# Review of the New Zealand adult attention-deficit hyperactivity disorder work by Moffitt *et al.* (2015)

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Despite a prevailing assumption that attention-deficit hyperactivity disorder (ADHD) is a childhood-onset neurodevelopmental disorder, no prospective-longitudinal study has described the childhoods of the adult ADHD population. Unexpectedly, the adult ADHD group did not show tested neurophysiological deficits in childhood or adulthood nor did they show polygenetic risk for childhood ADHD. Findings raise the possibility that adults presenting with the ADHD symptom picture may not have a childhood-onset neurodevelopmental disorder; thus, the disorder's place in the classification system must be reconsidered, and research must investigate the etiology of adult ADHD.

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## Moffitt *et al.* (2015)

The cohort prevalence of attention-deficit hyperactivity disorder (ADHD) was 6% in childhood and 3% at the age of 38 years, corresponding to previous estimates among children and adults. Unexpectedly, childhood and adult diagnoses comprised virtually nonoverlapping sets of individuals.

In the year following publication of Moffitt and colleagues, Bonvincini *et al.* (2016) 'confirmed the significant role of BAIAP2 and DHA in the etiology of ADHD exclusively in adults.' Awareness of ADHD in adults has rapidly increased, and a new clinical practice has emerged across the world. Despite this progress, treatment of adult ADHD in Europe and many other regions of the world is not yet a common practice, and diagnostic services are often unavailable or restricted to a few specialist centers.

For researchers, these new data are a 'call to arms' to study adult-onset ADHD, determine whether and how to incorporate age at onset into future diagnostic criteria, and clarify how it emerges from subthreshold ADHD and other neurodevelopmental anomalies in childhood. The current age-at-onset criterion for ADHD, although based on the best data available, may not be correct. We hope that future research will determine whether and how it should be modified (Faraone and Biederman, 2016).

Moffitt *et al.* (2015) reported on a 38-year-old prospective study of ADHD among 1037 individuals born from 1972 to 1973 in New Zealand. It is entirely unique, and the world of general practitioners now has deeper insights available into what to expect, who to screen, and the presentation one might expect in general or other psychiatric practice. Upon publication of Moffitt and colleagues, many of the world's ADHD luminaries soon found occasion to mention it (e.g. Castellanos, 2015; Agnew-Blais *et al.*, 2016; Asherton *et al.*, 2016; Bonvincini *et al.*, 2016; Faraone and Biederman, 2016; Kennedy *et al.*, 2016; Wakefield, 2016; Clemow *et al.*, 2017, where Moffitt and colleagues is cited in the first sentence of the authors' presentation; Geffen and Forster, 2018, where Moffitt and colleagues is cited in the first sentence of the second paragraph; and Murray *et al.*, 2018, where Moffitt and colleagues is cited in the second sentence of the second paragraph). It is perhaps the study by Moffitt and colleagues and its general reception into the community of adult ADHD researchers which now defines how adult ADHD is best understood in discussions of adult ADHD etiologies, diagnosis, and treatment.One of the Egyptian adult ADHD researchers most suitably poised to have immediately translated this change of paradigm into changes in best practice died shortly after the publication of Moffitt and colleagues (Mohamed Nashaat MD). Hence his most recent citations are from 2015 in his PhD thesis manuscript (here referred to as Nashaat, 2015), comprising three in number, and one of them is Moffitt and colleagues.



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Nashaat (2015) describes study of adult ADHD in 300 consecutive adults (58.3% male, 41.7% female) seeking general psychiatric consultations at the outpatient clinics of the Psychiatry Department of Kasr Alainy Hospitals in Cairo, Egypt.

The patients completed Adult ADHD Self-Report Scale-v.1.1, and 72 of those patients (56.9% male, 43.1% female) were 'definite' cases of adult ADHD by DSM-5 criteria, resulting in a 24% rate of affliction among those patients who had presented to that clinic with issues. Comorbidity was present in all 72 cases: 41.7% bipolar I disorder, 25.0% substance use disorder (SUD), 15.3% major depressive disorder (MDD), 9.7% anxiety disorder, and 8.3% obsessive-compulsive disorder (OCD); these were the primary diagnoses in an overall pattern of two-thirds of the patients having two or more comorbidities. Moffitt and colleagues, in their prospective study, found a large number of adult cases without comorbidity, and it can be assumed that Nashaat would have found such cases in such proportions in a 38-year-old prospective study from birth of Egyptian patients. However, he was dealing with adults experiencing issues sufficient to seek consultation, and thus, a different kind of cross-section was involved.

The results of Nashaat (2015) showed that something on the order of 25% of that facility's Egyptian adults presenting with concerns may be afflicted and that SUD is not the first place to go looking when wondering who might have adult ADHD comorbidity, which would be bipolar I disorder. In Nashaat's sample at least, the common SUD/ADHD equation is associated with SUD as a self-medication for adult ADHD and the figures that result when mainly patients with SUD are screened for ADHD, commonly in the context of evaluating criminal offenders or patients presenting with behavior issues.

So where might Egypt now turn One would want to start with the best evidence about general community ADHD morbidity and comorbidity worldwide. In those massive literature studies, there is the persistent finding that human populations generally see ~6% of their children afflicted and ~3% of their adults. What is known about Egypt suggests a similar pattern.

Alkhateeb and Alhadidi (2016) have recently noted how short the list of Arab ADHD studies seems to be. Beyond Nashaat, I find few English reports on the topic of adult ADHD in Egypt or Arab countries in general, just as Alkhateeb and Alhadidi have indicated. Moreover, even wealthy nations have often paid little attention to adult ADHD. Sweden, for instance, only recently emerged from an older pattern where there was little diagnostic or treatment activity.

For the moment and for some years into the future, the questions of who to screen and how to evaluate findings will first involve familiarity with the New Zealand research summarized in Moffitt and colleagues. In that study, '[a]s expected, the adult ADHD group showed 3% prevalence . . . Unexpectedly . . . 90% of adult ADHD cases lacked a history of childhood ADHD.' So just as SUD may not be the first place to go looking for adult ADHD comorbidity, patients with childhood ADHD histories are not the first place to go looking for afflicted adults either.

'If this finding is replicated, then the disorder's place in the classification system must be reconsidered, and research must investigate the etiology of [adult] ADHD' (Moffitt *et al.*, 2015), which is a rather modest pronouncement on the part of those authors. It would take 38 years to replicate their study. Perhaps other such studies are underway.

However, 'he who hesitates is lost' and, in light of Moffitt and colleagues, practitioners are in possession of evidence which beckons one toward a new path more or less immediately. Moreover, there are discussions in Moffitt and colleagues describing what would constitute more powerful presentations or refutations of their main or indicative findings. Supporting physiological evidence emerged in the next year. Bonvincini *et al.* (2016) 'confirmed the significant role of BAIAP2 and DHA in the etiology of ADHD exclusively in adults.'

One would hope that the world community of adult ADHD specialists is not going to be slow to bring Moffitt and colleagues to the attention of sentencing, incarceration, and parole practitioners.

Adult ADHD diagnosis is neither extremely old (c.f., e.g. Biederman *et al.*, 1993 for the idiom of that period) nor is the search for the afflicted all that it might be at this time (and, thus, such measured forays into adult ADHD diagnosis as Nashaat, 2015.

Nashaat's (2015) sample was a different kind of sample than that of Moffitt and colleagues and produced somewhat different results in that Moffitt's group found the following:

Ubiquitous comorbidity for adults with ADHD has been reported before (Kessler *et al.*, 2006), suggesting the hypothesis that ADHD symptoms in adults in their thirties might be the psychiatric equivalent of fever, a syndrome that accompanies many different illnesses and is diagnostically nonspecific, but signals treatment need. However, 55% of adult ADHD cases had no other concurrent diagnosis at age 38; the ADHD symptom picture can present alone in adults.

Nashaat (2015) found no adult patients with ADHD without comorbidity which may be a result of screening individuals presenting with issues, underrepresenting the afflicted who suffer solely from adult ADHD, and such persons perhaps make life adjustments of varying levels of suitability and more rarely seek treatment.

One place to go looking for undiagnosed persons who create social, administrative, and institutional costs would be prisons, as their inmates' criminal conduct is often so impulsive, incomprehensible, and self-defeating owing to adult ADHD. Such is accompanied by a high level of SUD and its ADHD self-medication effect when the main substance involved is methamphetamine. The world is in the awkward position of imprisoning many people for illegal methamphetamine use or sales only to end up deciding to treat some of them with methamphetamine once they are diagnosed with adult ADHD in prison, in the case of those prisons which are screening for and treating adult ADHD (cf. Young *et al.*, 2017 for related issues). Moreover, in the case in Egypt, one might imagine, where the cost of methamphetamine alternatives might be considered prohibitive.

#### Taking the message to prison system administrators

Although women constitute approximately half of the adults diagnosed with ADHD, they do not have anything like the rates of male offences and incarceration. Afflicted women's symptomologies are more associated with inattention than the impulsiveness, aggression, and diminished executive functioning of males. So the following speaks only to the more distressing situation with respect to males.

As many as half of the incarcerated males may have adult ADHD in some nations. World prison systems have long been aware that many of their inmates experience something like adult ADHD, and some prison systems have implemented stimulant or atomoxetine therapies for such offenders. Results seem buried in the gray literatures. Little mention of results of such trials or operating procedures seems available through English language academic sources, including journals concerned with prison administration. However, Usher *et al.* (2013) provide an example of what is found when prisoners are screened:

Previous research has shown that a significant percentage of offenders are affected by adult ADHD and its related symptoms; however, it is unknown the extent to which this disorder affects federal inmates in Canada and the impact ADHD has on key correctional outcomes. Four hundred and ninety-seven male federal offenders were assessed at intake over a 14-month period using the Adult ADHD Self-Report Scale. Approximately 16.5% scored in the highest range, which is consistent with the clinical threshold for diagnosis for the disorder; a further 25.2% reported subthreshold symptoms in the moderate range. ADHD symptoms were found to be associated with unstable job history, presence of a learning disability, lower educational attainment, substance abuse, higher criminal risk and need levels, and other mental health problems. ADHD symptoms were also found to predict institutional misconduct. Additionally, offenders with high levels of ADHD symptomatology fared more poorly on release to the community. Implications for institutional behavior management and the need for additional resources and adapted interventions are discussed (The Usher and colleagues research was conducted using DSM-IV, as DSM-5 was published at about the same time as Usher and colleagues was completed and published. DSM-5 would have moved more patients into the 'highest' and 'moderate' range.)

Egypt's rates of incarceration (traditionally about 80 prisoners per 100 000 total population) are on par with Germany, Switzerland, and the Netherlands, and for such populations, it is often noted that something less than half of such inmates, but rarely less than 30%, are incarcerated for the typical sorts of impulsive misconduct or aggression related to 'ADHD crimes.' Forethought is impaired and impulsivity is high.

Possibly this will interest the Egyptian law enforcement and incarcerations systems over time if such information can find a certain level of prominence in their occupational literatures. Perhaps it already has. In the meantime, it would be useful to screen and then treat afflicted newer and older prisoners and parolees for ADHD to demonstrate to criminal justice stakeholders the efficacy of such remedies as exist and their

cost–benefit equations. It might open doors for more and quicker paroles if treated prisoners are responding as might be expected with reduced offending while initially incarcerated.

## Conclusion

Moffitt *et al.* (2015) provide the world's treatment and incarceration specialists with a solid point of reference in making sense of adult ADHD etiologies and interventions and will continue to do so for a very long time even while those authors' own recommendations for further enquiry are addressed (see also Faraone and Biederman, 2016 for some initial observations). Meanwhile, the world of adult diagnosis and treatment goes on and on as if practitioners do not know what to do. 'This situation is remarkable given the strong evidence base for safe and effective treatment' (Asherton *et al.*, 2016). With the publication of the findings of Moffitt and colleagues, there is no reason for Arab and other nations to wait for further evidence when translating existing information into action with respect to adult screening and treatment in general practice and in its criminal justice systems.

National and local incarceration and parole systems should be invited to employ screening and pharmacological interventions (Scott *et al.* 2016) using proven treatments to enrich the lives of the afflicted and reduce disease burden costs to the society. Young *et al.* (2015) note that populations in male youth prisons have five times the ADHD prevalence as the general population and that there is a tenfold factor in male adult prisons. Ibrahim *et al.* (2014) and and Scott *et al.* (2016) observe that the psychiatric health of prisoners typically declines rather than improves. Research seems far ahead of best practice across most incarceration systems internationally. Those jurisdictions which come to implement remedial interventions might best report simply and clearly on the extent to which net system costs contract when best practice is implemented so as to entice more jurisdictions to follow suit. On another front, general psychiatric practitioners might find they have a new tool kit for improving outcomes for a substantial portion of their adult patients if they would screen more or all of them for ADHD, which takes little time, and then treat the afflicted.

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