follow-up period, geography, and others. All the statistical analysis was performed using RevMan version 5.3.

Results: This meta-analysis was based on 15 studies constituting 395085 dialysis patients with a mean age of 56.39 ± 14.15 years. The pooled risk of all-cause mortality was higher for elevated ALP levels as compared to low ALP levels with a pooled risk ratio (RR) of 1.47 (95% CI: 1.33 – 1.62), $p < 0.00001$ (Fig.1). All-cause mortality risk was higher in peritoneal dialysis (PD) patients with a RR of 1.64 (95% CI: 1.53 – 1.76), $p < 0.00001$ as compared to hemodialysis (HD) patients RR 1.44 (95% CI: 1.29 – 1.61), $p < 0.00001$. Subgroup analysis revealed that studies with follow-up period more than 4 years and Asians had higher risk of all-cause mortality RR 1.53 (95% CI: 1.18 – 1.98), $p = 0.001$ and RR 1.51 (95% CI: 1.28 – 1.78), $p < 0.00001$ respectively.

Conclusions: Elevated serum ALP levels in both HD and PD patients were found to be associated with a higher risk of all-cause mortality. Future well-designed randomized control trials are needed to make the evidence more transparent.

Fig.1

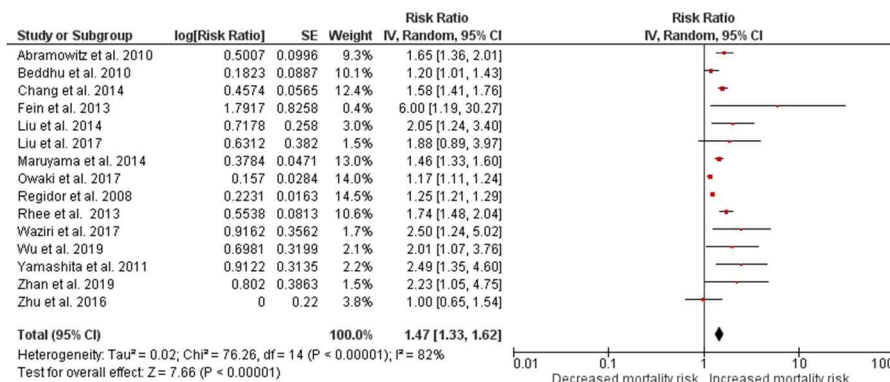


Fig.1 Forest plot demonstrating higher all-cause mortality risk due to elevated ALP level