

# Cystatin C sebagai prediktor mortalitas jangka panjang pada lanjut usia: sebuah telaah sistematis dan meta-analisis = Cystatin C as predictor of long term mortality in rlderly: a systematic review and meta-analysis

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## Abstrak

**Latar Belakang.** Prediksi mortalitas pada kelompok lanjut usia yang semakin meningkat jumlahnya akan memberikan banyak manfaat bagi kesehatan. Cystatin C ditunjukkan memiliki kemampuan sebagai prediktor mortalitas pada beberapa studi. Studi-studi mengenai kemampuan prediksi cystatin c masih sangatlah beragam dan belum ada telaah sistematis untuk menilai kemampuannya dalam memprediksi mortalitas jangka panjang pada kelompok lansia.

**Tujuan.** Penelitian ini bertujuan untuk menilai kemampuan cystatin c sebagai prediktor mortalitas semua sebab dan mortalitas kardiovaskular jangka panjang pada kelompok lanjut usia.

**Metode.** Studi ini merupakan telaah sistematis dan meta-analisis dari studi kohort prospektif observasional. Pencarian studi dilakukan di PubMed, Cochrane, Scopus, EBSCOHost, dan Proquest serta pencarian manual. Kriteria inklusi berupa lansia minimal berusia 65 tahun dengan data cystatin c serum tercantum, kematian semua sebab sebagai luaran. Waktu follow up minimal 5 tahun. Seleksi studi dilakukan berdasarkan alur dari PRISMA. Penilaian kualitas studi dan risiko bias dinilai menggunakan Newcastle Ottawa Scale untuk studi kohort. Hasil studi ditampilkan dalam bentuk deskriptif serta Forest plot.

**Hasil.** Dari 609 studi hasil pencarian, didapatkan 12 studi yang memenuhi kriteria: 5 studi menilai kematian semua sebab, 3 studi menilai kematian kardiovaskular saja, dan 4 studi menilai keduanya. Sebanyak 6 studi dengan kualitas baik dan 6 studi kualitas sedang setelah dilakukan penilaian. Hasil meta-analisis menunjukkan kadar Cystatin C yang tinggi meningkatkan risiko mortalitas jangka panjang akibat semua sebab [HR: 1,74 (95% CI: 1,48 – 2,04);  $p < 0,00001$ ] dan mortalitas jangka panjang kardiovaskular [(HR: 2,01 (95% CI: 1,63 – 2,47);  $p < 0,00001$ )] pada lansia. Kemampuan prognostik cystatin c tergolong moderat [AUC 0,70 (95% CI: 0,68-0,72);  $p = 0,02$ ].

..... **Background.** Prediction of mortality in growing aged-population will offer several benefits for health sector. Cystatin C, which has long been known as biomarker to more accurately evaluate glomerular filtration rate in elderly, has also been shown to predict mortality from several studies. Studies regarding its predictive ability were vastly varied and there has not been systematic review to examine its ability in predicting long-term mortality in elderly population.

**Objectives.** This study aimed to evaluate Cystatin C performance as predictor for all-cause and cardiovascular mortality among elderly population.

**Methods.** A systematic review of prospective cohort studies was performed. Literature searching was done in major databases such as PubMed, Cochrane, Scopus, EBSCOhost, and Proquest. Manual searching was also performed. Inclusion criteria were studies involving elderly age 65 or older, cystatin c serum levels available, all-cause mortality as outcome, and 5-years minimum of follow-up. Study selection was performed according to PRISMA algorithm. Newcastle Ottawa Scale for cohort study was used to assess primary studies' quality and risk of bias. Study results were presented in descriptive tables and Forest plot.

Results. Initial searching revealed 609 hits with 12 studies eligible for the review: five studies evaluated all-cause mortality, three studies evaluated cardiovascular mortality, and four studies evaluated both. Meta-analysis showed that high cystatin c levels increasing risk of long-term all-cause mortality [(HR: 1.74 (95% CI: 1.48 – 2.04);  $p < 0.0001$ )] and cardiovascular mortality [HR: 2.01 (95% CI: 1,63 – 2,47);  $p < 0,0001$ ]. The prognostic ability of cystatin c was considerably moderate [AUC 0.70 (95% CI: 0.68-0,72);  $p = 0.02$ ]. Conclusion. Cystatin C was able to predict long-term mortality in elderly population.