Neuroimaging predictors of treatment response and abnormalities in neuropsychiatric disorders: a meta-analysis

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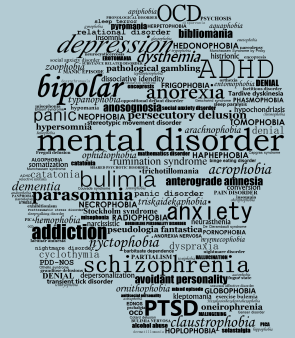
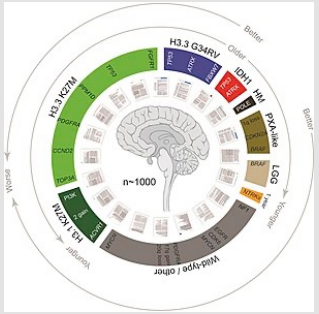
Background

- most research **focuses on a specific type of psychiatric disorder**, and even closely related diagnostic categories are rarely compared with each other
- some recent studies suggest that **different psychiatric diseases share similarities** in neurochemical, functional, and genetic levels



Why Meta-Analysis?

- Findings from neuroimaging studies of treatment response may not be robust when considered independently
- Inconsistency in results and between-study heterogeneity including differences in effect size caused by small sample sizes
- **Meta-analyses** provide an effective way to **determine consistencies** across datasets with improved statistical power



Research Questions

- **Interventions targeting common brain regions affected by mental illness might be used broadly across psychopathology?**
- **What are predictive biomarkers associated with treatment response across different psychiatric diseases?**

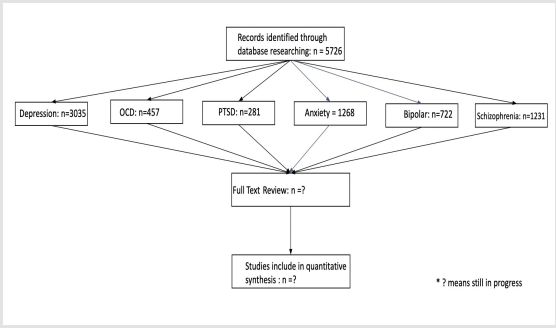
Aims

- Understand the functional brain activation changes before and after psychiatric disorder treatment
- Identify common areas that serve as pre-treatment brain activation predictors of treatment response across different psychiatric diseases

Exclusion

We applied the following criteria for our research:

- Articles were excluded if they did not include subjects meeting Diagnostic and Statistical Manual (DSM) or International Classification of Disease (ICD) (Moher et al., 2009) (World Health Organization, 2012) diagnostic criteria for major depressive disorder (MDD); bipolar disorder; dysthymia; post-traumatic stress disorder(PTSD); panic disorder; social anxiety disorder (SAD); or generalized anxiety disorder (GAD).
- Only adult samples were suitableStudies have to include a pre (baseline) and post treatment scan
- Articles were excluded if they were case reports, reviews, meta-analyses, or not written in English.



Quantitative Analysis

Activation Likelihood Estimation (ALE) Algorithm

- Activation foci reported in neuroimaging studies not as single points but as spatial probability
- Obtain ALE Map
- Calculate ALE Score, reflect the convergence of results at each particular location of the brain
- Significant convergence assessed by comparing ALE scores with an empirical null distribution
- Assesses above-chance convergence between experiments

References

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