# Introduction

The brain is the part of the central nervous system which controls body activities through a complex network of nerves. Disorders of the brain typically include physical injury, cancer or other neurological conditions, and they can arise from trauma, genetic mutations, congenital abnormalities, or illnesses such as infections, blood and autoimmune disorders. Brain disorders feature numerous symptoms, including defects in sensation, thinking ability, perception of reality and muscle control as well as changes in memory and personality. For many of these disorders, no cure exists and management involves rehabilitation, medication or surgery.

It is estimated that over 40% of the burden of brain disorders is attributed to genetic defects. Over the past decades, a significant amount of research has focused on studying the genetics of neurological brain disorders. For many of these disorders, such as Huntington Disease, Fragile X Syndrome and Down's Syndrome, the underlying genetic basis has been clearly identified. On the other hand, the genetic basis of disorders such as Autism and Attention-Deficit Hyperactivity Disorder (ADHD) is not clearly understood. Many genes are thought to play a role in each of these disorders, with environmental factors contributing to disease onset and progression as well. To understand the role of genetics in such complex disorders, the heritability value (H) is used. H is calculated by studying differences in the symptoms of a disease between those who share the same genetic background, such as identical twins, in comparison to others. A value of H close to 1.00 (the maximum) indicates a clear genetic cause to the condition. Values less than 1.00 indicate that external factors such as these emanating from the environment do affect the disease phenotype.

Diagnosis for neurological brain disorders is done by assessing individuals for behavioral as well as physical defects. Behavioral analysis includes studying the ability to perform and complete given tasks, memory, attentional control as well as thinking ability and social cognition through various kinds of tests in the form of questionnaires and examinations. Physical defects such as brain structural changes are examined using neuroimaging techniques. These same tests can be used to determine the heritability of clinical features. In ADHD for example, the ability to maintain sustained attention is impaired and this feature is estimated to have an H value of up to 0.72.

Neurological brain disorders are generally viewed negatively due to the accompanying social stigma as well as the psychological and financial burden on caretakers. This is particularly true in the Arab world, and more so for females in these societies. For example, studies have shown that affected women in Arab societies are less likely to consult a specialist, as it may affect their social status and chances when it comes to marriage. Moreover, a majority of the parents of affected children have difficulties accepting these conditions and choose not to consult a specialist due to fear of stigma. For example, a study in the UAE observed that only a little more than a third of parents of children with neurological brain disorders seek professional care. Various other factors including profound lack of awareness as well as reliance on spiritual healers instead of medical professionals have been noted. Nevertheless, significant efforts are being

made to spread education and establish neurological care in culturally acceptable settings to reduce social stigma.

Limited data on Arab populations show that brain disorders have a similar prevalence to that in developed countries. Studies attribute the scarce amount of research on neurological brain disorders in Arab countries to the lack of facilities, professionals and available services.

This booklet provides an overview of the symptoms, risk factors, genetic basis and impact on the Arab world of five common neurological brain disorders, namely Alzheimer Disease, ADHD, Intellectual Disability, Schizophrenia and Tourette syndrome.