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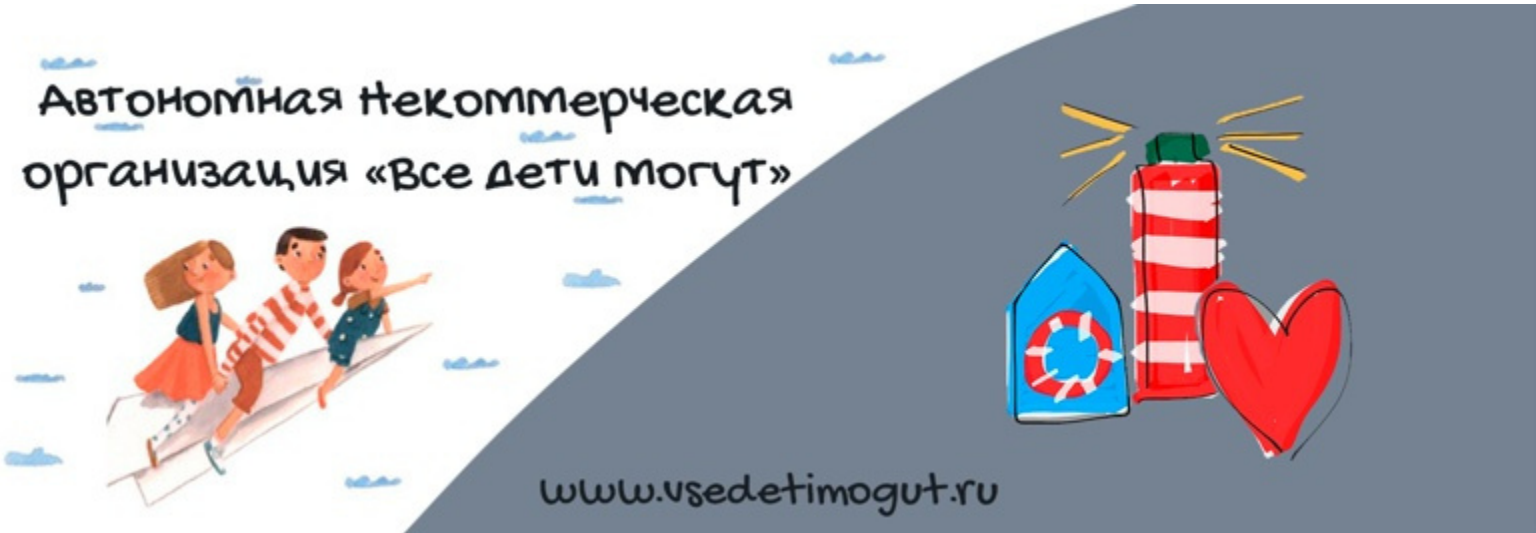

Diagnosis and Treatment of Aggression in Individuals with Developmental Disabilities

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ORIGINAL PAPER

Diagnosis and Treatment of Aggression in Individuals with Developmental Disabilities

Diana J. Antonacci · Crystal Manuel · Ervin Davis

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Abstract Aggressive behavior is a common referral problem for individuals with developmental disabilities (DD), placing them at risk for institutionalization, social isolation, physical restraint, over-use of medication to treat behavior problems, exclusion from services, and becoming a victim of abuse. Aggression strains relationships between individuals being supported and their caregivers, whether professionals or family members. The treatment of aggression is persons with DD, with or without comorbid mental illness, remains a controversial area and changes in practice have been slow to come. The evidence related to pharmacotherapy and psychological treatment is, in general, either lacking or poor. This does not suggest that these treatments are necessarily ineffective but that there is not enough good quality evidence to support their usefulness. This review considers the prevalence and correlates of aggression, as well as possible causative factors. The relationship between mental illness, intellectual disability and aggression is explored. The psychopharmacological and psychological treatment literature is reviewed with implications for clinical care and future research.

Keywords Aggression · Intellectual disability · Developmental disability · Mental illness · Pharmacotherapy · Behavioral therapy · Psychological treatment

Introduction

Aggression towards self (self-injurious behavior) and others (usually including property destruction) are common referral problems for individuals with developmental disabilities (DD). Prevalence rates vary with the population studied. In institutionalized adults, rates of aggressive behavior are high [1, 2]. Deinstitutionalization does not necessarily predict a decrease in rates of aggression [3] and aggression may continue or even manifest itself for

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the first time after an individual moves into the community [4]. Continued aggression while in the community is a risk factor for hospitalization and/or re-institutionalization. Psychotic symptoms and the presence of physical aggression predict admission to acute inpatient care in individuals with DD and mental health diagnoses [5]. Aggression strains relationships between the individuals being supported and their caregivers, whether professionals or family members [6, 7]. Risk for physical restraint [8, 9], over-use of medication to treat behavior [10], exclusion from services [11], and becoming a victim of abuse [12] are all increased in individuals who exhibit aggressive behavior.

The research on prevalence of aggression in individuals with DD is colored by methodological issues which account for wide variations in reported figures. Most authors report prevalence rates of aggressive behavior from 2 to 40% [13, 14]. There are a number of suggested reasons for this disparity. Aggression is often studied in the context of a spectrum of challenging behaviors which include stereotypy, pica, rumination, non-compliance and non-specific behavior problems. Certain types of aggression are studied more frequently than others. For example, in their 2003 meta-analysis of 26 studies, McClintock et al. [15] found that 17 papers dealt with self-injurious behavior and only seven included aggression toward others or property destruction. Study settings (institutional vs. community), level of cognitive disability and age group all potentially influence prevalence. In a 1999 population study, Emerson et al. [16] found an increased frequency and severity of challenging behavior in males who were younger and living in more highly supervised residential settings compared to adults over the age of 50 living in less restrictive settings in the community. The most common challenging behaviors were "other" (non-compliance, tantrums, pestering, screaming, running away, overactivity, stealing, stripping, inappropriate sexual behavior and smearing feces), aggression, destructive behavior and self-injury. Outward aggression, such as physical attack, was more likely to be manifested by less severely disabled people with greater communication skills. Self-injury was more common in individuals with more severe cognitive disabilities, decreased mobility, reduced self-help skills, more severe hearing impairment, increased stereotypic movements and less well developed communication skills.

Tenneij and Koot [17] studied aggression in longer-term inpatient treatment centers for individuals with mild developmental disabilities and severe challenging behavior. Rates of aggression were high. In the 20 week observation period, 639 incidents were documented. Seventy-one percent of incidents were outwardly directed, predominantly toward staff. Of the 185 individuals included in the study, 44% were involved in outwardly directed incidents and 12% in self-injurious incidents. The authors note that although half of all residents were involved in some type of aggressive incident, a small minority were responsible for the majority of aggression. 17% caused one incident, 25% caused 2–10 incidents and 8% caused 11 or more incidents. Outwardly directed incidents were most often provoked by denial of requests and were mostly aimed at staff. Half of these incidents were verbal aggression alone with only 4% of incidents having severe consequences for the victims. The authors note with interest that this was a population of individuals specifically referred to inpatient treatment because of severe or frequent aggressive behavior. They speculate that the low severity and frequency of incidents seen in the treatment centers was impacted by restrictive treatment interventions which were used to stop an incident or prevent escalation. They also comment that although few outwardly directed incidents had physical consequences, in 40% of these, staff reported feeling threatened.

Recent studies have specifically looked at aggression as opposed to "challenging behavior" [18, 19] and have supported Emerson's earlier findings; namely, that individuals with more severe levels of developmental disability are more likely to display aggressive

behavior, especially self-injurious behavior. While some authors have shown gender differences in the prevalence of aggressive behavior, in more recent studies neither Tenneij [17] nor Crocker et al. [20] found significant differences. Although aggression may begin in childhood, rates tend to peak in late adolescence and early adulthood with increased rates in persons aged between 20 and 35 years [21, 22].

Prevalence may also vary according to the level of severity required to qualify for inclusion into a study sample. The focus of much of the literature has been primarily on more severe forms of aggression with most participants living in institutional settings. More recently, published studies have begun to examine community samples of people with milder DD and less severe aggression. Crocker et al. [23] studied milder forms of aggression in 3165 adult men and women living in the community. They noted that the 12 month prevalence of aggressive behavior was 51.8%. Most of the aggression was mild in severity with only 4.9% of aggressive incidents leading to injury of the victim. However, for individuals being supported in the community, even mild aggression can adversely impact social integration, access to services and subsequent quality of life.

Etiology and Differential Diagnosis of Aggression

Clinicians within the field of DD underscore the importance of considering a variety of factors in the etiology of aggression [24, 25]. Gardner and Moffat [26] use the concept of a "multimodal" model for assessment which includes "individual setting conditions", "environmental setting conditions" and "maintaining variables". Individual setting conditions include physiological factors such as symptoms secondary to acquired neurological damage (poor attention span, impulsivity and memory impairment). In addition, they note that seizures, acute or chronic pain, allergies and hormonal disorders can go undetected or under-treated in individuals with DD and can be triggers for aggressive behavior. Skill deficits, particularly in areas of communication, social relatedness and independent functioning increase the probability of aggression. Psychiatric disorders and psychological problems are also included in their description of individual setting conditions.

Environmental setting conditions in the Gardner & Moffat model include such triggers as excessive heat, noise, overcrowding, high staff turnover, inadequate staff training, provocative interactional styles or modeling of aggressive behavior, lack of structure or predictability in the work or home environment and presence of intermittent reinforcement of aggression behavior. Their model, aggression that has been precipitated by individual and environmental factors/events will be maintained through positive or negative reinforcement. Conversely, aggressive behavior may be reduced by positive or negative punishment.

Correlates of aggressive behavior have been studied. Epilepsy has been suggested as a cause of aggression irrespective of developmental disability [27]. Seizure disorders are more common in individuals with developmental disabilities, particularly in those whose disabilities are in the severe/profound range [27]. It has therefore been suggested that epilepsy is a potential causative factor in this population. However, in a 2000 review of epilepsy and developmental disability, Bowley and Kerr [28] found that the evidence did not show a clear correlation between seizure disorder and aggression or self-injury. Likewise, Espie et al. [29] found that behavior problems such as irritability, agitation, lethargy, social withdrawal, stereotypic behavior, hyperactivity, non-compliance and inappropriate speech were lower than population norms in their sample of 186 individuals with developmental disabilities and epilepsy. Level of developmental disability, sensory or

motor disabilities and side effects of anti-epileptic medications better explained behavior problems in their study population.

Deficiencies in language skills have been found to be a risk factor for aggression in non-disabled populations [30, 31]. In the population of individuals with DD, language skills are often deficient or absent. It is therefore theorized that aggression toward self and others might take the place of more appropriate means of communication in these individuals. Bihm et al. [32] studied aggression in 170 persons with severe and profound DD and failed to support the hypothesis that lower levels of communication relate to higher levels of aggression. Deb et al. [18] showed higher rates of self-injurious behavior to be associated with more severe DD and poor communication abilities. In 2003 McClintock et al. [15] summarized studies from the last 30 years and noted that severity of DD, poor communication and autism were risk markers for aggression although interpretation of results was difficult given the overlapping nature of these variables. Other handicapping conditions such as visual impairment, hearing impairment and inability to ambulate may result in unfulfilled needs combined with an inability to express those needs. Carvill et al. [33] notes that sensory impairments are much more common in people with DD. In his summary of 18 case reports he found a 10 fold increase in the prevalence of visual impairment. Hearing impairment was 40–100 times greater than that of the general population. He notes that hearing testing is often challenging and this, along with variability in definitions of sensory impairment, accounts for the variation in reported rates. Despite high rates of sensory impairment, there are few published reports of the frequency of aggression in sensory impaired, intellectually challenged people. In an attempt to examine profiles and correlates of aggression among adults with DD, Crocker et al. [23] examined sensory and motor impairment (which they labeled "physical handicap") as an individual characteristic in a sample of 296 individuals with DD. A high proportion in the violent (all forms of aggression) and self-mutilation subgroups (self-injurious behavior) had physical handicaps of some kind.

Mental Illness as a Contributor to Aggression

The presence of a mental illness comorbid with developmental disabilities (referred to as dual diagnosis) is considered a risk factor for aggression and self-injury. While the idea that individuals with DD can suffer from mental illness has been largely accepted since the late 1980s, this is still an underserved and poorly studied population [34–36]. Historically, it was thought that the cognitive limitations inherent in individuals with DD precluded the development of emotional disorders. Disturbed behavior was attributed entirely to the delay in development which was a part of the retardation syndrome. A second view was that individuals with developmental disabilities were more vulnerable to mental illness but problems were primarily biologically based and explained by structural brain abnormalities, "brain damage" and central nervous system dysfunction [37]. It is now recognized that individuals with DD can be diagnosed with psychiatric disorders similar to those found in the general population. However, rates of psychiatric disorders comorbid with DD reported in the literature range from less than 10 to more than 80% [38]. There are a number of methodological limitations which account for this wide range. These include small sample size, lack of uniformity in screening and assessment instruments, broad and highly variable inclusion criteria, and focus on higher functioning, more verbal subgroups.

There are barriers to recognition and diagnosis of psychiatric disorders in persons with DD. Communication deficits are frequent, especially in individuals with more severe DD.

These deficits preclude the use of many standard diagnostic instruments/interviews and can make it difficult to understand if aberrant behavior is due to a mental illness, brain injury or environmental circumstances. The interaction between symptoms and developmental level is complex. Symptoms and developmental level can mutually influence each other and this may not be well understood by examiners with limited exposure to persons with DD. For example, minor emotional issues can be magnified by a developmental disability and the presence of a psychiatric disorder can suppress scores on intelligence tests. Referral for psychiatric consultation is often dependent on carers recognizing signs and symptoms of a psychiatric disorder. Carers' ability to distinguish psychiatric symptoms from problems in adaptive behavior is often limited. This can lead to a phenomenon known as "diagnostic overshadowing" [39], the tendency to attribute behavioral problems to the DD rather than a psychiatric disorder, and can preclude timely referral. Even if a referral for mental health services is made, a specific and accurate diagnosis may be difficult to establish. Several instruments have been developed in order to assist clinicians and researchers in making more accurate psychiatric diagnoses in individuals with DD. There is wide variability in these screening and assessment tools. A few tools incorporate symptom checklists which are linked to DSM or ICD criteria. Clearly, the specific instruments used to arrive at a diagnosis necessarily impact definition, identification and prevalence of psychopathology within individuals with DD. Aman [40] reviewed these instruments and notes that the constructs they measure are variable and their relationship to DSM and to each other has not been well defined.

In a 2005 review, Smiley [41] summarized the literature on prevalence rates of mental illness in individuals with DD, noting several methodological issues similar to those noted above. At the time of her review, there were only two population based prevalence studies from the previous decade [42, 43]. Both population based studies showed rates of mental health problems higher than in the general population. A year later, Whitaker et al. [44] reviewed epidemiological studies on psychiatric disorders in people with DD. Studies were excluded if the sample was drawn from a single setting or if they did not include people with mild DD. Ten studies focused exclusively on children. Fourteen studied prevalence of psychiatric disorders in adults only or adults and children. Whitaker notes that that there is a lack of consistency as to the conditions reported in both adults and children. Not all studies used an actual examination of the patient. Most studies reported that overall rates of psychiatric disorders did not differ significantly from overall rates in the non-disabled population as a whole. The studies which reported higher overall rates used primarily administrative samples as opposed to clinical samples. There was evidence that when mental illness was present, the rate was higher in adults and children with severe DD than people with mild or no DD.

In 2007, Cooper et al. [45] investigated the prevalence of psychiatric disorders in 1023 individuals with DD. This population-based study used individual assessments which were comprehensive and standardized. Men and women were equally represented and level of disability ranged from mild to profound. Psychiatric diagnoses were made by a psychiatrist experienced with disabilities, review of case notes, the Vineland scale (survey form) [46], and the present psychiatric state for adults with learning disabilities (PSS-LD) [47]. This semi-structured instrument is specifically designed to be used with adults with DD and allows classification by clinical, DC-LD, ICD-10-DCR, and DSM-IV-TR criteria. Six hundred five participants (59.1%) had no clinical diagnoses, 297 (29.1%) had one, 94 (9.2%) had two, 25 (2.4%) had three and two (0.2%) had four. Affective disorders had a point prevalence of 6.6% with the majority (4.1%) being a unipolar depressive episode. There was a 4.4% point prevalence in the psychotic disorder category, the majority of

which (2.9%) were in a schizophrenic episode. In the anxiety category (3.8% point prevalence), generalized anxiety disorder (1.7%) was the most widely represented. In this study, associated factors were measured. For the entire cohort, factors which were independently associated with mental illness of any type (excluding autistic spectrum disorders and specific phobias) were: severe DD, higher numbers of life events in the preceding 12 months, smoking, living with paid carers, lack of physical disabilities, unimpaired mobility, having urinary incontinence and being female. The authors note that considerably lower prevalence rates were found using ICD-10-DCR and DSM-IV-TR, supporting the contention made by previous researchers [48, 49] that these diagnostic classification systems do not accurately represent the presentation of psychiatric disorders in individuals with DD. This was particularly true with the category of "problem behavior" which had a point prevalence of 0.1% using ICD-10-DCR and DSM-IV-TR and 22.5% and 18.7% using clinical diagnoses and DC-LD.

Aggression and Mental Illness

While there is now very little disagreement that psychiatric disorders exist in the population of individuals with DD, the contribution of mental illness to aggression remains less clear. "Problem behaviors", including aggression, have been considered as possible behavioral equivalents of psychiatric symptoms in persons with DD, and this relationship has been examined. In their 1994 descriptive article, King et al. [50] reported on 251 patients with severe and profound DD who were referred for psychiatric assessment. They grouped consultation problems as follows: self-injurious behavior; aggression; agitation; maladaptive behavior such as non-compliance or nuisance behavior; hyperactivity; and "medical". Considerable overlap existed among reasons for referral. For instance, in 23% of all referrals, aggressive and self-injurious behaviors were jointly noted. Diagnoses were based on DSM-III-R criteria. For the group as a whole, the most frequent diagnoses were impulse control disorders (29%), stereotypy/habit disorder (26%), anxiety disorders (12%) and mood disorders (13%). In patients diagnosed with an anxiety disorder, the most common referral problem was agitation (25%). Patients ultimately diagnosed with an impulse control disorder were likely to be referred for aggression (36%), self-injury (30%) or evaluation for psychotropic medications (30%). The group with stereotypy/habit disorder diagnosis was most likely to exhibit self-injurious behavior (41%). In the mood disorder group, those with bipolar disorder exhibited aggression (12%), hyperactivity (12%) and maladaptive behavior (10%). In the depressed group, the most common referral problem was maladaptive behavior (10%) followed closely by hyperactivity (8%).

Rojahn et al. [51] looked at a similar population (severe and profound disabilities, living in a developmental center) and used the diagnostic assessment for the severely handicapped-II (DASH-II) [52] and behavior problems inventory (BPI) [53] to elicit clinically relevant associations between problem behaviors and psychiatric conditions. Problem behaviors of self-injury and aggression/destruction were related to impulse control and conduct disorders. Stereotypic behavior was linked to pervasive developmental disorders and, somewhat less, to schizophrenia. These authors note the lack of reliability of psychiatric diagnoses in this population and argue that the use of a rating scale rather than clinical diagnoses reduces the possibility of biased diagnoses. In their analysis of the literature, Whitaker et al. [44] found that, while not a psychiatric disorder per se, "behavioral problems" have been included in a number of prevalence studies of psychiatric disorders in adults and children with DD. The inclusion of behavior problems seemed

to contribute to the relatively high overall rates of psychiatric disorders reported in some studies. In children, behavior problems were often part of diagnosed conditions in the disruptive behavior disorder spectrum. In adults, it was less clear that disruptive behaviors were symptomatic of specific psychiatric conditions. They caution that it would be a mistake to assume that all problem behaviors are symptomatic of psychiatric disorders and that further research is needed in order to clarify the relationship between aggression and psychiatric illness.

Hemmings et al. [54] built on Moss et al's [55] and Holden et al's [56] studies using the psychiatric assessment schedule for adults with developmental disabilities (PAS-ADD) checklist [57]. Moss found that psychiatric symptoms were generally increased in individuals with problematic behaviors although these did not correspond with ICD-10 diagnostic criteria. The prevalence of "depression" and "hypomania" was highest in individuals with "more demanding" behavior. Holden conducted a similar study and found that symptoms of "anxiety" and "psychosis" were most commonly associated with problematic behavior. Hemmings et al. used the PAS-ADD to sample 214 adults at all levels of DD. Most were in residential care, older than 35 years and in the mild/moderate range of DD (64%). Seven of 13 problem behaviors were shown by at least 10% of the sample and could be further analyzed. Psychotic symptoms were of low prevalence. Affective symptoms were more common and associated with self-injurious behaviors and aggressive behaviors. Screaming and destructive behavior were associated with social impairments. These findings support a potential link between self-injury/aggressive behavior and affective disorders, an association also suggested by previous authors [58, 59]. Hemming notes that irritable mood, rather than sadness or euphoria, may be a more frequent symptom of distress in a person with DD.

Treatment of Aggression

Current practice parameters support the notion that treatment of psychiatric disorders in individuals with DD should be guided by biopsychosocial assessments and models. While the basic principles of psychiatric treatment for specific diagnoses are the same as in the non-DD population, modification of approaches or techniques may be needed [60]. Treatment plans should be formulated only after careful and comprehensive assessments that take into consideration environmental factors, medical co-morbidities, side effects of medication, skill deficits, unmet sensory needs, physiological factors, communication deficits, and potential frustration because of a lack of meaningful choices in life and absence of personal control and efficacy. Expert consensus [60] provides the following key principles for diagnosis and treatment: Treatment should be based upon the most specific psychiatric diagnosis possible. When only a tentative non-specific diagnosis can be made, such as in individuals with more severe DD, clinicians should focus on one or more behavioral symptoms as targets of treatment. For purposes of this review, we will focus first on pharmacological treatments of aggression in individuals with DD, some of whom have comorbid mental illness.

Psychopharmacological Interventions

Antipsychotics

The use of antipsychotic medications in individuals with DD and aggressive behavior is commonplace. Rates vary across studies with average rates of 30–50% [61]. Tyrer et al.

[62] note rates between 22% and 45% in hospitalized individuals with DD and 20% in community samples. Despite the fact that this is the most commonly used class of these medications for aggressive behavior, there is little evidence based research supporting the efficacy of antipsychotic medications for treatment of aggression in this population.

In a 10 year review of psychopharmacology from 1990 to 1999, Matson et al. [63] reported 14 studies assessing medication efficacy in individuals with DD. The vast majority of studies they reviewed had major methodological flaws. Twelve of the 14 studies used traditional or atypical antipsychotics to treat aggression and most of these studies reported significant decreases in frequency and severity of aggression with administration of antipsychotic medication. However, over half were open trials with antipsychotics added to an existing treatment regimen. Data collection was standardized in most studies but there was no report of medication effects on social or adaptive behavior. Matson concludes that, as of 1999, there was "no information in the literature suggesting that antipsychotic agents are effective means of treating aggression".

In 2002, King [64] commented that the evidence base was growing for the use of antipsychotic medications in individuals with DD and suggested that the newer atypical antipsychotics held much promise. He noted that while a 2000 survey of the use of psychotropic medication by people with DD in residential settings found thioridazine, chlorpromazine and haloperidol to be the most commonly used agents, the more recent literature showed a shift to the prescription of atypical agents. In their 2004 Cochrane review, Brylewski and Duggan [65] included nine randomized controlled treatment studies (RCTs) of antipsychotic medication used for challenging behavior. They found the overall quality of the evidence to be poor. Only two studies had been published since 1990. Deb et al. [66] conducted a systematic review of the empirical research on the effectiveness of antipsychotic medications in adults with DD and aggression, including all the available intervention studies, regardless of quality of evidence. Eleven papers were identified; one randomized controlled trial (RCT), one controlled, four uncontrolled prospective, three retrospective and two studies in adults and children (one crossover RCT and one prospective controlled trial). Target behaviors often included several items but aggression by itself or in combination with other challenging behavior was targeted in eight studies. Five of the studies used risperidone, two used clozapine, one each used olanzapine, quetiapine, fluphenazine and zuclopenthixol. The authors note that the evidence for the effectiveness of antipsychotics is primarily based on case studies. In the reported RCTs, data showed effectiveness of risperidone in managing behavior problems. However, sample sizes were small and had insufficient statistical power. In general, in the scant literature available for review, outcome measures were not appropriate or were not validated, method of selection was not always clear or appropriate, psychiatric illness was not distinguished from behavior problems and antipsychotics were often used as add-on therapy.

Since Deb et al's 2007 review [62], one additional publish study was identified. Tyrer's 2008 [62] RCT evaluated risperidone, haloperidol and placebo in the treatment of aggressive behavior in 86 non-psychotic patients in centers in England, Wales and Australia. This RCT identified and enrolled patients referred by community clinicians, with 86 of the 180 referred patients assigned to one of three treatment conditions: risperidone up to 2 mg/d, haloperidol up to 5 mg/d or placebo. Patients' aggression was assessed using the Modified Overt Aggression Scale (MOAS) before and after 4 weeks of treatment. Aggression deceased in all three groups with the placebo group showing the greatest change. The authors comment that their results differ from those of previous authors who have found risperidone treatment more efficacious than placebo. They postulate that, compared to previous studies, their study sample was more representative of the population

of people with DD, containing more individuals with moderate and severe DD. They further note that they did not use a placebo run-in period prior to assignment, as several previous studies had done. There were no significant differences seen between groups when they rated aberrant behavior, quality of life, general improvement, effect on carers, and adverse drug effects. All groups improved substantially, doses were relatively low and side effects were similar across groups. The authors caution that their results "should not be interpreted as an indication that antipsychotics have no place in the treatment of some aspects of behavior disturbance in people with DD" and they cite demonstrated effectiveness in children with autism and behavior disturbances or in adults requiring emergency treatment. They do conclude, however, that "the routine prescription of antipsychotic drugs early in the management of aggressive challenging behavior, even in low doses, should no longer be regarded as a satisfactory form of care."

In the Expert Consensus Guidelines for Treatment of Psychiatric and Behavioral Problems in Individuals with Mental Retardation, a large scale survey of clinicians working in the field [60], atypical antipsychotics are recommended to treat aggressive behavior, with risperidone (90%) being the first choice. First-line ratings were also given to olanzapine, with quetiapine a high second-line option. Other newer atypicals were not available at the time of the survey. Studies with olanzapine and ziprazidone are few and are uncontrolled [67–69]. The authors could identify no studies using quetiapine or aripiprazole in the literature. Clozapine was reported as useful in reducing self-injury and aggression in two individuals who did not respond to risperidone. [70].

Matson sums up the state of the evidence nicely in his comments on Tyrer's 2008 study [62, 71]. He notes that this is a highly controversial area. Aggression is a serious problem and this has resulted in the high use of antipsychotic medications despite the sparse evidence. Changes in practice have been slow to come, partly because of theoretical reasons (biological treatment versus applied behavioral analysis) and secondly, because there are insufficient numbers of trained community staff to implement applied behavior analysis. Both approaches have merit but are rarely used together. Matson underscores the vulnerability of this population of individuals and urges more research in the area of assessment and treatment with behavioral and drug interventions.

Anticonvulsants

Anticonvulsants are the second most common psychotropic medication class prescribed in this population, in part because they are used to treat epilepsy, a disorder commonly found in individuals with DD [63]. Clinically, anticonvulsants already being used to treat seizures are often used for their mood stabilizing properties. The Expert Consensus Guidelines for Treatment of Psychiatric and Behavioral Problems in Individuals with Mental Retardation, updated in 2004, [60] lists anticonvulsants/mood stabilizers as a preferred medication for the treatment of aggression and self-injury as target symptoms. Divalproex (90%) and carbamazepine were the preferred agents. In a 1997 review, Fava [72] notes that very little is known about the efficacy of anticonvulsant drugs to treat aggression in this population. Robertson et al. noted rates of use varied from 23 to 46% across residential settings [73] but acknowledged that this class of medications is increasingly being explored for the treatment of challenging behaviors.

Lindenmayer and Kotsaftis [74] reviewed the literature on the use of valproate to target violence and aggression in non-bipolar patients. Patients had a variety of diagnoses and only a small number had co-morbid DD. Seventeen reports were identified with a total of

164 patients. Ten were case reports, three were retrospective chart reviews and three were open-label prospective studies. There were no controlled studies. An overall response rate of 77.1% was calculated based upon response defined as a 50% reduction in target behavior (aggression alone or in combination with other behaviors). Valproate was primarily used in conjunction with other agents at serum levels comparable to those used to treat seizures. Seven patients (three case studies) had DD and five (one case study) had autism. Valproate was used to target aggression, "outbursts", assaultive behavior and irritability. Reductions in target behaviors were shown in all five case studies.

Deb et al. [75] conducted a systematic review of the literature in order to develop national guidelines following the National Institute for Health and Clinical Excellence (NICE) criteria. These criteria relate to the use of medications to manage behavior problems in adults with DD. Two studies using valproate fit their inclusion criteria of being a primary trial that studied effectiveness in the management of behavior problems in adults with DD. Both studies included a variety of disruptive behavior besides aggression. Both were uncontrolled non-experimental studies with $N < 30$ and both studies showed clinical improvement in approximately 70% of subjects. Janowsky et al. [76] reported on the use of topiramate as add on therapy for aggression, self-injury and destructive/disruptive behavior. Forty-one percent of their group of 22 patients had epilepsy. The authors retrospectively reviewed reports from neuropsychiatric behavioral reviews conducted as part of patients' routine care. Seventy-four percent of individuals were rated as improved. Deb et al. [75] conclude from their review of the literature that although improvement was seen with the use of anticonvulsant medications, the overall quality of evidence for the use of anticonvulsant medications for aggression was not high.

Antidepressants

Antidepressant medications, specifically selective serotonin re-uptake inhibitors (SSRIs), have been suggested as being potentially useful in the treatment of aggression and self-injury. This is, in part, due to the observation that irritability is often associated with aggressive behavior. It has therefore been suggested that there is a potential link between aggression and untreated mood disorders as well as a modulatory effect on aggression mediated by the brain serotonin system. In their ten year literature review, Matson et al. [63] found two studies using SSRIs for aggression. Both combined aggression with other aberrant behaviors. One study indicated that aggression severity was reduced with SSRI treatment but this reduction was not statistically significant. The other concluded that clinical global improvement scale (CGI) ratings improved when the SSRI was used as add on therapy.

In their retrospective case note analysis of 37 adults with DD who were prescribed SSRIs for perseverative and maladaptive behavior, Brandford et al. [77] found that fluoxetine or paroxetine used in average doses was of no benefit to 15 subjects (40%) and led to deterioration in nine (25%). Some reduction in maladaptive behaviors was seen in 13 (35%). Aggression and self-injury were only two of the 15 maladaptive behaviors measured and were not distinguished from the other behaviors in the reported results.

In a letter to the editor in 2001, La Malfa et al. [78] reported preliminary findings on 60 aggressive inpatients with diagnoses of DD who were treated with fluvoxamine after 1 week of no medication and 2 weeks of placebo. The dose was gradually increased over 3 week's time to a maximum of 300 mg/d. They noted a reduction in severity of aggressive behaviors using the handicaps, behavior, and skills schedule (HBSS) [79] and suggested

that their results support the use of fluvoxamine for the treatment of aggression. Janowsky et al. [80] reviewed treatment response to a variety of antidepressants used for add-on therapy in 38 institutionalized DD adults. (Paroxetine = 14, fluvoxamine = 9, sertraline = 7, clomipramine = 2, citalopram = 1). Patients were referred for a number of maladaptive behaviors, including aggression. The authors performed a retrospective analysis of quarterly neuropsychiatric behavioral reviews and concluded that serotonergic antidepressants produced a statistically significant decrease in behavior ratings. Responders did not seem to differ from non-responders on any demographic or diagnostic variables. In an open prospective trial using paroxetine for aggression, Davanzo et al. [81] examined frequency and severity of aggression in 15 institutionalized DD adults with severe aggression and self-injury. Doses ranged from 10 to 50 mg with a mean dose of 35 mg/d. Eight individuals had paroxetine as add-on therapy. Severity but not frequency of aggression and self-injury were reduced at 4 month follow-up. The most beneficial effects were seen at 1 month but these gains were not statistically significant at the end of 4 months.

Sohanpal et al. [82] performed a comprehensive systematic review of the literature to establish the current evidence base regarding the effectiveness of antidepressants for management of behavior problems in DD adults. Ten studies were found which met their inclusion criteria. One was a RCT and it tested clomipramine. Nine studies investigated SSRIs. The authors note that the evidence for efficacy was scant. Responses varied and some patients showed negative effects. Improvement, if reported, was usually in self-injurious behavior. They conclude that antidepressants (SSRIs) improve aggression and self-injury on average in less than 50% of cases and patients with underlying anxiety or obsessions and compulsions may benefit the most.

Lithium Carbonate

Lithium carbonate has been used to treat behavior problems in non-bipolar individuals with dual diagnosis. There have been two reviews of the literature, one in 2003 [83] and another in 2008 [84]. In the most recent review by Deb et al. [84], three studies were identified which met inclusion criteria. One was a RCT with a total $N = 42$. Lithium was added to existing medication regimens in order to target aggression. Seventy-three percent improved and 9% got worse when treated with lithium carbonate compared to 30% improved with placebo [85]. A second study had a double blind, controlled crossover design with $N = 52$. Patients with symptoms of aggression, self-injury, destructive behavior, tantrums and hyperactivity were followed for 5 months with lithium as add-on therapy. Fifty-six percent improved, 44% were unchanged and two participants dropped out [86]. The final study reported results of a retrospective uncontrolled study of severely and profoundly disabled institutionalized residents ($N = 66$) who received lithium carbonate for various behavior disorders and were followed for 10 years. Their disorders had not been responsive to other medications or treatments. Lithium was used as adjunctive therapy for aggression, self-injury and hyperactivity. The authors reported that 47% ($N = 31$) sustained major reduction or elimination of behavioral symptoms and were classified as lithium responders. However, 77% ($N = 24$) of those rated as responders required medications in addition to lithium. Characteristics that indicated greater likelihood of response included older age and presenting symptoms of psychosis, although all characteristics studied were seen in both the responder and non-responder groups [87]. Pary [88] reported in a non-blinded clinical trial that 10 of 15 participants experienced adverse effects with lithium treatment. Subsequent authors reported that in their studies lithium appeared to be safe and none reported

lithium toxicity. Deb et al. conclude that, based upon their review of these three studies, a high proportion of the patients treated with lithium showed improvement in target behaviors.

Opioid Antagonists

Deb et al's [84] systematic review found no studies published in the last 5 years which addressed treatment of behavior problems per se. Four older studies were found, one of which was a RCT. Naltrexone was compared to placebo in 33 adults and was found to be ineffective. Symons et al. [89] reviewed 27 research articles spanning 20 years in order to determine if naltrexone was efficacious in the treatment of self-injurious behavior. They reported that the literature was highly contradictory and there was considerable variation in the effect of the medication. In the end, they concluded that 80% of individuals included in the analysis improved in the short-term. Reduction of self-injurious behavior of 50% or greater was reported for 47% of all subjects.

Buspirone, Anxiolytics, and Beta-blockers

In their 2007 review of the literature, Deb and Unwin [90] could identify no recent papers that used these medications and met their inclusion criteria of a clinical trial that assessed effectiveness in the treatment of behavioral problems in adults with DD. They did include a 1996 uncontrolled prospective open label trial with 26 adults and found no benefit of buspirone on aggression or self-injury [91].

Behavioral side effects of benzodiazapines are of concern in individuals with DD. In their 2002 literature review, Kalachnik et al. [92] note that behavioral side effects (agitation, aggression, anger, depression, euphoria, hostility, hyperactivity, irritability, socially inappropriate behavior, psychosis, temper tantrums) occurred in 13% of 446 individuals with DD. Benzodiazepines were prescribed for psychiatric conditions (17.4%), epilepsy (15.4%) or myoclonus/cerebral palsy (2%). The range of behavioral side effects was 11.4–25% which would be considered "frequent" in terms of side effect occurrence. The authors recommend the use of lower doses of shorter acting agents for short treatment periods.

Psychological and Behavioral Interventions

As previously noted, the evidence in support of psychotropic drugs as a first line treatment for aggression in individuals with DD is weak. Despite these limitations, practice patterns have not changed substantially over time [93] and there is still concern about over-reliance on pharmacological treatments for aggression in individuals with DD. There may be a number of barriers to implementing psychological/behavioral treatments alone or in combination with medication treatment. In general there has been a lack of interest in the emotional lives of individuals with disabilities. They are often seen as being socially marginalized or different and their emotional difficulties are often attributed to their disability or an organic cause. Behavioral interventions which have been shown to be effective are not always implemented because they require more intensive staffing/training than pharmacotherapy. These types of interventions are difficult to implement outside of facilities with trained staff. The perception of many professionals has been, and remains, that psychological interventions are ineffective

because of the cognitive limitations and verbal deficits seen in this population. And there continues to be debate in the field as to the effectiveness of non-behavioral therapies with expert opinion divided as to whether cognitive behavioral therapies when used in this population are "cognitive" or "behavioral" [94–99.]. Two recent review articles address the amount of progress (or lack thereof) that has been made in research in this area [100, 101]. Prout et al. used an expert consensus rating method to review 20 years of literature on psychological treatments. They analyzed 92 of 103 selected articles. Type of treatment included group (57%), individual (42%), skills training (17%) and other/unclear (3%). In looking at theoretical orientation, behavioral comprised 33%, cognitive or cognitive behavioral = 13%, analytic/dynamic = 15%, humanistic/person centered = 2% and 34% were in the "other" category. The literature was dominated by case studies and single subject designs with few controlled studies. Descriptions of interventions were vague; treatment manuals and treatment integrity measures were seldom used and outcome data was vague or omitted. The authors conclude that the evidence is flawed but would seem to suggest that psychotherapy with persons who have DD can produce moderate benefits and be moderately effective and these effects were consistent across age, level of retardation, technique and theoretical approach.

In a second review, Beail [102] examined the literature on effectiveness of psychodynamic and cognitive-behavioral psychotherapy with people who have DD. He noted that problem solving and anger management packages were the most commonly used forms of self-management approaches. There were 18 published reports on anger management interventions. All but four were a single case or a small case series. Of these remaining four, one study showed improvement with intervention but did not include a no-treatment group. Three studies had a no-treatment or treatment as usual control groups but the overall number of subjects was small. One of these three introduced staff participation as a novel factor in treatment, potentially influencing outcome. The final two reported modest improvement in treated patients as compared to controls. Beail also reviewed the literature on cognitive therapy and found only case reports and a case series. Because of these limitations, the evidence was not reviewed. He found that there were only a few pre-post clinical trials using psychodynamic psychotherapy reported at the time of his review. Two were in populations of offenders and reported decreases in offending behaviors and recidivism. A third study reported the results of psychodynamic treatment in 20 individuals with dual diagnosis with findings of decreased psychological distress, increased self-esteem and improved interpersonal functioning. Beail concludes that progress in research has been negligible. While cognitive behavioral approaches have been examined more than psychodynamic approaches, most cognitive behavioral approaches have been in the self-management arena and are more behavioral in content. In his review, he concluded that that evidence based research was inadequate in this area.

Willner [103] recently published a critical overview of the effectiveness of psychotherapeutic interventions for people with learning disabilities. He reviewed psychodynamic, cognitive-behavioral and cognitive approaches and concluded that the available data support that all three approaches can be effective in individuals with mild disabilities and even effective in a proportion of those with more severe cognitive delays. However, he cautions that the outcome literature is extremely limited and there is a significant absence of randomized controlled trials.

In the following section we will summarize the literature regarding use of these treatment modalities to specifically address aggression in individuals with developmental disabilities.

Behavioral Therapies

There is an extensive literature dating back to the 1960s regarding the use of behavioral interventions in individuals with DD for a wide range of problematic behavior. In 1991 Scotti et al. [104] conducted a meta-analysis of interventions for problem behavior in individuals with DD. They searched 18 major journals with dates from 1976 to 1987 and concluded that physical aggression/tantrum behaviors were associated with the lowest treatment effect. Less intrusive interventions such as environmental change and positive practice were more effective than the more intrusive techniques of aversive stimulation and restraint. In their meta-analytic study of treatment effectiveness for problem behaviors, Didden et al. [105] extended Scotti's work by including a larger number and more varied assortment of journals. They analyzed 482 studies from 1968 to 1994 with a goal of improving the quality of information available to clinicians as they make decisions regarding treatment procedures. Interventions studied were in four categories: pharmacological, diet, guided movement training and response non-contingent procedures. Outcomes were reduction or elimination of internal maladaptive behavior such as self-injury, socially disruptive behavior or externally directed destructive behavior. The authors' concluded from their analysis that the majority of behaviors could be treated fairly effectively (47.1%) with these four intervention; 26.5% could be treated quite effectively; 23.5% could be treated questionably; and 2.9% could not be treated reliably. Behaviors that were externally destructive were more difficult to treat and response contingent procedures tended to be more effective than other categories of treatment. Pharmacological treatments were the least effective. Functional analysis was significantly related to percentage of non-overlapping data and only performing a functional analysis made a significant contribution. The Centre for Reviews and Dissemination's database notes that although this review provided adequate descriptions of its objective, interventions, outcomes, participants, search strategy and methods, there was limited information about study designs included, validity criteria, inclusion process, method of data extraction and methods of analysis of heterogeneity. Sample sizes were small and likely to not have control groups.

Carr et al. [106] reviewed 33 studies which used non-contingent reinforcement (NCR) as a treatment for aberrant behavior in individuals with DD. Reinforcement was provided as long as the problem behavior did not occur. The majority of individuals had cognitive disabilities in the moderate to severe range. Only 2 of these studies had patients with mild mental retardation. Except for one study with $N = 29$, all were individual case reports or very small case series. Aberrant behaviors included aggression (15), self-injury (11): inappropriate speech (2); stereotypy (1), rumination (1), pica (2) and excessive medical complaints (1). The author's note that NCR is a promising treatment for aberrant behavior but it had not yet been evaluated outside of extremely controlled experimental settings. They propose that the application of NCR in a naturalistic setting is an area for further research so that transferability and generalization effects can be explored.

Whitaker [107] reviewed psychological methods for targeting aggression in individuals with DD. The bulk of the literature was concerned with contingency management using behavioral methods. He found little evidence for the effectiveness of self-control procedures (self-monitoring, contingency control, self-instruction), especially in subjects with greater levels of disability and more limited language skills. Ecological interventions based on functional analysis had some evidence for usefulness but the numbers were small, possibly because these methods require consistency and high staff ratio. Whitaker concluded that the most effective approaches were behavioral in nature and involved antecedent control, skills training or contingency management.

Cognitive-Behavioral, Cognitive and Psychodynamic Therapies

The majority of studies involving cognitive-behavioral approaches are based on treatment developed by Novaco [108] and include cognitive re-structuring, arousal reduction and behavior skills training. Since anger is a known risk factor and is strongly correlated with outward aggression in this population, management of anger and anger control treatments have been developed and implemented. Whitaker [109] recently reviewed the literature on anger control studies and was able to identify 16 studies in which a cognitively based anger control package was evaluated. Most of the studies were individual case studies or case series with persons who had mild to moderate cognitive disabilities. He concluded that there is some evidence that cognitively based anger control treatment can be effective in this population but this evidence is not strong because of methodological issues. When individual components were analyzed, the ones with the best supporting evidence were non-cognitive procedures (relaxation and self-monitoring).

In 2002, Taylor reviewed the assessment and treatment of anger and aggression in offenders with DD [110]. As part of this review, he provided a comprehensive summary of studies that have evaluated cognitive-behavioral approaches to anger problems in people with DD. Twelve studies were identified between 1986 and 2002. Two were RCTs, one was a group controlled study without randomization or comparison group and nine were systematic studies without randomization or comparison group. Five were group studies and seven were either case series or case studies. Both RCTs flaws in methodology. One did not include a no-treatment control group and the other used outcome measures which have only limited reliability and validity data available. Taylor concluded that the experimental evidence for cognitive-behavioral treatment in individuals with DD is weak but urged further exploration of these techniques as purely behavioral interventions were not always effective. He noted that in the DD population, behavioral interventions do not always lead to the development of self-control and coping skills which can transfer across a range of settings. He further notes that most of the studies of behavioral interventions have been with individuals with high levels of DD who have a variety of challenging behaviors, rather than with higher functioning individuals with only outwardly directed aggression. It is, therefore, possible that behavioral interventions would be more effective in higher functioning individuals with fewer behavior problems. In his review, Taylor notes that ethically sound and unintrusive behavioral treatments have not been proven outside of highly controlled settings with high staff ratios, making them less useful in community settings where most individuals with mild DD live. And he notes that the effectiveness of behavioral interventions with low frequency, high severity behavior is open to question.

In a subsequent study, Taylor et al. [111] reported on 40 detained individuals with mild to borderline DD and histories of serious aggression. The subjects were assigned to either a modified individual cognitive behavioral anger treatment condition or a routine care wait list condition. The treatment group received 18 individual sessions with the same therapist. Treatment was guided by a treatment manual designed specifically for use with people with mild/borderline intellectual abilities [112]. Groups were assessed via staff and patient anger measures at four time intervals: screening period, pre- and post-treatment as well as 4-month follow-up. There were no statistically significant differences seen between the groups, however the anger treatment group showed post-treatment improvement with the Spielberger state-trait anger expression inventory (STAXI) anger expression scale and its anger control subscale [113], as well as on the staff rated ward anger rating scale (WARS) anger index [114]. Limitations of the study included evaluators not blinded to treatment groups, relatively short length of follow-up (4 months), and a common milieu for both

groups, meaning that the common milieu could be independently responsible for washing out any group differences.

Recent developments in the use of cognitive-focused strategies with individuals with DD have attempted to move beyond self-instruction to deal with improving socioemotional understanding and attributions of hostile intent. A key component of recent anger management interventions has been an educational phase concerned with improving emotional understanding and emphasis placed on social information-processing approaches to problems of anger and aggression. Basquill et al. [115] looked at attributional bias and social problem solving deficits in aggressive and non-aggressive adult males with mild DD. Fifty-five individuals were included in the study and 45 completed. The aggressive subjects were less accurate in identifying interpersonal intent, had more problem-solving deficits and resolved problems aggressively more often than non-aggressive peers. Matheson and Jahoda [116] studied emotional identification in 19 aggressive and 15 non-aggressive adults with DD. Both groups improved on emotional recognition tasks when given a greater number of contextual cues but the aggressive participants had more difficulty labeling emotions and were more likely to mislabel emotions as "angry" than the control group. Jahoda et al. [117] reported on two studies comparing emotional recognition and perspective-taking abilities in 43 frequently aggressive individuals with DD and 46 non-aggressive peers (also with DD) and found no difference in the two groups' ability to label affect. Both groups had similar success with a perspective-taking task but the aggressive group was better at predicting attributions. They conclude that deficits in emotional recognition and perspective-taking cannot be assumed to be causal or maintaining factors for aggression. The same group of investigators [118] studied the same group of subjects to explore attributional bias of hostile intent. The aggressive subjects attributed significantly more hostile intent to protagonists and indicated they would respond more aggressively when compared to nonaggressive peers. Jahoda et al. conclude that it may be clinically important to assess interpersonal perceptions in persons with milder forms of DD and aggression, and then to address these issues in their treatment.

Conclusions

Aggression of all types is a common referral problem in individuals with DD and can lead to adverse outcomes in both residential and community settings. Aggression can adversely impact treatment, access to services and quality of life for both the individuals being served and their caregivers. While there are barriers to assessment in this population, careful attention to biological, psychological, behavioral and social factors can often provide insight into possible etiologies for aggressive behavior. Biological vulnerabilities such as acquired neurological damage, comorbid medical problems, communication deficits and sensory disorders should be assessed. Environmental factors related to living arrangements, vocational opportunities and staff behavior and training should also be examined. It should be determined if the individuals being referred have opportunities to make meaningful choices and develop interpersonal efficacy, thus reducing frustration and subsequent aggression.

Mental illness is an important risk factor for aggression in dually diagnosed individuals. While the presence of mental illness in this population is now widely accepted, barriers to referral and diagnosis and treatment remain. Mental illness continues to be under-recognized and under-treated in persons with DD. Traditional methods of diagnosing mental illness using DSM and ICD criteria are not always accurate or sufficient to characterize

psychiatric disorders in persons with DD, especially those with severe and profound DD. Diagnostic instruments and screening tools have been designed specifically to be used with this population but are not always well linked to more traditional diagnostic nomenclatures. Traditional diagnostic instruments have been modified for persons with borderline, mild and moderate DD. However, clinicians in the field continue to debate the utility of treating syndromes versus symptoms.

Pharmacotherapy, particularly with antipsychotic medication, has been heavily relied upon, despite scant evidence supporting its efficacy. There are few RCTs and most of the studies to date have significant methodological shortcomings. Sample sizes are small, target behaviors are not always well defined, outcome measures are not appropriate or validated and initial selection criteria are widely variable. There is even less robust evidence supporting the use of other agents such as mood stabilizers or antidepressant medications and the results of clinical case reports or case series are highly variable, making interpretation difficult.

Behavioral treatments, while well-studied in institutional settings and with individuals with severe DD, have been difficult to implement and study in more naturalistic settings which tend to have lower staffing ratios or are "staffed" with untrained individuals such as family members. Reviews of the literature concluded that environmental change and positive practice were more effective than the more intrusive techniques of aversive stimulation and restraint. Functional analysis research is promising but hampered by methodological concerns.

Controversy remains as to the effectiveness of non-behavioral therapies and the opinion of experts in the field is divided. Most authors conclude that little progress has been made in research in this area. Cognitive behavioral treatment has primarily addressed anger control and management. Relaxation and self-monitoring are noted to be the most effective components of these therapies, raising the question of whether these are "cognitive" or "behavioral" treatments. While there is some evidence supporting efficacy of cognitive behavioral therapy for treatment of anger and aggression, it is not strong due to methodological issues. There is little to report on the use of purely cognitive or psychodynamic therapies for treatment of aggression in persons with DD. Recent research has focused on the use of cognitive strategies in order to move beyond self-instruction and deal with improving the patient's socioemotional understanding and attribution of hostile intent. This would appear to be particularly germane to individuals with milder forms of DD living in community settings. Preliminary data does not support deficits in emotional recognition and perspective-taking as causal or maintaining factors for aggression but suggest that it may be clinically important to assess interpersonal perceptions and address these in treatment. Models of treatment use a biopsychosocial or multimodal understanding of etiology and suggest that clinical treatment of aggression should not rely on only one strategy. Yet, there is little reported evidence addressing the use of pharmacotherapy and psychological treatments in combination.

The treatment of aggression in persons with DD, with or without comorbid mental illness, remains a highly controversial area and changes in practice have been slow to come. The evidence related to pharmacotherapy and various psychological treatments is, in general, either lacking or poor. This does not suggest that these treatments are necessarily ineffective but that there is not enough good quality evidence to support their usefulness. Future research needs to be conducted in the area of pharmacotherapy so that the use of medications to treat aggression is firmly rooted in a sound base of evidence. It continues to be important to study aggressive behavior in a variety of specific contexts and settings in order to better understand the frequency, type and severity of this behavior. More research

focusing on distinctive profiles of aggressive behavior may be useful along with methods and tools for assessment which link to major diagnostic schemas such as the DSM and ICD. The effectiveness of psychological treatments for this population is only tentative and should be examined more rigorously using adequate designs, larger treatment numbers, no-treatment groups and reliable and valid outcome measures.

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