

Introduction

Cardio-renal metabolic (CaReMe) syndrome is defined as a group of interactive cardiovascular, renal, and metabolic conditions (1). These co-morbidities independently affect each other's response to treatment and influence disease severity, heart failure (HF) outcomes and hospitalisation (2,3).

Cardiovascular disease (CVD) causes:

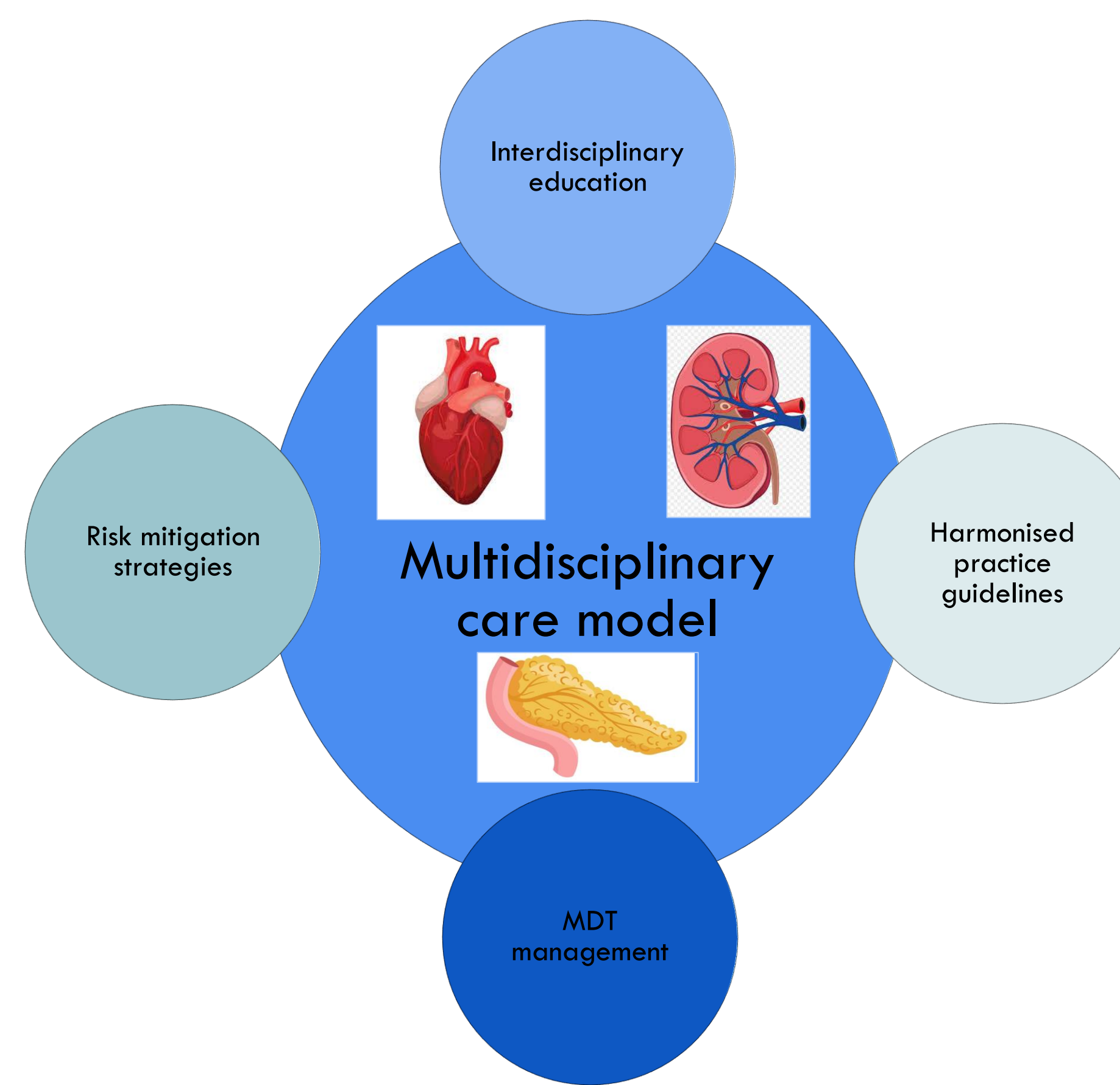
- 523 million cases worldwide(4)
- 17.3 million deaths (5)
- HF itself affects 64 million people worldwide, (6)
- Global prevalence of multimorbidity is 37.2% (7)



Background

The literature advocates collaborative multispeciality team (MDT) approaches to CaReMe management as gold standard, which leads to consensus in decision making and could improve all-cause outcomes for individuals, whilst providing organisational cost benefits (8, 9). Integrated care systems (ICSs) are advocated to deliver a vision of shared care (10) and a current NHS model has evolved over time to deliver a virtual multispeciality collaborative to manage CaReMe patients. The model lacks formal evaluation to demonstrate the merits of its approach and the perceptions and roles of staff who contribute.

(10)



Study aims and design

To co-produce an integrated care model for patients with CaReMe disease by understanding current care models and the individual roles and experiences of staff, patients, and carers using a sequential mixed methods research with three phases

Phase 1

To undertake a narrative synthesis of the evidence base to establish current models implemented for patients with co morbidities requiring complex interventions.

Phase 2

To understand individual roles, contributions, and experiences within the current service model by,

- Process Evaluation (PE)
- Staff qualitative interviews, thematically analysed (11)
- Quantitative clinical data on patient outcomes.

Phase 3

To refine and co-produce an integrated model of care for patients with cardiorenal metabolic disease.

- Use the information collected from phase 1 and 2 to inform the co-creation and co-production of a new integrated model of care.
- Facilitate collaborative meetings with staff, patients, carers, and stakeholders to develop the integrated model of care.
- Underpin the process using by the principles the Medical Research Council framework for developing and evaluating



Implications for practice

This study seeks to inform current evidence relating to multidisciplinary and multispeciality working with complex interventions and multimorbidity.
Application of a co-designed and co-produced model in clinical practice

References

- 1 Ronco, C., Bellasi, A. and Di Lullo, L., (2018) Cardiorenal syndrome: an overview. *Advances in chronic kidney disease*, 25(5), pp.382-390.
- 2 Bhatt AS, Ambrosy AP, Dunning A et al. The burden of non-cardiac comorbidities and association with clinical outcomes in an acute heart failure trial - insights from ASCEND-HF. *Eur J Heart Fail* 2020 June;22(6):1022-31
- 3 Pandey A, Vaduganathan M, Arora S et al. (2020) Temporal Trends in Prevalence and Prognostic Implications of Comorbidities Among Patients With Acute Decompensated Heart Failure: The ARIC Study Community Surveillance. *Circulation* 2020 July 21;142(3):230-43
- 4 Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, de Ferranti SD, Floyd J, Fornage M, Gillespie C, Isasi CR, Jiménez MC, Jordan LC, Judd SE, Lackland D, Lichtman JH, Lisabeth L, Liu S, Longenecker CT, Mackey RH, Matsushita K, Mozaffarian D, Mussolino ME, Nasir K, Neumar RW, Palaniappan L, Pandey DK, Thiagarajan RR, Reeves MJ, Ritchey M, Rodriguez CI, Roth GA, Rosamond WD, Sasson C, Towfighi A, Tsao CW, Turner MB, Virani SS, Voeks JH, Willey JZ, Wilkins JT, Wu JH, Alger HM, Wong SS, Muntner P; (2017) American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics-2017 Update: A Report from the American Heart Association. *Circulation*. 2017 Mar 7; 135(10): e146-e603. Doi: 10.1161/CIR.0000000000000485.
- 5 Global Burden of Disease (GBD) (2017) DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018; 392:1859-1922.
- 6 Chowdhury, S.R., Das, D.C., Sunna, T.C., Beyene, J. and Hossain, A., 2023. Global and regional prevalence of multimorbidity in the adult population in community settings: a systematic review and meta-analysis. *EclinicalMedicine*, 57.
- 7 Sankaranarayanan R, Douglas H, Wong C. (2020) Cardio-nephrology MDT meetings play important role in management of cardiorenal syndrome Br J Cardiol 2020;27
- 8 Essa, H., Walker, L., Mohee, K., Oguno, C., Douglas, H., Kahn, M., Rao, A., Belleu, J., Hadcroft, J., Hartshorne-Evans, N. and Bliss, J., 2022. Multispeciality multidisciplinary input into comorbidities along with treatment optimisation in heart failure reduces hospitalisation and clinic attendance. *Open heart*, 9(2), p.e001979.
- 9 Rangaswami, J., Tuttle, K., Vaduganathan, M. (2020) Cardio-Renal-Metabolic Care Model. *Circ Cardiovasc Qual Outcomes*. 2020; 13: e007264. DOI: 10.1161/CIRCOUTCOMES.120.007264
- 10 Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), pp.77-101.
- 11 Skivington, K., Matthews, L., Simpson, S.A., Craig, P., Baird, J., Blazeby, J.M., Boyd, K.A., Craig, N., French, D.P., McIntosh, E. and Petticrew, M., 2021. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *bmj*, 374.