

correlated with the staff rated Dundrum-4 (0.373, $p = 0.003$). The self-rated Dundrum-3 correlated with the HCR-20 total (0.0352, $p = 0.005$), HCR-C (0.3677, $p = 0.004$), and HCR-R (0.301, $p = 0.018$). The self-rated Dundrum-3 correlated significantly with GAF occupational (-0.273, $p = 0.48$), symptomatic (-0.299, $p = 0.03$). The self-rated Dundrum-4 correlated only with the GAF symptomatic (-0.333, $p = 0.05$). The self-rated Dundrum-3 correlated with PANSS positive (0.457, $p = 0.001$), PANSS negative (0.514, $p < 0.001$), PANSS general (0.395, $p = 0.004$) and PANSS total (0.352, $p = 0.005$). The self-rated Dundrum-4 correlated with PANSS positive (0.356, $p = 0.01$) and PANSS negative (0.413, $p = 0.002$).

Conclusion. There was good correlation between patient and clinician ratings of programme completion and recovery. Patient self-ratings of programme completion and recovery correlated with staff ratings of functioning and symptoms. The directions of agreement were correct

Structural and Functional Thalamic Changes in Progressive Supranuclear Palsy

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Aims. Studies of thalamic structure and function in Progressive Supranuclear Palsy (PSP) suggest it may play a role in key aspects of the clinical syndrome. This study examined thalamic changes across PSP phenotypes investigating (i) thalamic atrophy (ii) thalamic functional connectivity and (iii) the relationship between thalamic structural and functional connectivity changes with clinical severity.

Methods.

Participants

92 participants with PSP [63 PSP-Richardson's Syndrome (RS), 24 PSP-cortical, 5 PSP-subcortical] and 104 age-matched controls were recruited from the Cambridge Centre for Parkinson's Plus Disorders cohort. Clinical assessments and imaging were conducted within 1 year of diagnosis.

Structural Analysis

Thalamic volumes (TVs) were obtained using FreeSurfer. Bayesian multiple regression (brms, R) was used to model (i) mean TVs (ii) group differences in mean TVs (iii) relationships between Z-standardised clinical scores and TVs with age, gender, and total grey matter as covariates.

Functional Analysis

Voxel-wise seed-based functional connectivity of the thalamus used the Functional Magnetic Resonance Imaging Expert Analysis Tool (FEAT) in FMRIB's Software Library (FSL). Inter-group differences and relationships between clinical scores and functional connectivity for each group were assessed using a general linear model with age and gender as covariates.

Results.

Structural Analysis

TVs for all PSP subgroups were smaller than controls. No differences between PSP subgroups were detected. There was evidence for a relationship between TVs for the entire PSP group and Revised Addenbrooke's Cognitive Examination (ACER)

scores [$\beta = 0.28$, 95% credible interval (CI) = 0.04–0.53]. Subgroup analysis showed evidence for a relationship between ACER scores and TVs in PSP-RS [$\beta = 0.33$, 95% CI = 0.09–0.57] and PSP-cortical [$\beta = 0.46$, 95% CI = 0.12–0.83] phenotypes. A negative influence of TVs on total PSP rating scale scores was found for the PSP cohort as a whole [$\beta = -0.51$, 95% CI = -1.00 – -0.02].

Functional Analysis

PSP patients as a group showed decreased thalamic functional connectivity in higher cortical regions. Subgroup analysis revealed decreased connectivity in those areas compared to controls but in distinct distributions and magnitude. Increased thalamic connectivity with the middle temporal gyrus correlated with ACER scores for PSP patients as a group and in the PSP-cortical subtype.

Conclusion. Thalamic volume loss is a prominent aspect of PSP and is associated with a wide network of changes in functional connectivity that may be distinct between PSP subtypes. Changes in thalamic structure and function predict clinical severity, particularly in PSP-RS and PSP-cortical subtypes.

Assessing the Impact of Pre-Existing Mental Health and Neurocognitive Disorders on the Mortality and Severity of COVID-19 in Those Aged Over 18 Years: A Systematic Review and Meta-Analysis

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Aims. Since the coronavirus disease 2019 (COVID-19) pandemic began, evidence suggests that people with underlying mental health disorders have worse outcomes from COVID-19 infection. Our aim was to assess the impact of COVID-19 infection on people with pre-existing mental health or neurocognitive disorder including COVID-19 related mortality and severity.

Methods. We conducted systematic searches of PubMed, EMBASE, and Cochrane library for articles published between 1 December 2019 and 15 March 2021. The language was restricted to English. We included all case control, cohort and cross sectional studies that reported raw data on COVID-19 associated mortality and severity in participants aged 18 years or older with a pre-existing mental health or neurocognitive disorder compared to those without. Three independent reviewers extracted data according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines. Methodological quality and risk of bias were assessed using the 9-star Newcastle-Ottawa Scale. We calculated the odds ratio as the summary measure along with the corresponding 95% confidence intervals. The random effects model was used to calculate the overall pooled risk estimates. COVID-19 related mortality was the primary outcome measure. The secondary outcome measure was COVID-19 related severity, defined as intensive care unit admission or use of mechanical ventilation.

Results. Fifteen studies were included in the meta-analysis comprising of 8,021,164 participants. There was a statistically significant increased risk of mortality for participants with a pre-existing mental health or neurocognitive disorder compared to those

without (OR = 2.18, 95% CI = 1.63–2.90, $P < .00001$). Increased mortality risk was found on subgroup analysis for participants with pre-existing schizophrenia (OR = 2.55, 95% CI = 1.38–4.71, $P = .003$) and dementia (OR = 3.83, 95% CI = 2.42–6.06, $P < .00001$). There was no statistically significant difference in the severity of illness when comparing the two groups. There was a statistically significant increase in the number of participants with comorbid diabetes and chronic lung disease in those with a pre-existing mental health or neurocognitive disorder compared to those without.

Conclusion. The results show that people over 18 years with a pre-existing mental health or neurocognitive disorder have an increased risk of mortality from COVID-19 and are more likely to have comorbid diabetes and chronic lung disease. These results highlight the need for better physical health monitoring and management for this group of people and better integration of mental and physical health services, as well as adding to the evidence that they should be prioritised in the ongoing COVID-19 vaccination schedules worldwide.

A Qualitative Study Exploring the Role of Hindsight Bias in the Process of Reviewing Clinical Practice Prior to Adverse Incidents

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Aims. To explore the effect of hindsight bias on retrospective reviews of clinical decision making prior to adverse incidents to inform future approaches to incident investigations.

Methods. We have undertaken focus groups with doctors of varying grades across the North West of England and North Wales. A vignette based on a real-life case from the publicly available NHS England Homicide Independent Investigation report database was presented to each group in one of three versions which differed in terms of the ending of the vignettes (i.e. suicide, homicide, no adverse incident). Using a semi-structured interview approach, the group participants were encouraged by the facilitators to reflect on issues relating to risk and risk management. All groups were provided with the same vignette which initially made no reference to the outcome and asked to comment on matters of risk and risk management. Halfway through the discussion, one of the three outcomes was disclosed, and further group discussion was held. The recorded interviews were transcribed and thematic analysis was undertaken using an adapted Framework Method.

Results. Preliminary results ($n = 10$) indicate that participants identified the potential for significant harm, particularly to others, and identified evidence of key psychopathological and historical correlates to support assertive management of risk and admission to hospital.

Whilst knowledge of the outcome did not lead to participants changing their favoured management plans, it did alter how they

appraised the case and led to participants constructing “narrative” explanations for the outcome given. The level of conviction participants held for their management plan reduced when their expectations about the outcome were confounded.

Participants presented with the suicide outcome vignette described their difficulties appraising risk to others and their over-sensitivity to that risk. Participants faced with the ‘no adverse outcome’ vignette perceived the original management plan far more favourably in hindsight. The groups that were presented with the homicide outcome vignette initially focused on both risks to self and others as well as the perceived need for further information. Following knowledge of the outcome, there was a tendency to highlight parts of the letter pertaining to risk to others which they previously had not given as much attention.

Conclusion. The initial analysis of our data confirms the findings from previous studies that hindsight colours the appraisal of adverse events. However, this study is novel in that it describes the nature of the thought processes underpinning the influence of hindsight on appraisals of risk.

Microbiome Modulators and Mood Disorders: Using a Multi-Strain Probiotic - Bio-Kult® Advanced - in Patients With Low Mood

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Aims. The aim of this proof-of-concept study was to understand the effect of daily intake of a 14-strain probiotic on mood, reward learning and emotional and cognitive processing in adults with low mood in the absence of prescribed medication. Salivary cortisol was measured as a marker for physiological stress.

Methods. In this parallel-group double-blind, placebo-controlled trial, 80 healthy adults with self-identified low mood were randomised to receive either the 14-strain probiotic or placebo for a duration of 4 weeks. Data were collected from participants at baseline (week 0) and post-intervention (week 4).

Results. Probiotic intake significantly reduced depression scores (by 50%) compared to baseline, as measured by the Patient Health Questionnaire-9 (PHQ-9) scale ($p < 0.05$). Analysis of individual items in the PHQ-9 revealed that participants taking probiotics reported improved concentration relative to baseline (+ 51%, $p < 0.05$) and felt less tired compared to placebo (–21%, $p < 0.01$).

Regarding emotional processing, the probiotic group was more accurate at recognising facial expressions compared to those receiving placebo (facial emotion recognition test, +12%, $p < 0.05$). Furthermore, the probiotic group performed less well at the reward learning task relative to the placebo group (probabilistic instrumental learning task, $p < 0.05$) and was less vigilant to emotional cues compared neutral cues (dot-probe unmasked test, –8%, $P < 0.05$). The probiotic group also showed increased susceptibility to emotional interference during a cognitive learning task, relative to placebo (auditory visual learning task, –18% $p < 0.05$).

The study also revealed a downward trend in salivary cortisol in the probiotic group over 4 weeks.

Together, these results suggest that probiotics may work via a different psychological mechanism to that of conventional antidepressants. In other words, probiotics may work by reducing emotional salience across all emotions whereas conventional antidepressants