| Project Details | |
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| Project Code | MRCPHS25Br Munafò |
| Title | Using diverse cohorts, methods and novel measures to understand the relationship between diet, physical activity and health outcomes |
| Research Theme | Population Health Sciences |
| Summary | Certain aspects of diet (e.g., high salt intake) and lower physical activity are known to cause poorer health outcomes. However, the impacts of other specific food types (e.g., ultra-processed foods, wholegrains) and different physical activity levels (e.g., sedentary vs moderate/vigorous activity) on health are less clear. Additionally, it is unclear whether these relationships are the same across different ethnic groups. This project will triangulate evidence from diverse datasets, using a range of methods (including genetic methods) to make causal inferences about relationships between specific aspects of diet, physical activity and health outcomes, informing health intervention targeting for 'at risk' groups. |
| Description | **Background:** Certain aspects of diet (e.g., high salt intake, low fibre intake) and lower physical activity are known to cause poorer health outcomes. However, the impact of other elements of diet (e.g., specific macronutrients, dietary patterns, food groups) and the relative importance of different physical activity levels (e.g., sedentary behaviour vs moderate or vigorous physical activity on health outcomes) is less clear. In addition, the impact of diet and physical activity on health outcomes can vary depending on a person's ethnicity. For example, we know that type 2 diabetes risk varies depending on ethnic background with studies reporting more than double the prevalence of Type 2 Diabetes in people with Middle Eastern and North African, Sub-Saharan African, and South-Asian descent compared to European descent (Meeks et al., 2016). Part of this relationship has been explained by higher intake of sugar-sweetened beverages in specific ethnic groups (Saab et al., 2015), with other studies suggesting associations between ethnicity related genetic polymorphisms and increased susceptibility to sugar exposure (López-Portillo et al., 2022). Likewise, increased salt sensitivity has been reported in African descendants (Balafa & Kalaitzidis, 2020), with this group more likely to carry an APOL1 gene polymorphism resulting in higher risk of cardiovascular disease (Ito et al., 2014). However, most research attributes low income and education to the higher risk of negative health outcomes, poor diet and low PA in observed in minority groups. Therefore, understanding how different diet and physical activity factors influence different health outcomes across diverse populations beyond these social factors and including a genetic perspective is crucial. Comparing this with results in European ancestries is also important.<br>**Aim:** This project aims to understand how specific factors for diet, and physical activity impact health outcomes. In particular, whether these relationhsips are causal and whether effects hold across diverse cohorts.<br>**Objectives:** The objectives of this project are to understand:<br>1. How specific factors for diet and physical activity influence physical and mental health outcomes, and whether this reflects causal relationships |

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| | 2. Whether similar or different causal pathways operate across different populations<br>3. Whether shared environmental and genetic effects play a role in the above relationships, identifying genetic nature and nurture effects on child health outcomes<br>The student will achieve these aims using a combination of epidemiological methods which could include observational analyses, Mendelian randomisation, polygenic risk score analyses, intergenerational transmission analyses and within-family analyses. They will use a range of novel methods as well as data from diverse cohorts (i.e., different ethnic groups, different age groups) to assess whether associations hold across diverse cohorts and methods. The student will incorporate the views of the public by conducting Patient and Public Involvement and Engagement (PPIE) throughout the project. During the 'prep' period in particular, the student will conduct an initial PPIE session to help them gain insight into what direction their research should take (e.g., which dietary or physical activity factors are of interest, which health outcomes are of more concern not known about).<br>The student will take ownership of and steer the project at the initial development stage. In the preparatory period they will begin by identifying the specific exposures they will examine and identifying health outcomes of relevance and interest. They will identify exposures and outcomes through the PPIE session as well as by reviewing previous literature and discussion with the supervisory team. They will then identify relevant cohorts with data available and explore which methods are appropriate to use for each project objective. To do this, they will need to gain a good understanding of the research area and epidemiological approaches. This will be guided by the supervisory team, but the student will also gain knowledge in this area through specific training in epidemiology. The supervisory team have worked with data from a range of cohorts and can advise the student as to which might be most appropriate, but the student will take a lead with identifying those which allow the research objectives to be addressed, focusing on the inclusion of diverse cohorts. Examples of cohorts that the student could consider are UK Biobank, the Avon Longitudinal Study of Parents and Children (ALSPAC), the Pelotas birth cohort, Born in Bradford and Southall and Brent REvisited (SABRE).<br>As the student will have ownership over their PhD, we have not provided a detailed outline of the project timeline but as a guide, we expect the student to roughly follow this structure:<br>Year 1: 3-month preparatory period conducting a literature review and PPIE, 9 months for training, Project 1 planning and data sourcing/accessing.<br>Year 2: Project 1 completion, project 2 planning<br>Year 3: Project 2 completion, project 3 planning and Broadening Horizons placement<br>Year 4: Project 3 completion and thesis write up |
| Supervisory Team | |
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