Psychopharmacological treatments in persons with dual diagnosis of psychiatric disorders and developmental disabilities

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People with developmental disabilities are at considerable risk for the development of comorbid psychiatric conditions. Psychopharmacological treatments may have a crucial role in a multidisciplinary and multimodal approach to the management of psychopathology in this population. Psychiatric illnesses that are particularly amenable include mood disorders, anxiety disorders, schizophrenia, and attention deficit hyperactivity disorders (ADHDs) and antidepressants, mood stabilisers, anxiolytics, antipsychotics, and stimulants should be considered, respectively. ADHD may also respond to α₁-agonists. Psychotropic agents such as β-antagonists can target aggressive, self-injurious, and stereotypical behaviours and opioid antagonists may be helpful in treating self-injurious behaviour and stereotypy. Selective serotonin reuptake inhibitors, newer anticonvulsants, and atypical neuroleptics are preferred when treating psychiatric disorders among people with developmental disabilities. This paper will review the major studies of pharmacological treatment of mental illness in individuals with developmental disabilities.

Prevalence estimates of psychopathology in individuals with developmental disabilities are larger than those observed within the general population. For example, Reber reported on the comorbidity of several psychiatric illnesses with mental retardation, including schizophrenia, bipolar illness, major depression, attention deficit hyperactivity disorder (ADHD), obsessive compulsive disorder, and other anxiety disorders. In the following review, and to remain consistent with the literature, the term “developmental disability” will be used interchangeably with “mental retardation” to refer to individuals who suffer from significant intellectual impairment and deficits in adaptive behaviours with onset before age 18 years.

A multidisciplinary and multimodal treatment approach is advisable in this population. Given that individuals with developmental disabilities are susceptible to the full range of psychopathology, a variety of treatment strategies should be considered, including environmental modifications, behavioural interventions, counselling, and psychopharmacology.

A significant number of people with developmental disabilities and concurrent psychiatric illnesses are treated with psychotropic agents. For instance, Spreat et al reported that among adults with mental retardation, 22% were prescribed neuroleptics, 5.9% antidepressants, and 9.3% anxiolytics.

It should be noted that the literature on individuals with developmental disabilities and comorbid psychopathology is fraught with methodological limitations. For instance, it is often difficult to obtain informed consent for the initiation and prolonged continuation of psychotropic treatments. And although there has been a recent increase in the number of studies devoted to this topic, there several limiting factors nevertheless remain. Borthwick-Duffy examined the epidemiology and prevalence of mental disorders in persons with intellectual disabilities. In her review, she reported on 12 US and nine international studies, including the works of Corbett and Lund. In this review, several factors that influence the appropriate use of psychotropic medications in this population were examined. These factors are:

1. Terms such as mental retardation, developmental disability, developmental handicap, and intellectual or learning disabilities are used interchangeably in the literature. Strict definitional criteria are not always adhered to. This can result in over-inclusion or under-inclusion of participants in the pharmacological studies dedicated to this group.

2. The coexistence of two major pathologies (that is, intellectual disabilities and mental disorders) makes it difficult to disentangle the relative contributions of each to the individual’s clinical presentation. For instance, it has been well documented that medical and physical problems observed among dually diagnosed individuals may be viewed as challenging behaviours or mental illness in this population. The presentation of behaviours and/or symptoms in these persons can be intertwined in the confines of the two phenomena; this is known as “diagnostic overshadowing”.

3. The use of the term “mental disorder”, and the lack of agreement on operational definitions of mental disorder, impose yet another limitation in these studies by the under-inclusion or over-inclusion of subjects.

Abbreviations: ADHD, attention deficit hyperactivity disorder; SSRI, selective serotonin reuptake inhibitors
The pharmacological studies of the dually diagnosed are characterised by a lack of standardised clinical tools for these individuals, thus resulting in an inherent bias in this literature.

The various studies on this topic do not include the full range of mental disorders. As such, they can be viewed as limited in their use, applicability, and generalisability.

In the present article, we will review the various psychotropic medications used in persons with dual diagnosis of developmental disabilities and psychiatric illnesses.

**METHODODOLOGY**

Databases used include:

- (A) Medline (1975 to December 2001) was searched using Ovid Online and the following terms: randomised clinical controlled trial (explode all subheadings or double-blind/all subheadings); (explode clinical trial in patients/all subheadings); (crossover controlled clinical trial/crossover). These searches were combined with (explode—learning disorders/all subheadings) or (explode—mental retardation or handicap or disab?).

- (B) PsycInfo (1975 to December 2001) was searched using Ovid Online using the following terms: randomised clinical controlled trial developmental disabilities/or mental retardation and psychotropic drugs/or psychopharmacology (explode all subheadings or double-blind/all subheadings); (crossover controlled clinical trial/crossover); (explode clinical trial in patients/all subheadings). These searches were also combined with (explode—learning disorders/all subheadings) or (explode mental retardation, handicap, or disab?).

- (C) Databases were searched for reviews, reports on series of cases, individual case reports, and other pertinent clinical information in the English language.

**RESULTS**

**A. Antidepressants**

Antidepressants are used for several major psychiatric illnesses, including major depression and other depressive disorders. Selective serotonin reuptake inhibitors (SSRIs) are the treatment of choice, given the more favourable side effect profile when compared with older antidepressants. However, lack of response after four to six weeks of treatment at therapeutic doses warrants reconsideration of the diagnosis and, if necessary, trials of other antidepressants such as other SSRIs, venlafaxine, trazodone, tricyclic antidepressants, or moclobemide. Although the majority of studies include fluoxetine, paroxetine was also found efficacious in treating depressed adolescents with developmental disabilities. An increasing number of psychiatric symptoms and illnesses have been linked to serotonin and thus may respond to serotonergic agents. For example, serotonergic antidepressants such as fluoxetine, sertraline, and clomipramine were found useful in treating obsessive compulsive disorder and therefore could be used in conjunction with behavioural strategies. Furthermore, the serotonergic system may be implicated in the pathogenesis of behavioural disturbances such as stereotypy, self injury, and aggression. Clomipramine was found to be effective in the treatment of self injurious behaviour and stereotypy in people with concurrent developmental disabilities in two double blind, placebo controlled trials. However, some authors have reported serious, adverse effects with the use of mirtazapine in this population. Among SSRIs, both paroxetine and sertraline were reported useful in treating behavioural disturbances in individuals with developmental disabilities. However, fluoxetine has been found to aggravate aggressive behaviours in persons with developmental disabilities. An open label study of mirtazapine has demonstrated its modest level of effectiveness in the treatment of several symptoms associated with pervasive developmental disabilities, such as aggression, self injurious behaviour, irritability, hyperactivity, anxiety, depression, and insomnia.

In brief, there is adequate evidence to suggest that antidepressants may be used in the treatment of persons with intellectual disability and comorbid major depression, other depressive and anxiety disorders, body dysmorphic syndrome, obsessive-compulsive disorder, eating disorders, smoking cessation, and functional enuresis. In addition, antidepressants have been found to be efficacious in the treatment of challenging behaviours, such as aggression, self injurious behaviour, stereotypies, and distraction.

Nevertheless, antidepressants should be used cautiously in this population, especially among those suffering from bipolar illness in the depressive phase. These medications can trigger a manic or hypomanic switch, especially in rapid cycling or mixed states, to which people with developmental disabilities are more prone.

Antidepressants studied in those with intellectual disabilities are shown in table 1.

**B. Antianxiety medications (anxiolytics)**

Benzoazepines could be used as possible alternative treatment of anxiety disorders. However, hostility, disinhibition, self injurious behaviour, and aggression were reported as paradoxical reactions to benzodiazepines, especially in people who exhibit evidence of stereotypical, self injurious behaviours before starting treatment with benzodiazepines. In addition, benzodiazepines have an increased risk for abuse, tolerance, and dependence. Therefore, the clinical consensus advises that benzodiazepines alone should only be used for a maximum of three weeks.

Some clinicians use benzodiazepines for the treatment of sleep disorders. However, effective long term treatments for insomnia include behaviour modification, relaxation techniques, and the practice of good sleep hygiene. In addition, it may be advisable to consider trazodone as a non-addictive alternative to benzodiazepines for the treatment of insomnia.

Buspirone, a partial 5-hydroxytryptamine-1A (5HT-1A) agonist, was found beneficial in the treatment of anxiety disorders, particularly generalised anxiety disorder. In addition, several studies have reported that buspirone improved agitation and behavioural problems, including aggression and self injury, in people with developmental disabilities.

In summary, anxiolytics, particularly buspirone, may be used in the treatment of anxiety disorders, as well as agitation and challenging behaviours. Caution should be taken when anxiolytics are used in this group, as they can exacerbate agitation, aggression, and cause paradoxical excitement.

Anxiolytics studied in those with intellectual disabilities are shown in table 2.

**C. Mood stabilisers**

Lithium may be useful in the treatment of acute mania, cyclothymic disorder, and the prophylaxis of bipolar illness type I. In cases of cycloid psychosis, which occurs particularly in Prader-Willi syndrome, the treatment of choice is lithium. Craft et al reported that lithium is useful in the treatment of aggression in people with developmental disabilities. Furthermore, several investigators assessed lithium as a therapeutic agent in the management of disruptive behaviours. A number of studies reported that lithium might be beneficial in patients with developmental disabilities and concurrent aggression and mood lability. In addition, several double blind placebo controlled trials found that lithium has beneficial effects on self injurious behaviour. However, this population is more prone to developing toxic side effects to lithium and thus requires close monitoring.

Valproic acid is the treatment of choice of rapid cycling and mixed states, illnesses that have a higher incidence among
people with developmental disabilities compared with those with normal IQ. There are only very limited data to support the use of anticonvulsant medications for behavioural disturbances. Valproic acid was found beneficial in patients with developmental disabilities and comorbid aggression, self injurious behaviour, and mood lability. In addition, divalproex sodium was found well tolerated and beneficial in the treatment of aggression and self injurious behaviour in adults with developmental disabilities. Furthermore, Kalachnik et al reported that antiepileptic drugs might have side effects underling behavioural problems in people with developmental disabilities.

Thus, mood stabilisers may be used in the treatment of acute mania, the prophylaxis of bipolar illness, type I, cyclothymic disorder, cycloid psychosis, and challenging behaviours. Certain guidelines must be followed with regard to before and after treatment laboratory testing when prescribing mood stabilisers.

Mood stabilisers studied in those with intellectual disabilities are shown in table 3.

Table 1 Various psychopharmacological treatments studied in persons with intellectual disabilities: antidepressants

<table>
<thead>
<tr>
<th>Author</th>
<th>Drugs</th>
<th>Duration</th>
<th>Subjects</th>
<th>Symptoms diagnosis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masi et al 1997</td>
<td>PRX 20–40 mg</td>
<td>9 weeks</td>
<td>7 adolescents MID</td>
<td>MDD</td>
<td>4/7 significant improvement</td>
</tr>
<tr>
<td>Sovner et al 1993</td>
<td>FLX 20–40 mg/day</td>
<td>11 and 15 months</td>
<td>Woman in late 50s and man in late 30s</td>
<td>MDD/SIBs</td>
<td>SIBs and depressive symptoms reduced: maintained for 1 year</td>
</tr>
<tr>
<td>Brasic et al 1996</td>
<td>CMP 25 mg initially 200 mg finally/day</td>
<td>Open study</td>
<td>5 female preadolescents SID</td>
<td>Autism + dyshkinies and motor tics</td>
<td></td>
</tr>
<tr>
<td>Bodfish and Madison 1993</td>
<td>FLX 40–80 mg/day</td>
<td>4 months baseline and treatment phases</td>
<td>16 adult MR</td>
<td>10 subjects OCD</td>
<td>7/10 with OCD responded favourably: to FLX none of the controls</td>
</tr>
<tr>
<td>Wiener and Lamberti 1993</td>
<td>SRT 50 mg/day</td>
<td>8 weeks</td>
<td>33 year old woman with MDD</td>
<td>OCD with fears about health, face rubbing, etc</td>
<td>Reported less anxiety with decrease in fears and OCD symptoms</td>
</tr>
<tr>
<td>Posey et al 2001</td>
<td>MRTP</td>
<td>Open study</td>
<td>26 subjects with PDD/ID</td>
<td>Aggression; SIBs, irritability, hyperactivity, anxiety, depression, insomnia</td>
<td>9/26 showed improvement varying from much improved to very much (modest effectiveness)</td>
</tr>
<tr>
<td>Davanzo et al 1998</td>
<td>PRX</td>
<td>4 months open study</td>
<td>15 I/P adults with SID and PIB</td>
<td>Aggression and SIBs</td>
<td>Aggression significantly reduced for 1 month: no effect thereafter. No change in SIBs</td>
</tr>
<tr>
<td>Hellings and Warnock 1994</td>
<td>FLX 20–60 mg/day</td>
<td>24 months</td>
<td>3 adults with MID</td>
<td>Prader-Willi with stereotypy with intermittent explosive disorder</td>
<td>2/3 showed decrease in skin picking; the 3rd patient showed significant reduction in hoarding and explosive behaviour</td>
</tr>
<tr>
<td>Lewis et al 1995</td>
<td>CMP</td>
<td>6–7 weeks</td>
<td>10 institutionalised adults SID</td>
<td>Repetitive behaviour</td>
<td>Body and object stereotypy were reduced; irritability and hyperactivity improved</td>
</tr>
<tr>
<td>Lewis et al 1996</td>
<td>CMP</td>
<td>7–8 weeks</td>
<td>8 institutionalised adults with ID</td>
<td>Self injury and self restraint</td>
<td>6/8 subjects &gt;50% reduction in SIBs</td>
</tr>
<tr>
<td>Troisi et al 1995</td>
<td>FLX 20 mg CBZP and neuroleptics</td>
<td>Open study</td>
<td>19 I/Ps with ID</td>
<td>Aggressive behaviour</td>
<td>Varied response, 9/19 showed increased aggression over time</td>
</tr>
</tbody>
</table>

CBZP, carbamazepine; CMP, chlorpromazine; CPZ, chlorpromazine; FLX, fluoxetine; ID, intellectual disability; I/P, inpatient; MDD, major depressive disorder; MID, mild intellectual disability; MR, mental retardation; MRTP, mirtazepine; OCD, obsessive-compulsive disorder; PDD, pervasive developmental disorder; PRX, paroxetine; SIB, self injurious behaviour; SID, severe intellectual disability; SRT, sertraline.

D. Antipsychotics (neuroleptics)

Antipsychotic medications are frequently prescribed for psychotic symptoms or behavioural disturbances in people with developmental disabilities. The rationale of employing neuroleptics for the treatment of self injurious behaviour stems from the model of Lesch-Nyan syndrome. According to this model, the dopaminergic system is implicated in self injurious behaviour. A number of studies have reported that neuroleptics are helpful in treating aggressive and self injurious behaviours. Furthermore, Kalachnik et al reported that antiepileptic drugs might have side effects underlying behavioural problems in people with developmental disabilities.

Thus, mood stabilisers may be used in the treatment of acute mania, the prophylaxis of bipolar illness, type I, cyclothymic disorder, cycloid psychosis, and challenging behaviours. Certain guidelines must be followed with regard to before and after treatment laboratory testing when prescribing mood stabilisers.

Mood stabilisers studied in those with intellectual disabilities are shown in table 3.
investigators have reported that risperidone is an effective therapeutic agent for the treatment of self-injurious behaviour, aggression, and stereotypical behaviour.\textsuperscript{45,46} Furthermore, Vanden Borre et al reported in a double blind, placebo controlled study that risperidone is a beneficial adjunctive therapeutic agent for treating behavioural problems in patients with developmental disabilities.\textsuperscript{47} In addition, a double blind study and a randomised controlled trial showed that risperidone is well tolerated and effective for the treatment of behavioural disturbances in individuals with developmental disabilities.\textsuperscript{48,49} A pilot study found that olanzapine is well tolerated and effective in reducing stereotypic self-injurious behaviours in adults with developmental disabilities.\textsuperscript{50} Finally, clonazepam has been shown to be useful for the treatment of severe behavioural disturbances in people with developmental disabilities.\textsuperscript{51} In addition, clonazepam was found to be a safe, efficacious, and well tolerated agent for the management of treatment-resistant mood and psychiatric illnesses in people with developmental disabilities.\textsuperscript{52,53}

Atypical neuroleptics have a more tolerable side effect profile than typical neuroleptics. There is an increased frequency of extrapyramidal side effects in people with developmental disabilities who are treated with typical neuroleptics, especially phenothiazines, butyrophenones, and depot preparations. Akathisia is the most common of the acute extrapyramidal side effects to diagnose.\textsuperscript{54} Akathisia is the most common of the acute extrapyramidal side effects. Atypical antipsychotics, effects can include extrapyramidal symptoms, particularly akathisia and other dyskinesias. Atypical antipsychotics, although very efficacious in the treatment of challenging behaviours in this group, as severe. Psychopathological phenotype associated with their use. Other, less catastrophic, but nevertheless important, side effects can include extrapyramidal symptoms, particularly akathisia and other dyskinesias. Atypical antipsychotics, although very efficacious in the treatment of challenging behaviours in this group, can potentially create side effects such as epilepsy, weight gain, and secondary diabetes.\textsuperscript{55}

Atypical antipsychotics, although very efficacious in the treatment of challenging behaviours in this group, can potentially create side effects such as epilepsy, weight gain, and secondary diabetes.\textsuperscript{55} Again, caution should be exercised when these medications are administered to persons with intellectual disabilities.

Antipsychotics studied in those with intellectual disabilities are shown in table 4.

E. Stimulants

Although several studies have found that individuals with developmental disabilities have lower response rates to stimulants in comparison with people without developmental disabilities,\textsuperscript{56,57} stimulants have been shown to be helpful in treating ADHD among individuals with concurrent mild to moderate developmental disabilities.\textsuperscript{58} However, the use of stimulants in people with severe to profound degrees of developmental disabilities is limited.\textsuperscript{59} Furthermore, although preschool children with developmental disabilities and ADHD respond to methylphenidate at rates similar to those of school age children with dual diagnosis,\textsuperscript{60,61} they are more prone to developing adverse effects.\textsuperscript{62} It is important to monitor patients receiving antipsychotics for the onset of symptoms suggesting neuroleptic malignant syndrome. Caregivers should be educated regarding the significance of symptoms such as high fever, muscle rigidity, and change in mental status, in order to seek immediate medical attention.

Antipsychotics studied in those with intellectual disabilities are shown in table 4.
to have limited effects on hyperactivity in people with developmental disabilities.\(^\text{41}\)

Currently there is no compelling evidence supporting the use of clonidine in the treatment of Tourette’s syndrome, other tic disorders, and impulsivity.\(^\text{41}\)

**G. Opioid antagonists**

There have been controversial reports with respect to the efficacy of naltrexone for the treatment of self injury in people with developmental disabilities. Some investigators found it helpful,\(^\text{41}\) while others indicated that naltrexone might worsen stereotypical and self injurious behaviours.\(^\text{61}\) Casner et al conducted a retrospective study, and found that out of 56 (n = 8000 patients with developmental disabilities) patients, 32 were considered to have responded to treatment by their prescribing physicians but only 13 were judged to be improved according to the investigator’s standards.\(^\text{61}\) Casner et al reported a low frequency of serious side effects and a gradual

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**Table 4** Various psychopharmacological treatments studied in persons with intellectual disabilities: antipsychotics

<table>
<thead>
<tr>
<th>Author</th>
<th>Drugs</th>
<th>Duration</th>
<th>Subjects</th>
<th>Symptoms diagnosis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aman et al 1989(^\text{41})</td>
<td>HLPD 0.025–0.05 mg/kg/day RD</td>
<td>Crossover HLPD study 3 weeks</td>
<td>20 I/P adults with ID</td>
<td>Stereotypic behaviours</td>
<td>Slight reduction in stereotypic behaviours. Gross increase in motor activity under high doses. 50% reduction in ABC. A subset of 5 subjects showed 4/5 improved</td>
</tr>
<tr>
<td>Zarcone et al 2001(^\text{40})</td>
<td>Double blind/crossover design 22 weeks with 6 months follow up</td>
<td>Double blind/crossover 2–8 weeks</td>
<td>34 adults with ID</td>
<td>SIBs + aggressive behaviours</td>
<td>SHBS (schedule for handicapped behaviour and skills) showed significant improvement with ZCPX. CGI did not differentiate between the two</td>
</tr>
<tr>
<td>Malt et al 1995(^\text{41})</td>
<td>ZCPX v HLPD</td>
<td></td>
<td>20 adults with ID</td>
<td>SIBs + aggressive behaviours</td>
<td></td>
</tr>
<tr>
<td>Buitelaar et al 2001(^\text{41})</td>
<td>RSD mean: 2.9 mg/day</td>
<td>6 weeks double blind</td>
<td>38 adolescents with ID hospitalised</td>
<td>Psychiatric disorders with severe aggression</td>
<td>Significant improvement on the CGI</td>
</tr>
<tr>
<td>Cohen et al 1998(^\text{44})</td>
<td>RSD</td>
<td>Open study</td>
<td>8 adults with MID</td>
<td>SIBs, aggressive behaviours</td>
<td>Significant reduction of aggression and SIBs</td>
</tr>
<tr>
<td>Horrigan and Barnhill 1997(^\text{40})</td>
<td>RSD 0.5 mg/BID</td>
<td>Open study</td>
<td>11 male young adults with ID</td>
<td>Aggression, SIBs, explosivity, sleep disorders</td>
<td>Substantial clinical improvement immediately</td>
</tr>
<tr>
<td>Vanden Borre et al 1993(^\text{40})</td>
<td>RSD 4–12 mg/day</td>
<td>Double blind/placebo crossover trial</td>
<td>37 adults with ID</td>
<td>Persistent aberrant behaviours SIBs and aggression</td>
<td>ABC + CGI significantly superior to placebo</td>
</tr>
<tr>
<td>McDonough et al 2000(^\text{42})</td>
<td>CLZ 5–15 mg/day</td>
<td>15 weeks open study</td>
<td>7 adults with ID</td>
<td>Stereotypic form of chronic SIBs</td>
<td>3/7 clear improvement; 1/7 marginal progress; 1/7 deteriorated; 2/7 no major change</td>
</tr>
<tr>
<td>Cohen and Underwood 1994(^\text{43})</td>
<td>CLZ</td>
<td>Open study</td>
<td>6 adults with MID and PID</td>
<td>SIBs + aggression</td>
<td>Significant reduction in SIBs and aggression Statistically significant improvement on CGI</td>
</tr>
<tr>
<td>Antonacci and de Groot 2000(^\text{40})</td>
<td>CLZ</td>
<td>Retrospective review I/P. 26/33 prospective 5–48 months</td>
<td>33 adults with ID</td>
<td>Schizophrenia, schizoaffective, bipolar, delusional, or psychotic disorder NOS</td>
<td></td>
</tr>
<tr>
<td>Buzan et al 1998(^\text{45})</td>
<td>CLZ</td>
<td>Review article/open study</td>
<td>Review article. Total number of published cases 84</td>
<td>Psychoses/bipolar illness unresponsive to other agents</td>
<td>Great efficacy and well tolerated</td>
</tr>
<tr>
<td>Pary 1994(^\text{44})</td>
<td>CLZ</td>
<td>Review article on the use of CLZ in general population</td>
<td>Adults with ID</td>
<td>SIBs, aggressive, psychotic disorders</td>
<td></td>
</tr>
<tr>
<td>Brylewski and Duggan 2001(^\text{41})</td>
<td>Antipsychotic medication</td>
<td>Randomised controlled trials</td>
<td>Persons with ID I/P institutionalised</td>
<td>Challenging behaviours</td>
<td></td>
</tr>
</tbody>
</table>

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**Table 5** Various psychopharmacological treatments studied in persons with intellectual disabilities: stimulants

<table>
<thead>
<tr>
<th>Author</th>
<th>Drugs</th>
<th>Duration</th>
<th>Subjects</th>
<th>Symptoms diagnosis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handen et al 1991(^\text{42})</td>
<td>MPH</td>
<td>Open study</td>
<td>27 children with ID</td>
<td>ADHD</td>
<td>Adverse effects were studied. Significant increase in motor tics and severe social withdrawal. 69% continued on medication. 72% improved although 2/3 of sample rated 98th percentile on hyperactive index and 22% had had I/P treatment during follow up</td>
</tr>
<tr>
<td>Handen et al 1997(^\text{43})</td>
<td>MPH</td>
<td>12–65 months following double blind study</td>
<td>52 children (7–14 years) M-ID and borderline ID</td>
<td>ADHD</td>
<td>Significant improvement on teachers rating. 8/11 medication responders</td>
</tr>
<tr>
<td>Handen et al 1999(^\text{45})</td>
<td>MPH 0.3 mg/kg/day</td>
<td>Double blind study</td>
<td>11 preschool (4–5.11 years) with ID</td>
<td>ADHD</td>
<td></td>
</tr>
<tr>
<td>Aman et al 1997(^\text{46})</td>
<td>MPH 0.4 mg/kg/day</td>
<td>Double blind/placebo controlled</td>
<td>Children with ID</td>
<td>ADHD</td>
<td>Better results with FFRM, but more side effects such as drowsiness, dizziness, and anorexia</td>
</tr>
<tr>
<td>Casner et al 2000(^\text{47})</td>
<td>MPH 0.4 mg/kg/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Note:**

- ABC, Aberrant Behaviour Checklist; CGI, clinical global impression; CLZ, clozapine; HLPD, haloperidol; ID, intellectual disability; LD, learning disability; MID, mild intellectual disability; NOS, not otherwise specified; OLZ, olanzepine; PID, profound intellectual disability; RSD, risperidone; SIB, self injurious behaviour; ZCPX, zuclopenthixol.
onset of improvement in behavioural disturbances. Furthermore, a controlled study found that opioid antagonists improve self injurious behaviours only minimally.

**H. β-Blockers**

Propranolol was found to be beneficial in managing aggressive and self injurious behaviours in some people with concurrent developmental disabilities. A limited number of non-controlled trials showed some benefit to propranolol and nadolol on behavioural disturbances such as impulsiveness, aggressivity, self injurious behaviour, and stereotypies.

Opiates and β-blockers studied in those with intellectual disabilities are shown in table 6.

**DISCUSSION**

This article provides the reader with a review of psychopharmacological agents used in persons with dual diagnosis of developmental disability and mental disorders. The various categories of these pharmacological treatments are outlined in groups that are addressing different mental health/behaviour problems. The purpose of this review is to facilitate clinicians in the pharmacological management of behavioural and psychiatric disturbances in people with developmental disabilities.

This review found that SSRIs, newer anticonvulsants, and atypical neuroleptics are preferred medication choices for the treatment of psychiatric disorders among people with developmental disabilities. These findings are consistent with those reported by Santosh and Baird and Madrid et al. in extensive reviews of the literature regarding the pharmacological management of behavioural and psychiatric disturbances in people with developmental disabilities.

Although the number of studies devoted to the use of psychotropic medication in persons with dual diagnosis remains rather small, there is adequate evidence to suggest that these medications are appropriate for use in this group. Although not exhaustive, the present review highlighted several key issues to keep in mind in the pharmacological treatment of individuals with developmental disabilities and comorbid psychopathology, in order to aid clinicians in making sound, evidence based treatment decisions.

**CLINICAL GUIDELINES**

The most important steps to be followed in a situation where a patient with intellectual disability is thought to be suffering from psychiatric disorder(s) are the following:

- Consider psychiatric disorder as a possible explanation of certain behaviour changes.
- Assess the problem behaviour.
- Diagnose the problem as a psychiatric disorder.
- Treat the problem with medication whenever appropriate.
- Follow up goals include:
  - Monitoring effectiveness of medication used.
  - Exploring the side effects, if any.
  - Treating the side effects.
  - Maintaining a minimal level of medication necessary to address the problems.
  - Physical checkup regarding other physiological functions that can become affected by the prolonged use of medication.

It is to be remembered that the patient is in the centre of our caring, and that various pieces of the puzzle of wellness/health are necessary to be in place in order to maximise the beneficial effects of all of the parts, and enhance the quality of life of persons with a dual diagnosis.

**FUTURE RESEARCH**

Future research directions should identify appropriate diagnostic criteria in persons with developmental disabilities to enable professionals to better identify psychiatric disorders and thus apply the appropriate diagnosis. Unfortunately, there is a paucity of studies of specific psychopharmacological interventions as they apply to persons with developmental disabilities. Multicentred studies that address specific biological treatments in people with developmental disabilities would further expand our current body of knowledge. It is hoped that these issues will be addressed in future research, so that our knowledge of evidence based treatments for this population is ameliorated.

New PMJ online submission and review system

I am pleased to inform authors and reviewers of Postgraduate Medical Journal’s new online submission and review system. Bench>Press is a fully integrated electronic system which uses the internet to allow rapid and efficient submission of manuscripts, and the entire peer review process to be conducted online. Authors can submit their manuscript in any standard word processing software. Graphic formats acceptable are: .jpeg, .tiff, .gif, and .eps. Text and graphic files are automatically converted to PDF for ease of distribution and reviewing purposes. Authors are asked to approve their submission before it formally enters the reviewing process.

To access the system click on “SUBMITTING YOUR MANUSCRIPT” on the PMJ homepage: http://www.postgradmedj.com/ or you can access Bench>Press directly at http://submit-pmj.bmjjournals.com/.

We are very excited with this new development and we would encourage authors and reviewers to use the online system where possible. It really is simple to use and should be a big improvement on the current peer review process. Full instructions can be found on Bench>Press and PMJ online. Please contact Natalie Davies, Project Manager, ndavies@bmjgroup.com for further information.

Pre-register with the system

We would be grateful if all PMJ authors and reviewers pre-registered with the system. This will give you the opportunity to update your contact and expertise data, allowing us to provide you with a more efficient service.

Instructions for registering
2. Click on “Create a new account” in the upper left hand side of the Bench>Press homepage.
3. Enter your email address in the space provided.
4. Choose a password for yourself and enter it in the spaces provided.
5. Complete the question of your choice to be used in the event you cannot remember your password at a later time (this will be needed if you forget your password).
6. Click on the “Complete step 1” button at the bottom of the screen.
7. Check the email account you registered under. An email will be sent to you with a verification number and URL.
8. Once you receive the email, copy the verification number and click on the URL hyperlink. Enter the verification number in the relevant field. Click on “Verify me”. This is for security reasons and to check that your account is not being used fraudulently.
9. Enter/amend your contact information, and update your expertise data.

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