

A systematic review and meta-analysis to quantify weight loss in pancreatic cancer: challenges using published research based on healthcare data



UNIVERSITY OF SURREY
Cancer Care



Claire A. Price¹, Debbie Cooke¹, Martyn Winn², Nadia A. Smith³, Agnieszka Lemanska¹

¹ School of Health Sciences, University of Surrey; ² Computational Biology, Science and Technologies Facility Council; ³ Data Science, National Physical Laboratory

Aim

To quantify the pattern (amount and timing) of pre-diagnosis weight loss in pancreatic cancer, improving its utility for early detection

Method

A systematic review and meta-analysis of literature to quantify weight loss patterns in pancreatic cancer

Open Research

Challenges: Healthcare data is usually closed making analysis harder
Successes: PROSPERO registration

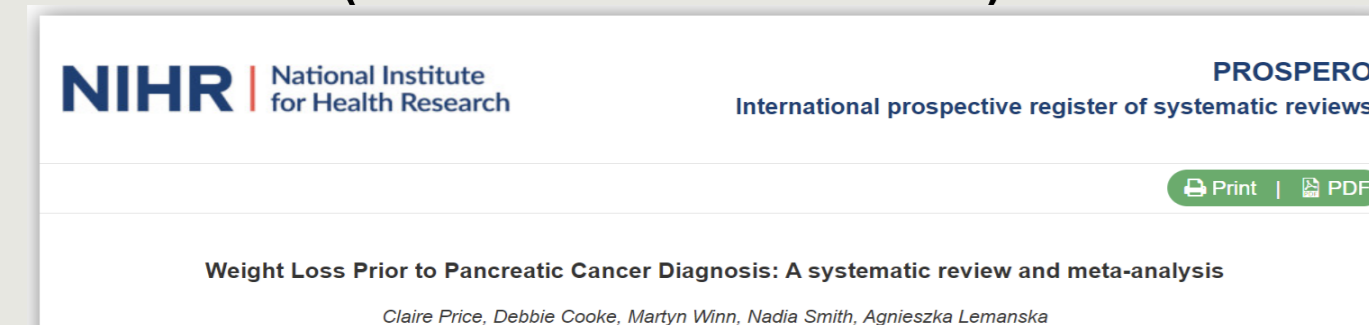
Introduction

Pancreatic cancer is relatively rare but its dismal survival rates mean that it is the sixth major cause of UK cancer mortality.¹ Pancreatic cancer often presents with non-specific symptoms, including weight loss. This makes early diagnosis, when curative treatment is possible, challenging. However, because weight loss occurs in most people diagnosed with pancreatic cancer, and it is often severe, it could act as a useful cancer marker.

Methods

Open Research

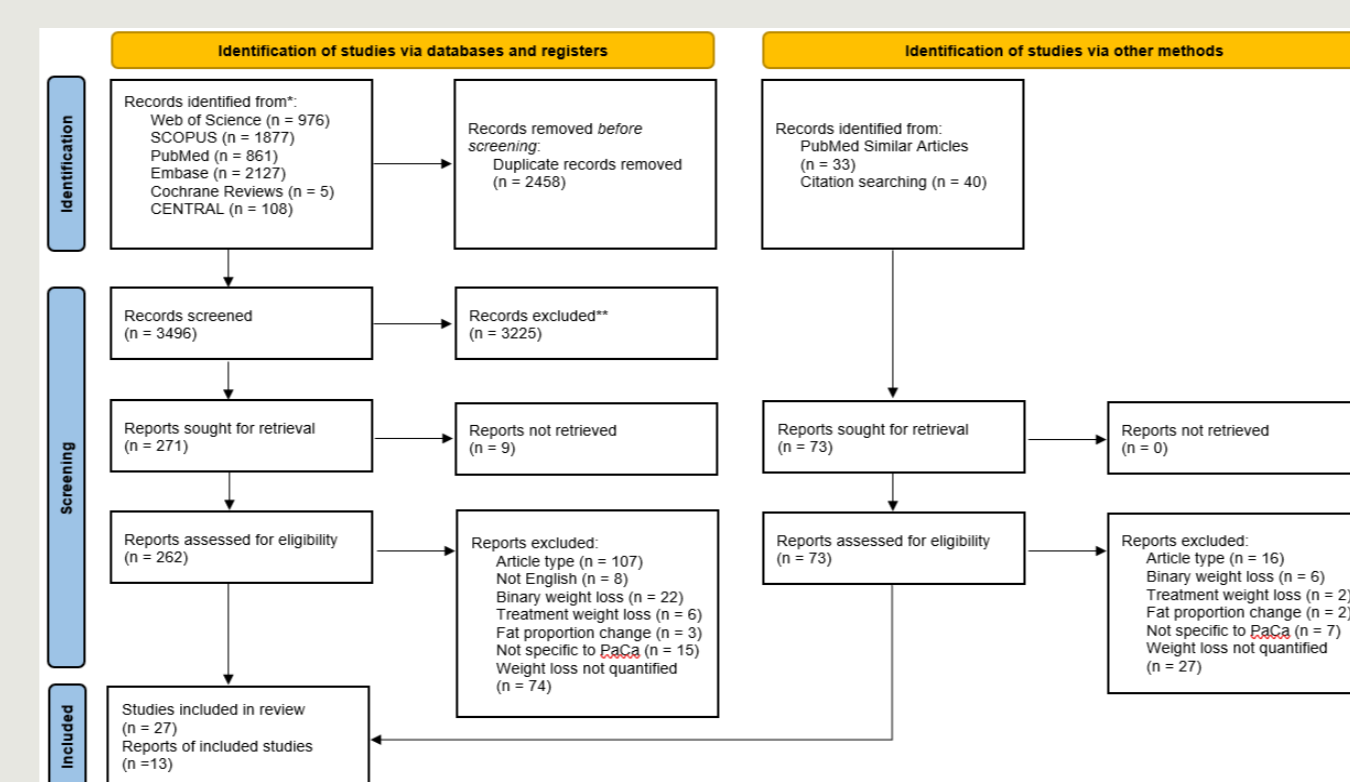
A systematic review and meta-analysis of literature was undertaken to quantify the amount and the timing of weight loss in pancreatic cancer patients. Five databases, Embase, PubMed, Scopus, Web of Science and The Cochrane Library were searched using key words including Pancreatic Cancer and Weight Loss. Additional manual searches of references were also conducted. The protocol for the review was registered on PROSPERO (CRD42022302985).



Methods Studies

Observational studies containing quantitative data on pre-diagnosis weight loss were eligible for inclusion.

A total of 40 studies met this criteria, comprising 15 case-control, 7 cohort, 8 retrospective studies of medical records and 10 prospective studies of medical records. The PRISMA^{2,3} diagram of the search is included to enable transparency and the search to be reproduced.



Open Research Hurdles

- Reported measurement outcomes lack consistency in units and conventions (kg, lbs, BMI, % relative, % absolute and grouped into categories)
- Data only presented graphically or as a regression model
- Original dataset cannot be shared due to privacy
- The authors no longer have access to databases
- Reporting only selected information (e.g. only cases in case-control studies)

Study Quality

Studies were evaluated for bias with Risk Of Bias In Non-randomised Studies of Interventions (ROBINS-I)⁴. The tool includes 7 domains of bias. Two studies were excluded due to serious risk of bias. Two more studies were excluded from the analysis of the case-control studies as they only reported data for cases. The results for case-control studies are shown below.

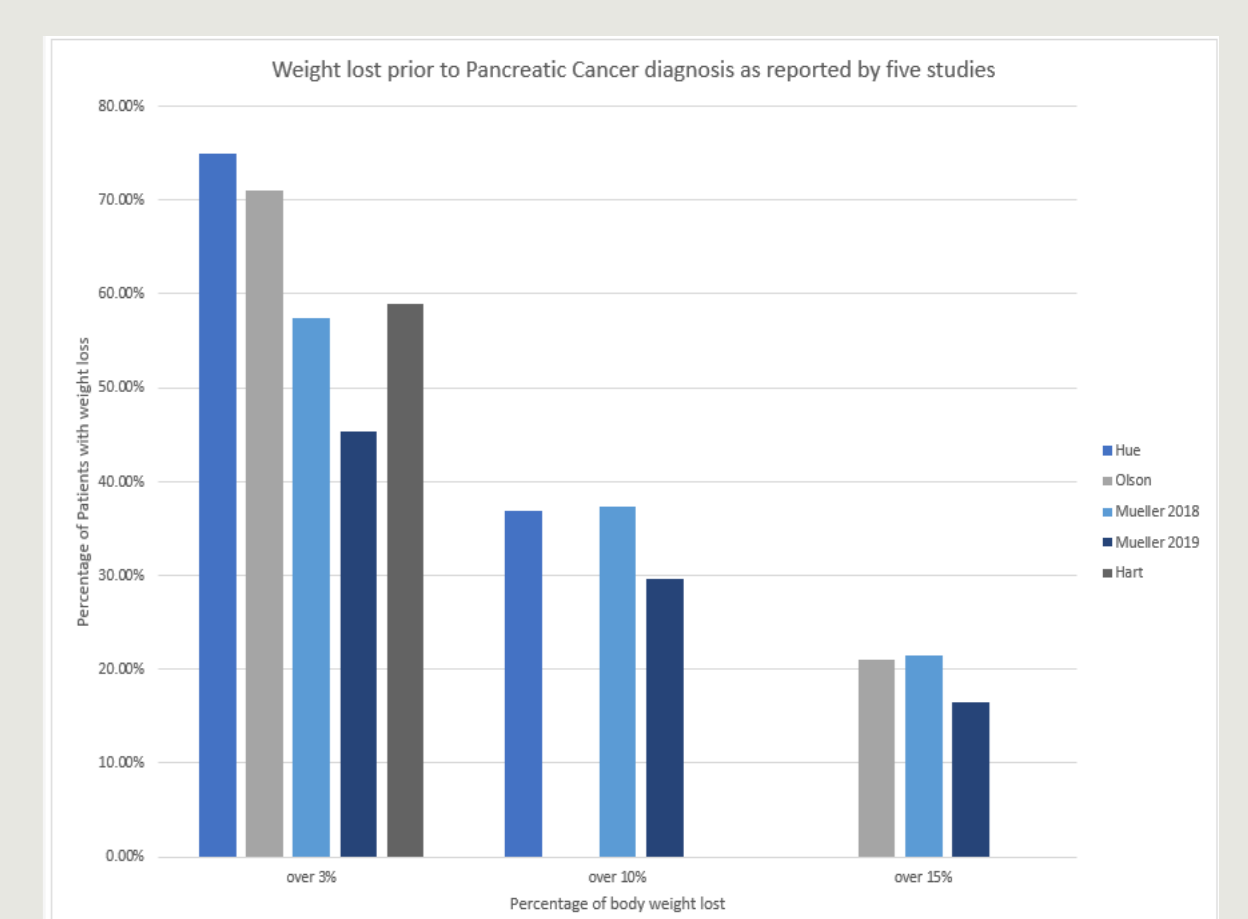
Discussion

Examining weight loss prior to pancreatic cancer diagnosis is complicated by the weight loss seen in the majority of cancer patients (cancer cachexia). Another complication is the diabetes status of pancreatic cancer patients as approximately 40-65% will develop new-onset diabetes.⁵ However, it appears that weight loss patterns become distinct over the year prior to pancreatic cancer diagnosis.⁶ Study populations often lack ethnic diversity.

Results

Weight Loss Amount

Case-control studies show that 45-75% of pancreatic cancer patient lose $\geq 3\%$ of their body weight⁶⁻¹⁰ with 16-21% losing $\geq 15\%$.^{7,9,10} Greater weight loss is linked with poorer prognosis.



Results

Weight Loss Timing

Weight loss can begin to be detected up to two years before pancreatic cancer diagnosis,^{11,12} with greater divergence between cases and control seen 1 year prior to diagnosis.^{6,8,11-14} Most of the weight loss occurs in the six months prior to pancreatic cancer diagnosis.^{8,14} This weight loss occurs as part of a suite of metabolic changes^{6,12} which appear to be distinct from cachexia and other cancer symptoms.^{6,11,13} It is likely that the maximum possible time this approach will accelerate the detection of pancreatic cancer is six months.

Conclusion

Detecting weight loss early is vital to improve diagnosis of pancreatic cancer to improve survival rates

Weight measurements should be more frequent than annual check-ups

Weight loss data should be reported in a standard format (kg and a percentage of weight lost) in literature to allow comparison of studies

claire.a.price@surrey.ac.uk



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