Discovery Award – Dr Sarah Bauermeister

Exploring childhood adversity through adult cognitive and biomedical outcomes

Objective(s):

1. The principal aim was to investigate associations between childhood adversity and multiple adult health-related outcomes (behavioural, psychological, cognitive and biomedical) utilising retrospective self-report questionnaire data from three UK population cohorts, Whitehall II, UK Biobank and MRC NSHD.
2. The second aim was to evaluate the link between childhood adversity and these multiple health-related outcomes in early adulthood, using a population birth cohort study, ALSPAC.

The award supported the training and career development of the Principal Investigator, Dr Sarah Bauermeister, plus allowed the establishment of a small, dedicated research group focused on study of childhood adversity and health related outcomes.

Overview Summary:

This project arose from a DPUK Discovery Award to Dr Sarah Bauermeister who is based at the University of Oxford. It aimed to use UK longitudinal population cohorts to investigate the associations between childhood adversity and adult health-related outcomes (behavioural, psychological, cognitive and biomedical).

The work indicated that early adversity is associated with poorer cognition and that socio-economic status in early childhood is associated with educational outcomes in later childhood (A-levels +). These findings could inform policy and suggest that childhood adversity should be factored into assessments of later life cognitive decline. The work is being extended to dementia outcomes and examination of the impact of childhood rejection on adult cognition.

Executive Summary:

The project aimed to investigate associations between childhood adversity and multiple adult health-related outcomes (behavioural, psychological, cognitive and biomedical) utilising retrospective self-report secondary data from Dementias Platform UK and the Avon Longitudinal Study of Parenting and Children (ALSPAC). Childhood adversity is a broad construct which encompasses extreme difficulties and adverse experiences during childhood such as sexual, physical and emotional abuse, deprivation and family dysfunction. Experiencing adversity in childhood is associated with cortical changes and poor mental health. What is little known is the impact on other adult outcomes, specifically, cognitive and dementia outcomes.
Our findings indicated that early adversity is associated with poorer cognition and that socio-economic status in early childhood is associated with educational outcomes in later childhood (A-levels +).

The project investigated these associations using multiple methodologies across 3 DPUK cohorts and ALSPAC. This award has enabled the project to be completed and to initiate conversations and funding elsewhere. The project continues with multiple external cohorts and multi-modal data, attracting support through Gates Ventures. The implications of this work is two-fold. First, that the impact of childhood adversity on adult outcomes is highlighted for awareness at the childhood level. This could inform policy at a funding level for the prevention of childhood adversity. Second, that understanding the impact of childhood adversity is an additional predictor of later life cognitive decline and should be taken into account when assessing adults in the clinic. Our current work, which has continued beyond the award, is now focusing on adult outcomes which have emerged through this initial work.

Summary of Outputs: (as per Researchfish categories)

Publications (as April 2020):

Associations of adverse lifetime experiences with brain structure in 7003 UK Biobank participants
Delia A. Gheorghe, Chenlu Li, John Gallacher, Sarah Bauermeister
bioRxiv 749077; doi: https://doi.org/10.1101/749077

Accepted pending minor revisions
(previously in bioRxiv- https://www.medrxiv.org/content/10.1101/19006189v2)

Psychiatric comorbid disorders of cognition: A machine learning approach using 1,159 UK Biobank participants
Chenlu Li, Delia A Gheorghe, John E Gallacher, Sarah Bauermeister. BMJ Evidenced based Medicine

Collaborations & Partnerships

This project has formed the basis of additional funding provided by Gates Ventures, and the cementing of a fruitful partnership between Gates Ventures and DPUK.

Further Funding

The findings will be followed up in a series of grant applications with decisions pending.

Next Destinations

Joshua Bauermeister is continuing his work on data curation on the Gates Ventures award.

Engagement Activities

A couple of articles focus on explaining the work of Dr Ruby Tsang, a post-doctoral analyst who has contributed to this work.
See

- https://www.alzheimersresearchuk.org/early-life-hardship-linked-to-decline-in-memory-and-thinking/
- https://www.thisislocallondon.co.uk/news/national/18331022.early-life-adversity-linked-long-term-effect-memory/

Dr Bauermeister has undertaken a series of engagement activities including

- Poster presentation at AAIC, Los Angeles 2019- “Early Adversity , brain injury and later life outcomes: A Dementias Platform UK investigation using multi-cohorts and machine learning”
  Ruby Tsang, Chenlu Li, Simon Young, John Gallacher and Sarah Bauermeister
- A talk to industry (Logikk) in London in March 2020 which included this work. There were approximately 100 attendees.
- Invited participant in the Healthy Ageing Workshop,Beijing, China, June 2019. This work and the DPUK Data Portal were presented. Interest generated has resulted in a grant application being submitted to UKRI.

Dr Bauermeister has contributed to the following Forbes, Editors' Pick article • https://www.forbes.com/sites/leciabushak/2020/02/11/experiencing-trauma-in-childhood-linked-to-increased-risk-of-developing-dementia/
Influence of policy, practice, patients & the public
Not at the current time although the research findings have the potential to influence policy in future.
Research Tools & Methods
None
Research Databases & Models
This DPUK Award needed to be focused around the use of the DPUK Data Portal https://portal.dementiasplatform.uk/
Intellectual property & licencing
None
Medical products, interventions & clinical trials
None
Artistic & creative products
None
Software & technical products
None
Spin outs
None
Awards & recognition
Dr Bauermeister was the recipient of an award to cover her travel and accommodation expenses to present at the UK-Korea Neuroscience Symposium held in Busan, Korea from 20-21 August 2018. She made the following oral presentation: Bauermeister S and Gallacher J, "Using the power of Dementias Platform UK (DPUK) cohorts to investigate the effects of childhood adversity on adult behavioural, physiological, cognitive and dementia outcomes: A cross-cohort investigation"
Other outputs & knowledge/future steps
None
Use of facilities & resources

None
Most successful outcome and what it means for future dementia research:
This pilot funding allowed the conduct of promising research which has now attracted funding from Gates Ventures and led to a separate strand of work (Early Experience & Dementia Research Programme) supported by DPUK. The findings will form the basis of a new Programme grant application and a further grant to support one of the research analysts who have contributed to the work. The grant has thus successfully led to the career development of the award holder, the enhancement of her research programme plus provided additional training opportunities for her and those supported on the award.
Lessons learned:
• The data access process outside of DPUK takes a long time (ALSPAC); • External datasets are expensive and should be costed properly (with ALSPAC £3000 was requested on the grant but the data cost £7500 to acquire); • Data cleaning across multiple datasets is time consuming and needs to be resourced properly; • As the project progressed the utility of further datasets was investigated and integrated into this work expanding the scope of the study extensively.
Other:
None
Date of report:
21 April 2020