Diet and exercise intervention to improve blood lipid and lipid fractions in young people with familial hypercholesterolaemia and their affected parents: a feasibility study

Supervisors: Julian Hamilton Shield (paediatrician), Fiona Lithander (dietician), Aidan Searle (qualitative researcher), David Stensel (exercise metabolism, NIHR BRC Leicester/Loughborough)

Overall aim: To investigate the feasibility and acceptability of a diet and exercise intervention to improve serum lipids and lipid sub-fractions in young people with familial hypercholesterolaemia and their affected parents

Overview:

The University of Bristol is offering the opportunity for a clinically-active dietician to undertake a PhD in innovation of invasive procedures as part of the new NIHR Biomedical Research Centre Bristol. The award covers salary commensurate with experience, tuition fees (£4,195 in 17/18) and an allowance for research and training. The successful candidate would be expected to start their PhD in October 2017.

The NIHR Biomedical Research Centre Bristol (BRC Bristol) is a partnership between University Hospitals Bristol NHS Foundation Trust and the University of Bristol which will conduct cutting-edge research to develop new, ground-breaking treatments, diagnostics, prevention and care for patients in a wide range of diseases. Our Research Themes in Cardiovascular Research, Nutrition, Surgical Innovation Mental Health, , Diet and Lifestyle, Reproductive and Perinatal Health and are underpinned by Cross-Cutting Themes in Translational Population Science Biostatistics, Evidence Synthesis and Informatics, as well as a Qualitative Research Network and work on patient and public involvement/engagement and training. Research in the Centre is multidisciplinary in nature, with researchers including nutritionists, research dieticians, surgeons of all specialities, bioethicists and social scientists, statisticians, public health physicians, psychologists, epidemiologists (including those working with multi-omic data such as epigenetics and metabolomics) and geneticists.

The successful candidate will be a part of the Nutrition Theme of the BRC, working with clinicians, research methodologists and dieticians within the Theme, gaining a multi-disciplinary training in clinical research methods and participating in the wider NIHR nutrition research network.

Background: Familial hypercholesterolaemia (FH) is a genetic disorder characterised by elevated LDL cholesterol that leads to atherosclerotic plaque formation at an early age, resulting in an increased risk of cardiovascular disease [1]. Whilst drug therapy is central to management, NICE Guidelines (2008) suggest that individuals with FH should consume a diet where total fat intake is ≤ 30% total energy intake (TEI), saturated fat is ≤ 10% TEI, dietary cholesterol < 300 mg/day, and that saturated fats are replaced by unsaturated fats [2]. However, a Cochrane review concluded that further research is needed to investigate the effectiveness of dietary interventions in children with FH [3]. The NICE guidelines also recommend that children and adolescents with FH accumulate at least 60 minutes of moderate- to vigorous-intensity daily physical activity; based on the evidence supporting physical activity guidelines for all young people [4]. A physically active lifestyle has been associated with several health benefits in childhood and adolescence, and there is some evidence that structured exercise training improves components of the lipid profile especially in young people exhibiting cardiovascular disease risk factors (e.g., obesity) [5]. However, we are not aware of studies that have examined the effect of exercise training on health outcomes in young people with FH, highlighting a gap in our current knowledge which may have important implications for improving metabolic health in a high risk population. Therefore, the aim of the current project is to develop and implement a feasibility study to assess the acceptability of combining a diet and exercise intervention with usual care to improve blood lipids and lipid sub-fractions in this patient group, using young people with FH and their affected parents as partners and advocates for improvements to clinical care.

Specific research questions: In young people with FH and their affected parents:

1. Investigate dietary intake using ‘Intake-24’ dietary assessment tool (https://intake24.co.uk/) which is a self-completed, computerised, validated tool based on a 24 hour recall
2. Investigate free living habitual physical activity and sedentary behaviour quantified objectively over seven days using a triaxial ActiGraph wGT3x-BT accelerometer (Actigraph, Pensacola, Florida, USA) and activPAL™ monitor (PAL technologies, Glasgow, UK)
3. Using a qualitative approach, investigate the knowledge of young people with FH and their parents of current diet and exercise recommendations for individuals with FH
4. Develop a family-centred evidence-based diet and exercise intervention based on patient preferences, informed by the qualitative work undertaken (described above). The dietary intervention may include plant sterols and stanols and/or the replacement of dietary saturated fats with unsaturated fats. The exercise component may involve weekly supervised exercise training consisting of a variety of activities such as running, cycling and circuit-based activities. All participants will be supported to increase Non-Exercise Activity Thermogenesis (NEAT) as this makes a significant contribution to energy expenditure [6].
5. Investigate the feasibility of implementing a family-based diet and exercise intervention alongside usual care. The primary outcomes of this feasibility study will be recruitment, retention rates, and adherence/acceptability in order to inform the design of a future full-scale trial.
6. Investigate the effect of combining a diet and exercise intervention with usual care on blood lipids, lipid fractions and total energy intake (secondary outcomes).

References

Candidate requirements:
Applications are welcome from high performing individuals who will be registered as a dietician with the Health and Care Professions Council by October 2017 and who have a 2.i or higher degree or equivalent. Possession of a relevant research Masters degree will be an advantage. Must be able to start full-time in October 2017.

How to apply

On the Programme Choice page, select 'Faculty of Health Sciences/PhD in Clinical Sciences'

Under ‘Funding’, identify UoB BRC as your fee payer. Under Research Details, provide the names of the project supervisors. Include these details (UoB and supervisor names) at the top of your Personal Statement.

Please provide a current CV, covering letter, two page research proposal building on the project outlines, certified copies of degree certificates and transcripts, and two academic references.

The deadline for applications is 5pm on 26th May. Interviews will be held in the first two weeks in June.

You are strongly encouraged to contact the named supervisors to discuss your research proposal prior to submitting your application.

Contact Julian Hamilton Shield j.p.h.shield@bristol.ac.uk