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

R Antochi, C Stavrakaki, P C Emery

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 α₂-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
(4) 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.

(5) 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.

**METHODOLOGY**

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); (explore 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 studies. However, some authors have reported serious, anecdotal, and sometimes fatal use of clomipramine 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)**

Benzodiazepines 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-1α (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, aggressivity, 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. The rationale of employing anticonvulsants 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 injury. A number of studies have 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.

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 injury. A number of studies have reported that neuroleptics are helpful in treating aggressive and self injurious behaviour in adults. Moreover, atypical neuroleptics such as risperidone show a better side effect profile than typical antipsychotics and are well tolerated and effective in treating behavioural disturbances of longstanding nature.

Moreover, typical neuroleptics such as risperidone show a better side effect profile than typical antipsychotics and are promising for the treatment of behavioural disturbances in people with concurrent developmental disabilities.

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 with MID</td>
<td>4/7 significant improvement of SIBs and depressive symptoms reduced: maintained for 1 year</td>
<td></td>
</tr>
<tr>
<td>Sover 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/MDD/SIBs</td>
<td></td>
</tr>
<tr>
<td>Brasic et al 1997</td>
<td>CPM 25 mg</td>
<td>Open study</td>
<td>5 female preadolescents with SID and motor tics</td>
<td>Autism + dyskinesias and 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>7/10 with OCD responded favourably: to FLX none of the controls</td>
<td></td>
</tr>
<tr>
<td>Wiener and Lambert 1993</td>
<td>SRT 50 mg/day</td>
<td>8 weeks</td>
<td>33 year old woman with MDD</td>
<td>Reported less anxiety with decrease in lars and OCD symptoms</td>
<td></td>
</tr>
<tr>
<td>Posey et al 2001</td>
<td>MRTP</td>
<td>Open study</td>
<td>26 subjects with PDDs/ID</td>
<td>Aggression: SIBs, irritability, hyperactivity, anxiety, depression, insomnia, aggression and SIBs</td>
<td></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 significantly reduced for 1 month: no effect thereafter. No change in SIBs</td>
<td></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>2/3 showed decrease in skin picking: the 3rd patient showed significant reduction in hoarding and explosive behaviour</td>
<td></td>
</tr>
<tr>
<td>Lewis et al 1995</td>
<td>CMP</td>
<td>6–7 weeks</td>
<td>10 institutionalised adults with SID</td>
<td>Body and object stereotypy were decreased; irritability and hyperactivity improved</td>
<td></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>6/8 subjects &gt;30% reduction in SIB</td>
<td></td>
</tr>
<tr>
<td>Troisi et al 1995</td>
<td>FLX 20 mg</td>
<td>Open study</td>
<td>19 I/Ps with ID</td>
<td>Varies response, 9/19 showed increased aggression over time</td>
<td></td>
</tr>
</tbody>
</table>

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

Table 2 Various psychopharmacological treatments studied in persons with intellectual disabilities: anxiolitics

<table>
<thead>
<tr>
<th>Author</th>
<th>Drugs</th>
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<th>Subjects</th>
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<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghaziuddin and Ghaziuddin 1990</td>
<td>DZP</td>
<td>Withdrawal</td>
<td>1 female MID</td>
<td>Acute behavioural disorders: aggressivity, SIBs</td>
<td>Attention to withdrawal symptoms of antianxiety medication</td>
</tr>
<tr>
<td>Barron and Sandman 1985</td>
<td>Sedative/hypnotics</td>
<td>Paradoxical excitement</td>
<td>Various degrees of ID, perinatal trauma</td>
<td>Paradoxical responses had a lower M/A, positive history of perinatal trauma, increased SIBs and aggression before treatment</td>
<td></td>
</tr>
<tr>
<td>Ricketts et al 1994</td>
<td>BSR 30 mg/day</td>
<td>Open study 6–33 weeks</td>
<td>5 adults with ID</td>
<td>SIBs, anxiety symptoms</td>
<td>Some response to BSR with decrease in SIBs (13%–72%)</td>
</tr>
<tr>
<td>Ratey et al 1991</td>
<td>BSR</td>
<td>Multiple baseline placebo lead-in studies</td>
<td>6 ID adults</td>
<td>SIBs with aggression/anxiety symptoms</td>
<td>BSR very effective in reducing SIBs and aggression with anxiety. No cognitive side effects</td>
</tr>
</tbody>
</table>

BSR, buspirone; DZP, diazepam; ID, intellectual disability; M/A, mental age; MID, mild intellectual disability; SIB, self injurious behaviour.
investigators have reported that risperidone is an effective therapeutic agent for the treatment of self injurious behaviour, aggression, and stereotypical behaviour. 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. 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. A pilot study found that olanzapine is well tolerated and effective in reducing stereotypic self injurious behaviours in adults with developmental disabilities. Finally, clonazepam has been shown to be useful for the treatment of severe behavioural disturbances in people with developmental disabilities. In addition, clonazepam was found to be a safe, efficacious, and well tolerated agent for the management of treatment resistant mood and psychotic illnesses in people with developmental disabilities.

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. Prevalence estimates of 13% of individuals affected by this is probably an underestimate given the fact that this condition is the most challenging extrapyramidal side effect to diagnose. In addition, tardive dyskinesia is reported in 20–30% of people with developmental disabilities. In addition, clonazepam was found to be a safe, efficacious, and well tolerated agent for the management of treatment resistant mood and psychotic illnesses in people with developmental disabilities.

Another adverse effect of antipsychotics is the neuroleptic malignant syndrome. Risk factors for this include male gender, lower grade of developmental delay, and exposure to higher potency neuroleptics. Neuroleptic malignant syndrome can be lethal; fatality rates of 21% to 30% have been reported (approximately double the rate than that of the general population). In 90% of cases, the causative neuroleptic had been introduced for the first time or reintroduced after a drug-free period. Haloperidol and fluphenazine were the most frequently implicated drugs, and antipsychotic polypharmacy was found in 55% of cases. The average time for the onset of neuroleptic malignant syndrome was eight days. A recurrence rate of 44% was reported with rechallenging of patients with developmental disabilities with antipsychotic medication after recovering from neuroleptic malignant syndrome. It is important to monitor patients receiving antipsychotics for the onset of symptoms suggesting neurollepatic 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.

In sum, typical and atypical antipsychotics may be used in the treatment of psychotic symptoms of various aetiologies and challenging behaviours in individuals with intellectual disabilities. Caution should be exercised in the use of typical 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.

### 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, stimulants have been shown to be helpful in treating ADHD among individuals with concurrent mild to moderate developmental disabilities. However, the use of stimulants in people with severe to profound degrees of developmental disabilities is limited. Furthermore, although preschool children with developmental disabilities and ADHD respond to methylphenidate at rates similar to those of school age children with dual diagnosis, they are more prone to developing adverse effects. In brief, stimulants may be used in people with intellectual disabilities and ADHD. However, stimulants may exacerbate tics, obsessions, compulsions, epilepsy, anxiety, or psychotic features.

Stimulants studied in those with intellectual disabilities are shown in table 5.

### F. Alpha2-agonists

Clonidine could be used as third line of treatment after stimulants and antidepressants for ADHD. Clonidine was reported

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**Table 3** Various psychopharmacological treatments studied in persons with intellectual disabilities: mood stabilisers

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<tr>
<td>Verheugen et al 1998</td>
<td>Lithium</td>
<td>Open study</td>
<td>6 adult males with PWS</td>
<td>Mood disorder/anxiety symptoms, cycloid psychosis</td>
<td>Specific vulnerability to cycloid psychosis improved with lithium; possibly specific “psychopathological phenotype”</td>
</tr>
<tr>
<td>Pary 1991</td>
<td>Lithium (serum concentration of at least 0.5 µg/l to 1 µg/l)</td>
<td>6–8 weeks</td>
<td>Review of case study. Description of clinical trial components</td>
<td>Mood disorder/anxiety symptoms, cycloid psychosis</td>
<td>Good response, although types of aggression not specified</td>
</tr>
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<td>Craft et al 1987</td>
<td>Lithium</td>
<td>Double blind 4 months</td>
<td>42 ID patients</td>
<td>Aggressive behaviours</td>
<td>Significant differences in mean weekly aggression and in frequency of aggressive episodes</td>
</tr>
<tr>
<td>Tyer et al 1984</td>
<td>Lithium + neuroleptics</td>
<td>Double blind/crossover trial 5 months</td>
<td>25 adults I/P with ID</td>
<td>Aggressive behaviours</td>
<td>Improvement during the lithium phase. Potentially side effects such as associated with good response were: less than 1 episode/week overactivity, stereotypies, female sex, and epilepsy</td>
</tr>
<tr>
<td>Ruedrich et al 1999</td>
<td>Divalproex sodium 500-4000 mg/day</td>
<td>Open study 2–73 months</td>
<td>28 adults (20–63 years)</td>
<td>Aggressive behaviour, SIBs</td>
<td>71% moderate to marked improvement 21% mild benefits 4/5 marked improvement 1/5 moderate</td>
</tr>
<tr>
<td>Sovner 1989</td>
<td>Divalproex sodium (levels between 50 µg to 100 µg)</td>
<td>Open study</td>
<td>5 adults with ID (1 fragile X, 2 with rapid cycling)</td>
<td>Bipolar disorder</td>
<td>71% moderate to marked improvement 21% mild benefits 4/5 marked improvement 1/5 moderate</td>
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ID, intellectual disability; I/P, inpatient; PWS, Prader-Willi syndrome; SIB, self injurious behaviour.


to have limited effects on hyperactivity in people with developmental disabilities.\textsuperscript{44}

Currently there is no compelling evidence supporting the use of clonidine in the treatment of Tourette’s syndrome, other tic disorders, and impulsivity.\textsuperscript{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,\textsuperscript{43} while others indicated that naltrexone might worsen stereotypical and self injurious behaviours.\textsuperscript{42} 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.\textsuperscript{42} Casner et al reported a low frequency of serious side effects and a gradual improvement in behaviour. Significant reduction of aggression and SIBs was observed. Substantial clinical improvement was reported in patients with moderate intellectual disability (MID) and severe aggression.

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

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Aman et al 1989\textsuperscript{41}</td>
<td>HLPD 0.025–0.05 mg/kg/day RSD</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\textsuperscript{40}</td>
<td>Double blind/crossover design 22 weeks with 6 months follow up</td>
<td>20 adults with ID</td>
<td>SIBs and aggressive behaviours</td>
<td>Substantial clinical improvement immediately</td>
<td></td>
</tr>
<tr>
<td>Malt et al 1994\textsuperscript{41}</td>
<td>ZCPX v HLPD</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>Buitelaar et al 2001\textsuperscript{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\textsuperscript{44}</td>
<td>RSD</td>
<td>Open study</td>
<td>8 adults with MDD</td>
<td>SIBs, aggressive behaviours</td>
<td>Significant reduction of aggression and SIBs</td>
</tr>
<tr>
<td>Horrigan and Barnhill 1997\textsuperscript{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\textsuperscript{42}</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\textsuperscript{21}</td>
<td>CLOZ, 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; 2/7 no change</td>
</tr>
<tr>
<td>Cohen and Underwood 1994\textsuperscript{43}</td>
<td>CLOZ</td>
<td>Review article</td>
<td>33 adults with ID</td>
<td>Schizophrenia, schizoaffective, bipolar, delusional, or psychotic disorder NOS</td>
<td>Statistically significant improvement on CGI</td>
</tr>
<tr>
<td>Antonacci and de Groot 2000\textsuperscript{44}</td>
<td>CLOZ</td>
<td>Retrospective review I/P. 26/33 prospective 5–48 months</td>
<td>Review article</td>
<td>Psychoses/bipolar illness unresponsive to other agents</td>
<td>Great efficacy and well tolerated</td>
</tr>
<tr>
<td>Buzan et al 1998\textsuperscript{43}</td>
<td>CLOZ</td>
<td>Review study/open study</td>
<td>Total number of published cases 84</td>
<td>Psychiatric problems (including functional psychiatric disorders)</td>
<td>Potential difficulties and side effects were reviewed for the ID group</td>
</tr>
<tr>
<td>Pary 1994\textsuperscript{44}</td>
<td>CLOZ</td>
<td>Review article on the use of CLOZ in general population</td>
<td>Adults with ID</td>
<td>SIBs, aggressive, psychotic disorders</td>
<td>Very many adults with ID and challenging behaviour with no discernible mental illness are treated with these powerful drugs which pose ethical issues</td>
</tr>
</tbody>
</table>

<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\textsuperscript{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\textsuperscript{27}</td>
<td>MPH</td>
<td>12–65 months following double blind study</td>
<td>52 children (7–14 years) M-D and borderline ID</td>
<td>ADHD</td>
<td>Significant improvement on teachers rating. 8/11 medication responders</td>
</tr>
<tr>
<td>Handen et al 1994\textsuperscript{25}</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>Children with ID</td>
<td>Significant improvement with FFRM, but more side effects such as drowsiness, dizziness, and anorexia</td>
</tr>
<tr>
<td>Aman et al 1997\textsuperscript{43}</td>
<td>MPH 0.4 mg/kg/day FFRM 1–2 mg/kg/day</td>
<td>Double blind/placebo controlled</td>
<td></td>
<td>ADHD</td>
<td>Better results with FFRM, but more side effects such as drowsiness, dizziness, and anorexia</td>
</tr>
</tbody>
</table>

ABC, Aberrant Behaviour Checklist; CGI, clinical global impression; CLOZ, clozapine; HLPD, haloperidol; ID, intellectual disability; I/D, learning disability; MID, mild intellectual disability; NOS, not otherwise specified; OLZ, olanzapine; PID, profound intellectual disability; RSD, risperidone; SIB, self injurious behaviour; ZCPX, zuclopenthixol.
Those reported by Santosh and Baird. These findings are consistent with the treatment of psychiatric disorders among people with developmental disabilities. These atypical neuroleptics are preferred medication choices for the monitoring of psychotropic medications.

It is essential to adopt an evidence based practice in the administering and monitoring of psychotropic medications. The purpose of this review is to facilitate clinicians groups that are addressing different mental health/behaviour categories of these pharmacological treatments are outlined in developmental disability and mental disorders. The various psychopharmacological agents used in persons with dual diagnosis of intellectual disabilities are more vulnerable to side effects, with potentially catastrophic results, including fatalities.

It is to be remembered that the patient is in the centre of our caring, and that various pieces of the puzzle of wellness/disease 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.

**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/disease 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. Multicentre 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.

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**Table 6 Various psychopharmacological treatments studied in persons with intellectual disabilities: opiates and β-blockers**

<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>Opiates</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Casner et al 1995</td>
<td>NLTX</td>
<td>Open study</td>
<td>3 adults with ID</td>
<td>SIBs</td>
<td>Good responses 3/3</td>
</tr>
<tr>
<td>Casner et al 1996</td>
<td>NLTX</td>
<td>Retrospective long term study</td>
<td>50 adults</td>
<td>SIBs</td>
<td>50% were maintained on NLTX because of professional belief</td>
</tr>
<tr>
<td>Willemsen-Swinkels et al 1993</td>
<td>NLTX 100 mg initial dose then 50 mg/day</td>
<td>Double blind controlled 4 weeks</td>
<td>33 adults with ID</td>
<td>Autism + SIBs</td>
<td>ABC and CGI no therapeutic effects. On the contrary NLTX increased stereotypic behaviour</td>
</tr>
<tr>
<td>β-Blockers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruedrich et al 1990</td>
<td>PNL + NDL</td>
<td>Review study</td>
<td>1 case report with ID</td>
<td>Review of literature</td>
<td>Literature review raised concern in the use of β-blockers in this group</td>
</tr>
</tbody>
</table>

ABC, Aberrant Behaviour Checklist; CGI, clinical global impression; ID, intellectual disability; NDL, nadolol; NLTX, naltrexone; PNL, propanolol; SIB, self injurious behaviour.
Psychopharmacology and developmental disabilities

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