**LEICESTER LIFESTYLE AND HEALTH RESEARCH GROUP**

**Optimising the 24-hour movement behaviours and long term health outcomes in metabolic and bariatric surgery**

|  |  |
| --- | --- |
| **First Supervisor** | **Dr Louisa Herring** |
| **School/Department** | Diabetes Research Centre |
| **Email** | **Louisa.herring@uhl-tr.nhs.uk** |

|  |  |
| --- | --- |
| **Second Supervisor** | **Prof Melanie Davies** |
| **School/Department** | Diabetes Research Centre |
| **Email** |  |

|  |  |
| --- | --- |
| **Additional Supervisor** | **Dimitris Papamargaritis, Diabetes Research Centre, dp421@leicester.ac.uk** |

**Section 2 – *Project Information***

|  |  |
| --- | --- |
| **Project Title** | **Optimising the 24-hour movement behaviours and long term health outcomes in metabolic and bariatric surgery** |
| **Project Summary** | |
| *Aim:* To explore the 24-hour movement behaviours before and after metabolic and bariatric surgery (MBS) and evaluate a post-operative physical activity and pharmacotherapy intervention (18 months post-MBS) to optimise physical function and MBS related long-term health outcomes.  *Background:* The increasing incidence of severe obesity (body mass index [BMI] ≥35kg.m2) represents a major public health concern1,2. Despite the advancement of new anti-obesity medications (AOMs) which have instigated a revolution in obesity treatment, metabolic bariatric surgery (MBS) continues to be the most effective and durable treatment for individuals living with severe obesity3,4. AOM could however exist in synergy with MBS and lifestyle modification to optimise and maintain MBS related health outcomes long-term5,6.  MBS, like AOM induced weight loss, does not eliminate the need for accompanying changes in key lifestyle behaviours, such as physical activity, as these behaviours are essential and recommended to optimise long-term MBS related outcomes and physical function7,8,9. As research evolves, the importance of physical activity for optimising MBS outcomes is gaining greater recognition 7,9,10,11. While a strong evidence base highlights that moderate-to-vigorous intensity physical activity (MVPA) is essential for optimising long-term MBS related health outcomes12; it is important to note that MVPA only accounts for a small proportion of daily activity, thus neglecting the largest proportion of individuals’ movement across a 24-hour day. A holistic approach recognising all of the movement behaviours, sleep, sedentary behaviour and light activity in addition to MVPA, and their co-dependent relationship is therefore essential to inform and optimise future MBS care.  *Methods:* This programme of work will encompass evidence synthesis, observational and experimental methodologies.  WP1-Evidence Synthesis (years 1)  To explore existing literature to provide a comprehensive summary of what is currently known about the 24 hour movement behaviours in MBS to inform future MBS research and physical activity recommendations.  WP2-Observational (years 1-3)  To measure the 24-hour movement behaviours both before and at multiple time points after MBS to characterise this clinical populations’ 24-hour movement behaviours in standard care and understand the impact of MBS on these behaviours.  WP3-Experimental (Year 2-3)  A randomised controlled trial study will be undertaken as part of an on-going platform trial to investigate whether physical activity support plus AOM >18 months after MBS (the point of weight-loss plateau) can optimise physical function, MBS outcomes and support the prevention of recurrent weight gain.  *Expected outcomes and impact:* At least 3 high quality research outputs will be produced, complimented by focused knowledge exchange activities (e.g., conference attendance). This cross-cutting research will inform future MBS clinical care and support the development of 24-hour movement behaviour guidelines in MBS. | |
| **References** | |
| 1. Khafagy R, Dash S. Obesity and Cardiovascular Disease: The Emerging Role of Inflammation. Front Cardiovasc Med. 2021 Oct 25;8:768119. doi: 10.3389/fcvm.2021.768119. PMID: 34760952; PMCID: PMC8573144. 2. Tiwari A, Balasundaram P. Public Health Considerations Regarding Obesity. [Updated 2023 Jun 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK572122/> 3. Horváth L, Mráz M, Jude EB, Haluzík M. Pharmacotherapy as an Augmentation to Bariatric Surgery for Obesity. Drugs. 2024 Aug;84(8):933-952. doi: 10.1007/s40265-024-02029-0. Epub 2024 Jul 6. PMID: 38970626; PMCID: PMC11343883. 4. Jakicic, John M.1; Apovian, Caroline M.2; Barr-Anderson, Daheia J.3; Courcoulas, Anita P.4; Donnelly, Joseph E.1; Ekkekakis, Panteleimon5; Hopkins, Mark6; Lambert, Estelle Victoria7,8; Napolitano, Melissa A.9; Volpe, Stella L.10. Physical Activity and Excess Body Weight and Adiposity for Adults. American College of Sports Medicine Consensus Statement. Translational Journal of the ACSM 9(4):e000266, Fall 2024. | DOI: 10.1249/TJX.0000000000000266 5. Tiwari A, Balasundaram P. Public Health Considerations Regarding Obesity. [Updated 2023 Jun 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK572122/> 6. Wong G, Garner EM, Takkouche S, Spann MD, English WJ, Albaugh VL, Srivastava G. Combination anti-obesity medications to effectively treat bariatric surgery weight regain at an academic obesity center. Obes Sci Pract. 2022 Sep 24;9(3):203-209. doi: 10.1002/osp4.635. PMID: 37287513; PMCID: PMC10242249. 7. Bond DS, Manuel KM, Wu Y, Livingston J, Papasavas PK, Baillot A, Pescatello LS. Exercise for counteracting weight recurrence after bariatric surgery: a systematic review and meta-analysis of randomized controlled trials. Surg Obes Relat Dis. 2023 Jun;19(6):641-650. doi: 10.1016/j.soard.2022.12.029. Epub 2022 Dec 19. PMID: 36624025; PMCID: PMC10219840. 8. Gualano B, Kirwan JP, Roschel H. Exercise Is Key to Sustaining Metabolic Gains After Bariatric Surgery. Exerc Sport Sci Rev. 2021 Jul 1;49(3):197-204. doi: 10.1249/JES.0000000000000253. PMID: 34112745; PMCID: PMC8588125. 9. Herring LY, Stevinson C, Carter P, Biddle SJH, Bowrey D, Sutton C, Davies MJ. The effects of supervised exercise training 12-24 months after bariatric surgery on physical function and body composition: a randomised controlled trial. Int J Obes (Lond). 2017 Jun;41(6):909-916. doi: 10.1038/ijo.2017.60. Epub 2017 Mar 6. PMID: 28262676. 10. Livhits M, Mercado C, Yermilov I, Parikh JA, Dutson E, Mehran A*, et al.* Exercise following bariatric surgery: systematic review. *Obesity Surgery*. 2010; 20(5):657-665. 11. Coen PM, Goodpaster BH. A role for exercise after bariatric surgery? *Diabetes, Obesity and Metabolism*. 2015. 12. Hussien J, Asselin M, Bond D, Wu Y, Ly V, Creel D, Papasavas P, Goodpaster B, Baillot A. Exercise Training in Metabolic and Bariatric Surgery; an overview of systematic reviews. SportRxiv. 2024 | |