Large Scale Genetic Research on Neuropsychiatric Disorders in African Populations is Needed

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Large Scale Genetic Research on Neuropsychiatric Disorders in African Populations is Needed

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In recent years there have been significant insights into the complex aetiologies of neurodevelopmental brain disorders. For example, neuropsychiatric genetics has achieved success with the identification of 108 loci for schizophrenia (Schizophrenia Working Group of the Psychiatric Genomics Consortium, 2014). Furthermore, meta-analyses of genomewide association study (GWAS) results encompassing thousands of samples have been completed for other psychiatric disorders including attention-deficit/hyperactivity disorder (ADHD), autism spectrum disorders, bipolar disorder, and major depressive disorder. However, published results on neuropsychiatric disorders have – thus far – predominantly included samples of European ancestry. In Fig. 1a, we compare world ancestry to the ancestry of individuals in the largest psychiatric GWAS meta-analyses published prior to 2015 (Total N = 121,985). The lack of African samples in the meta-analyses so clearly depicted here, raises concern that Africa will be left behind in terms of neuropsychiatric genetic research and subsequent treatment innovation.

There is biological rationale for conducting genetic research in African populations. It has been shown that modern humans originated in Africa and subsequently migrated to other parts of the world (Campbell and Tishkoff, 2008). As the cradle of humanity, Africa and its indigenous populations are a valuable resource when it comes to genetic research. Modern African genomes are characterised by a unique pattern of variation as a result of migration and admixture in earlier generations as well as recombination, natural selection and mutation. With an increase in allelic diversity and shorter segments of linkage disequilibrium, African genomes hold informative alleles which are useful for fine mapping of disease causing alleles (Campbell and Tishkoff, 2008). However, there is limited knowledge on African-specific functional variants highlighting the need to investigate African population groups, particularly for neuropsychiatric disorders.

As genetic findings are translated into intervention, genetic research focused solely on European populations threatens to widen the existing
large disparity between Africa and the rest of the world in mental health treatment. The vast majority of work is being conducted in high-income settings, such as the U.S. and Denmark, with a large proportion of subjects of Northern European ancestry (Fig. 1a). To date, there have been no large-scale studies on the genetics of neuropsychiatric disorders in African populations. The few studies that have been conducted have been on small samples, typically under a thousand in number (Kolassa et al., 2010). Recent successes in studies of schizophrenia have demonstrated that very large scale meta-analysis is necessary to identify genetic variants associated with neuropsychiatric disorders. Without engaging African scientists and physicians and performing studies of African populations, there is a significant risk that the recent advances in neuropsychiatric genetics will result in a widening of the massive research and treatment gaps between Africa and the rest of the world. Indeed, one of the aims of the movement for global mental health is to improve and achieve equity in mental health by expanding the infrastructure and research findings from large-scale psychiatric genetic epidemiology to Africa. This will be achieved by enhancing neuropsychiatric genetic research capacity in Africa through the training of scientists, conducting very large-scale sample collection and analysis through supporting the development of locally led research programmes in neuropsychiatric genetics and leveraging unique opportunities in population genetics.

In conclusion, while there is a clear need for further work in elucidating the genetics of neuropsychiatric disorders in African populations,
several challenges will first need to be tackled. An effective local network of neurogenetic researchers needs to be established in order to discover genetic variation predisposing to neuropsychiatric disorders. This research needs to avoid prior pitfalls of “safari research” by engaging and training African scientists and physicians to improve phenotyping and perform studies of African populations to ensure long-term capacity to translate genetic findings in a way that will benefit African peoples.

Conflicts of Interest

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