



Pharmacological Approaches to Managing Violence and Aggression in Prison Populations: Clinical and Ethical Issues

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Abstract

Violence and aggression are common problems encountered in prison, which frequently require clinical intervention. This increased prevalence is partially attributable to the high morbidity of psychiatric and personality disorders in prison inmates. As prisons are non-therapeutic environments, the provision of clinical care becomes more complex. This article examines the general principles of management of violence and aggression in prison settings, with a particular focus on the clinical and ethical considerations that guide pharmacological approaches. Use of psychotropic medication to address these problems is reserved for situations where there is (i) a diagnosable psychiatric disorder, or (ii) a significant risk of harm to an individual without urgent intervention. Initial focus should be on environmental and behavioural de-escalation strategies. Clear assessment for the presence of major mental illness is crucial, with appropriate pharmacological interventions being targeted and time-limited. Optimising management of any underlying psychiatric conditions is an important preventative measure. In the acute setting, rapid tranquilisation should be performed according to local guidelines with a focus on oral prior to parenteral administration. Clinicians must be mindful of capacity and consent issues amongst prisoners to protect patient rights and guide setting of care.

Key Points

Delivering psychiatric interventions in a non-healthcare setting (i.e. prison) is complex.

Psychotropics may be indicated for aggression in prison when there is an underlying psychiatric condition or significant acute risks.

It is vital to establish both capacity and consent prior to use of medication in prisoners.

1 Introduction

Prisons are non-therapeutic secure environments with the primary purpose of confining individuals as a punishment for a crime [1]. As prisons are not healthcare facilities, the provision of any clinical intervention becomes more complex than in the therapeutic environments where prisoners may also sometimes be held, such as specialised forensic hospitals or under guard in a general health facility. This distinction between prisoner and patient is important to consider before the provision of pharmacological treatments.

Violence and aggression are common problems encountered in prison settings [2]. These behaviours are broadly defined by the UK's National Institute for Health and Care Excellence (NICE) as actions that can result in “harm, hurt or injury to another person, regardless of whether the violence or aggression is behaviourally or verbally expressed, physical harm is sustained or the intention is clear” [3]. Violence and aggression are linked but are not synonymous entities: Violence is behaviour causing harm to other people or property, whereas aggression is the intimation of violence through threats, intimidating behaviour or verbal abuse [4]. Aggression can be further categorised as either predatory or impulsive acts: Predatory aggression involves premeditated

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behaviour with a specific goal, while impulsive aggression is usually reactive to an immediate stress or provocation [4, 5]. Self-harm, which is violence directed towards oneself, is considered separately and falls outside the scope of the present article.

Prisons are unique environments and therefore necessitate a considered and nuanced approach to the management of difficult behaviours like violence and aggression. This review article briefly examines the aetiology and prevalence of such issues in prison settings, before discussing in detail the principles of management with a particular focus on the clinical and ethical considerations that guide pharmacological approaches. For the purposes of this article, psychotropic medication is taken to mean chemical agents that alter neurotransmission with demonstrable effects in perception, affect, consciousness, cognition or behaviour [6].

1.1 Prevalence of Aggression and Violence

According to a review article by Fazel et al. [2], there are limited available data regarding prevalence rates for violence in prisons despite general acknowledgement that it is a common problem. Two studies have indicated that rates of physical assault are 13–27 times more common in prison compared to the general population [7, 8]. Data from the USA suggest that the single most common sub-type of violent behaviour is non-lethal physical assault perpetrated by one prisoner against another [9]. More serious types of violence (such as sexual assault and homicide) remain infrequent [10].

There is good evidence of an association between psychiatric diagnosis and involvement in violence within prisons [2]. It is also well documented that prison populations globally contain significantly higher rates of psychiatric morbidity when compared to the general population. An international meta-analysis of 33,588 prisoners found that 3.7% had psychotic illnesses and 11.4% had major depressive disorder, with these rates being significantly higher again within low-middle income nations [11]. Moreover, personality disorder is also highly prevalent within prisons, with an earlier large multinational meta-analysis finding that 65% of male prisoners and 42% of female prisoners had a personality disorder [12]. The majority of these were diagnosed with antisocial personality disorder, while borderline personality disorder was also common.

It is less clear how much of the increased incidence of violence can be attributed to major mental illness, as opposed to a personality or behavioural disorder. The high rates of antisocial personality disorder within the prison population are likely to account for a significant proportion of this violence. This is to be expected given the cardinal diagnostic criteria of antisocial personality disorder (e.g. disregard for social norms and low threshold for aggression)

overlap with key reasons for entry to prison and propensity to violence [2].

1.2 Aetiology of Aggression and Violence

Aggression and violence have a multi-factorial aetiology, with a heterogeneous mixture of biological, behavioural and environmental factors all contributing [13]. Whilst there is an association between psychiatric disorders and violence, it is important to acknowledge that the majority of individuals in the community with mental illness are not violent and, in fact, are more likely to be victims than perpetrators [14]. However, it must be reiterated that the prison population is not representative of the general population.

The key group of psychiatric disorders most associated with aggression or violence in prison are those that share the core feature of poor impulse control. This includes the diagnoses of antisocial personality disorder, borderline personality disorder, attention-deficit/hyperactivity disorder (ADHD) and intermittent explosive disorder [15–18]. ADHD is important to consider, as it often remains underdiagnosed within prison populations. Antisocial personality disorder is unique in that it is also associated with predatory violence, in which violent acts are premeditated and goal-directed, as well as with impulsive violence [15].

The second important diagnostic category is psychotic disorders, as symptoms such as persecutory delusions and, to a lesser extent, command hallucinations are associated with aggression and violence [19–21]. Important diagnoses in this category include schizophrenia, substance-induced psychosis and manic-phase bipolar affective disorder. These disorders are characterised by “threat/control-override symptoms”, in which the affected individual perceives a strong threat in their environment that overrides their self-control [20, 22]. Importantly, the risk of violence in these individuals is significantly lower if the psychotic disorder is recognised and treated. The risk of violence in individuals with schizophrenia is significantly increased by co-morbid substance use [23].

Other relevant neuropsychiatric syndromes worth noting include acquired brain injury and dementia [24, 25]. More broadly, important organic factors must also be excluded such as substance intoxication/withdrawal, delirium and seizure disorders [26–28]. A retrospective study by Workman and Cunningham [29] found that rates of aggression were higher among inmates who were taking psychotropic medication, particularly benzodiazepines. This may be related to the presence of specific side effects, with the California State Hospital Violence Assessment and Treatment (Cal-VAT) guidelines implicating several important adverse medication reactions such as akathisia, sedation and cognitive impairment [30].

It is important to acknowledge that aggression and violence in prison are not always the consequence of a formal psychiatric illness. Indeed, the prison environment itself contributes to the incidence of violence. Aggregating large numbers of individuals with antisocial tendencies in a confined space and then limiting personal freedoms is unsurprisingly a potential tinderbox [31]. Limited activities, overcrowding and inadequate privacy are all known aetiological risk factors within prisons for violence [32].

Given the complexity of the aetiology of violence and aggression, use of tools to help calculate the degree of risk may be useful. The most commonly used violence risk assessment instrument is the *Historical Clinical Risk Management-20* (HCR-20). This instrument is based on structured professional judgement and considers risk of violence across three broad domains – historical factors, clinical factors and risk management factors (see Table 1) [33].

2 General Principles in the Management of Aggression and Violence in Prison

Reducing rates of aggression and violence in prisons is an important goal, as this leads to reduced financial burden on prison authorities and improves psychosocial wellbeing of staff and inmates [34]. While non-pharmacological strategies should always be considered as the preferred first-line option, there will be incidents within prisons that warrant escalation to a pharmacological response. A general overview of the suggested steps prior to prescribing medication is provided in Fig. 1.

As a preventative step, environmental interventions should be employed to reduce the risk of aggression and violence. Important systemic factors to address include overcrowding, lack of daily routine, inexperienced staff and inadequate emergency response procedures [30]. Appropriate training of prison staff in crisis intervention and restraint procedures is essential [3].

2.1 Imminent Risk Setting

Following the immediate occurrence of an incident of violence or aggression, the preferred initial approach is the use of de-escalation strategies to gain control of the situation and prevent the need for use of restraint or other more restrictive interventions. Some examples of these approaches include removing extraneous people from the situation, ensuring one staff member is nominated as the primary communicator with the individual in question, and having sufficient staff on standby for back-up support [35]. The staff member nominated to communicate should seek to clarify the issues that precipitated the incident and attempt to resolve it in a non-confrontational manner. Staff should take care to regulate their own emotional state and avoid any verbal or non-verbal expressions of anxiety and frustration [3].

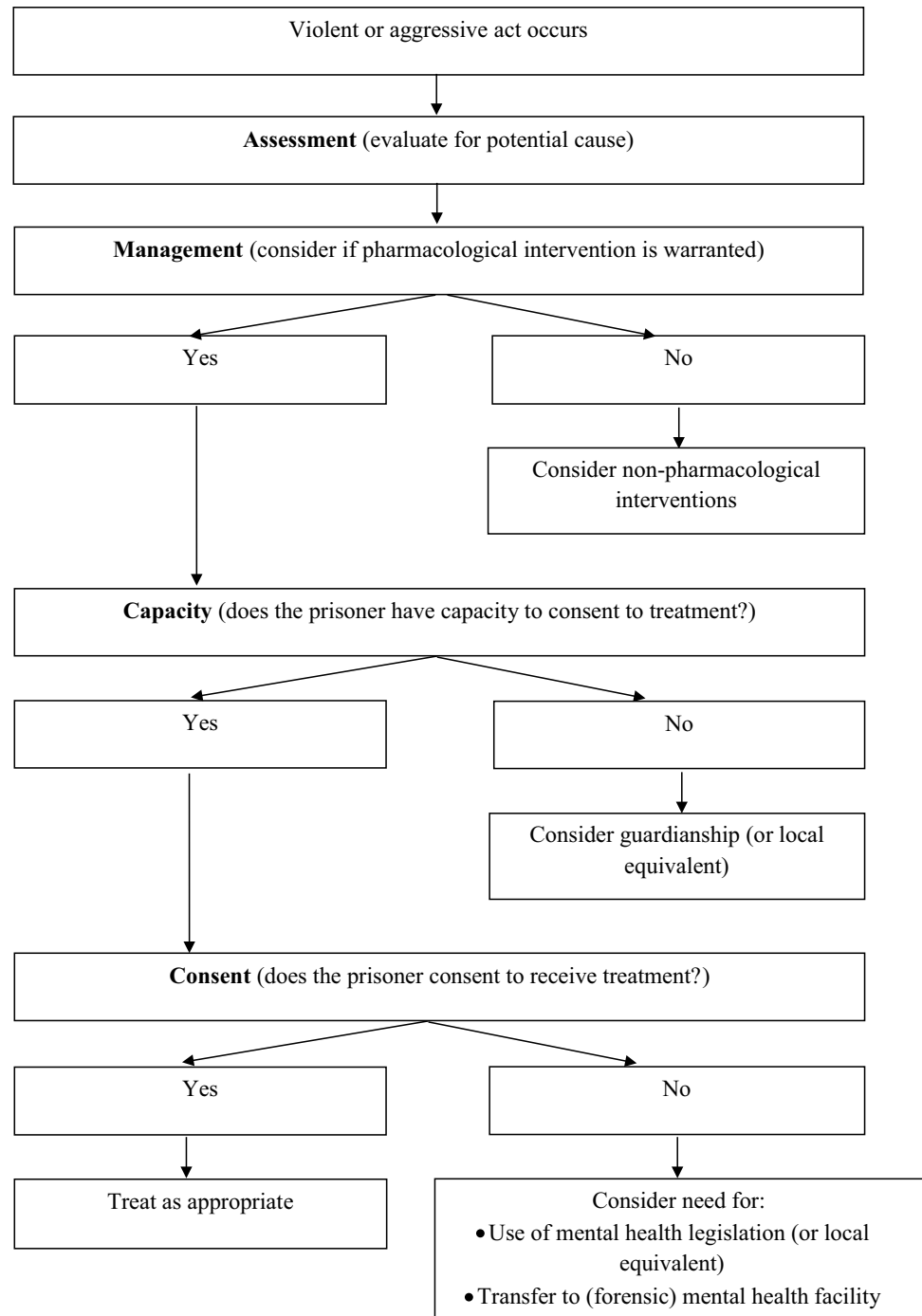
Any acute pharmacological intervention provided should follow recognised rapid tranquilisation protocols, as stipulated by local policies and procedures. As an example, Fig. 2 presents one such protocol that has been adapted from the Royal Australian and New Zealand College of Psychiatrists' (RANZCP) clinical practice guidelines [36]. The NICE guidelines suggest that there is a lack of high-quality evidence supporting the use of intramuscular benzodiazepines or antipsychotics in such situations and raise concerns about the potential for adverse effects like oversedation and movement disorders [3]. Whenever possible, oral administration of medication should be attempted prior to administering parenteral preparations. Seclusion and restraint (both chemical and physical) should always be a last resort management strategy. This is in line with the World Health Organization's push to eliminate the use of such practices globally [37].

According to the NICE and Cal-VAT guidelines, following acute stabilisation of the situation, the first step in responding to a violent incident is a focus on thorough assessment [3, 30]. Such an assessment should consider all potential antecedents to the behaviour, including biological, psychological and environmental factors. Identification

Table 1 Historical clinical risk management-20

Historical	Clinical	Risk Management
H1. Violence	C1. Insight	R1. Professional services and plans
H2. Other anti-social behaviour	C2. Violent ideation or intent	R2. Living situation
H3. Relationships	C3. Symptoms of major mental disorder	R3. Personal support
H4. Employment	C4. Instability	R4. Treatment or supervision response
H5. Substance use	C5. Treatment or supervision response	R5. Stress or coping
H6. Major mental disorder		
H7. Personality disorder		
H8. Traumatic experiences		
H9. Violent attitudes		
H10. Treatment or supervision response		

Fig. 1 Flowchart of the general approach to managing violence and aggression in prison



of a diagnosable psychiatric disorder that is contributing to the challenging behaviour should occur before medication is considered. It is also important to rule out other contributory factors such as substance intoxication/withdrawal, medication effects (e.g. akathisia) and organic syndromes (including delirium or seizure disorders). Again, distinguishing the type of aggressive act is important, as predatory aggression is often related to underlying psychopathy or antisocial personality disorder, and therefore medications are less suitable

[38]. Use of medication is more likely to be indicated in acts of impulsive aggression where there is an underlying disorder causing impulse control deficits.

2.2 Chronic Risk Setting

If a prisoner has an underlying psychopathology that is likely to be causative of or contributing to the ongoing impulsive aggression or violence, the pharmacological approach

<p>MILD LEVEL OF AROUSAL</p> <p>Clinical picture: Mildly aroused; distressed; pacing; still willing to talk reasonably.</p>	<p>MODERATE LEVEL OF AROUSAL</p> <p>Clinical picture: Moderately aroused; agitated; becoming more vocal; fearful; unreasonable and hostile.</p>	<p>SEVERE LEVEL OF AROUSAL</p> <p>Clinical picture: Highly aroused; distressed and fearful; refusing oral medication; violent towards self, others or property.</p>
<p>ORAL</p>	<p>ORAL</p>	<p>INTRAMUSCULAR</p>
<p>Lorazepam: Dose of 1-2mg; repeat if necessary every 2-6 hours to daily maximum of 10mg; peak effect at 1-3 hours.</p> <p>OR</p> <p>Olanzapine: Dose of 5-10mg; repeat if necessary every 2 hours to daily maximum of 30mg; peak effect at 1-3 hours.</p> <p>Review after 30-60 minutes, repeat as above if necessary.</p> <p><i>If still ineffective, consider escalating to Moderate.</i></p>	<p>Olanzapine: Dose of 10-20mg; repeat if necessary every 2-6 hours to daily maximum of 30mg; peak effect at 6 hours.</p> <p>PLUS</p> <p>Lorazepam: Dose of 1-2mg; repeat if necessary every 2-6 hours to daily maximum of 10mg; peak effect at 1-3 hours.</p> <p>Review after 30-60 minutes, repeat as above if necessary.</p> <p><i>If still ineffective, consider escalating to Severe.</i></p>	<p><u>First Line:</u></p> <p>Olanzapine: Dose of 10mg; repeat if necessary every 2 hours to daily maximum of 30mg; peak effect at 15-45 minutes.</p> <p><u>Second Line:</u></p> <p>Droperidol: Dose of 2.5-10mg; repeat if necessary every 20 minutes to daily maximum of 20mg; onset of action at 3-10 minutes; obtain ECG, where possible.</p> <p><u>Third Line (if tranquilisation not achieved):</u></p> <p>Clonazepam: May be used in addition, but NOT simultaneously (at least 1 hour gap with Droperidol and 2 hours with Olanzapine). Dose of 1-2mg; repeat if necessary after 2 hours, then every 4 hours to daily maximum of 4mg.</p> <p><u>Alternative agents:</u></p> <p>Other guidelines may consider intramuscular Midazolam, Lorazepam or Haloperidol (check local protocol).</p>
<p>In smokers, consider nicotine replacement therapy where possible (patch, inhaler or lozenge).</p>	<p>Alerts:</p> <ol style="list-style-type: none"> 1. Extra-Pyramidal Side Effects (EPSEs) must be assessed for and treated. Anticholinergic agents should NOT be used routinely. Acute dystonia may be treated with intramuscular Bzotroprine 2mg (daily maximum of 6mg). 2. Clonazepam has a long half-life of 30-40 hours. Be wary of cumulative effects of repeat administration. 	
<p>Monitoring:</p> <p>Vigilant monitoring for signs of: airway obstruction, respiratory depression, hypotension and over-sedation every <u>15 minutes</u> for first 90 minutes post-administration, then hourly.</p>		

Fig. 2 Flowchart of example rapid tranquilisation protocol for acute behavioural disturbance in psychosis. Adapted from Galletly et al. (2011) [36]

should be consistent with best practice for that particular disorder. When prescribing medication, it is important to note that no medications are approved by regulatory bodies for the specific indication of treating aggression [39]. Therefore, a prisoner with psychosis and aggression may require antipsychotics, a prisoner with depression and aggression may benefit from a selective serotonin reuptake inhibitor, while a prisoner with bipolar features and aggression may be suited to a mood stabiliser. For psychotically driven aggression, as an example, initial management should follow a standard treatment algorithm such as that depicted in Fig. 3 (algorithm adapted from the RANZCP’s clinical practice guidelines for first-episode psychosis) [36]. Further targeted medication strategies, as well as important considerations relating to consent and capacity, are explored in more depth in a later section of this article.

A broad approach to management of violence and aggression involves combination of both pharmacological and non-pharmacological strategies (see Table 2). Non-pharmacological approaches with particular utility in the ongoing management of aggressive prisoners are predominantly behavioural or psychological in nature. This includes both

targeted cognitive-behavioural interventions and corrections-modified dialectical behaviour therapy [5, 40]. Moreover, token economies are in widespread use throughout many prisons and have shown benefit in reducing the incidence of violence [41]. However, these topics are beyond the scope of the present article except to identify that an integrated systems approach is preferred, rather than relying exclusively on medication.

3 Pharmacological Approaches

Few studies in the extant literature have specifically looked at pharmacological strategies for managing aggression and violence in the prison setting. A general electronic search was conducted using the databases of PubMed and Google Scholar by entering combinations of search terms relating to “aggression, violence, prison, custodial, medication and pharmacology”. The reference lists of identified articles were further scoured for any additional relevant literature. The available data located is older and primarily considers the use of anticonvulsants and lithium across five

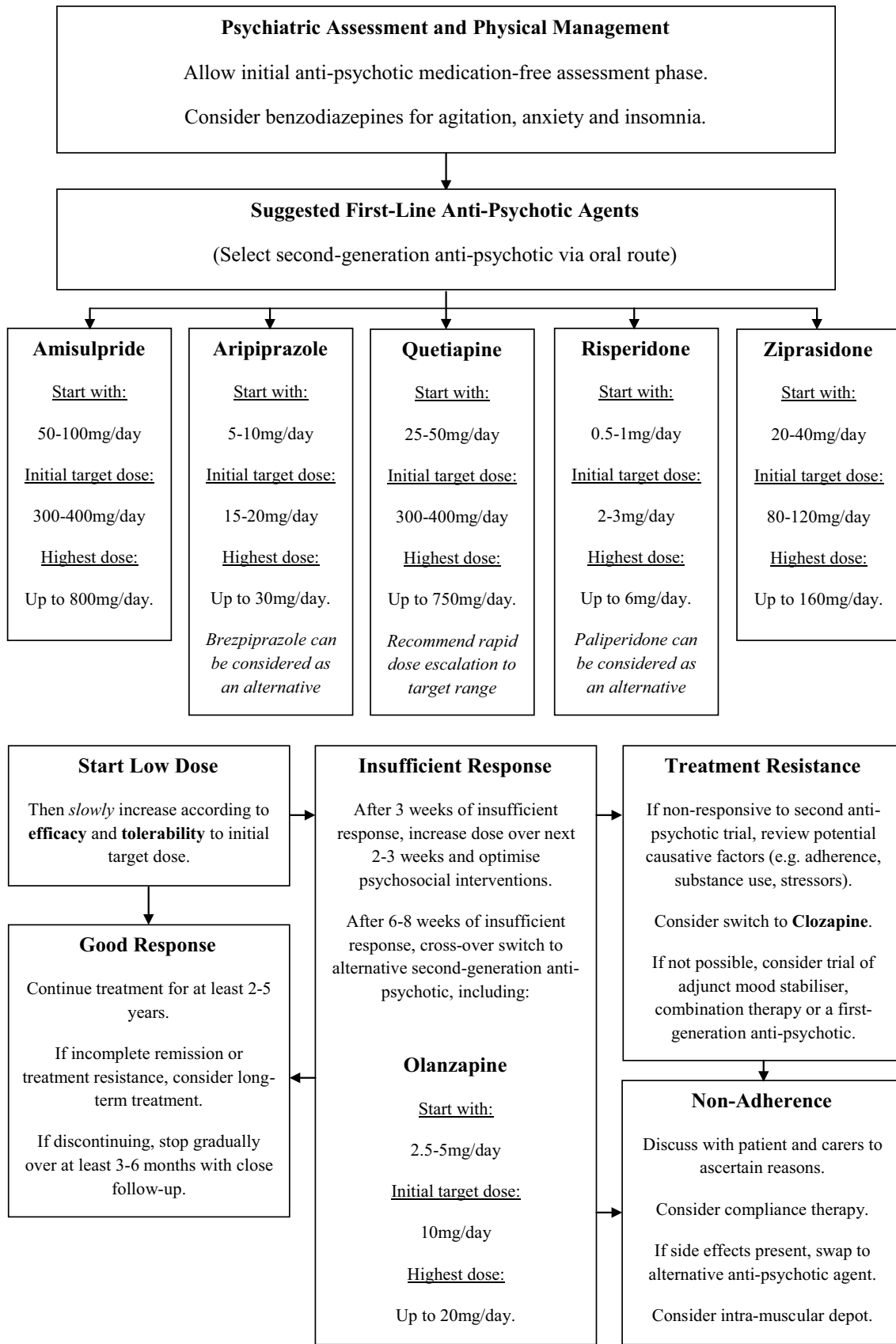


Fig. 3 Pharmacological treatment algorithm for first-episode psychosis. Adapted from Galletly et al. (2011) [36]

Table 2 Management of violence and aggression in prison

Clinical diagnosis	Non-pharmacological approaches	Broad pharmacological approaches
Personality pathology	De-escalation strategies	Benzodiazepines
Antisocial personality disorder	Behavioural management plan	Mood stabilisers
Borderline personality disorder	Anger management	Anti-psychotics
	Dialectical behavioural therapy	
Psychosis	De-escalation strategies	Antipsychotics
	Meta-cognitive therapy	
	Maastricht approach	
Substance-induced syndromes	De-escalation strategies	Benzodiazepines
Intoxication/psychosis	Motivational interviewing	Antipsychotics
Withdrawal	Contingency management	Nicotine replacement therapy
		Opiate substitution (methadone/buprenorphine)
		Acamprosate and naltrexone
Mood disorders	Cognitive-behavioural therapy	Selective serotonin reuptake inhibitors
Depressive disorder	Acceptance and commitment therapy	Mood stabilisers
Manic episode	Interpersonal (and social rhythm) therapy	Antipsychotics
Attention-deficit/hyperactivity disorder	De-escalation strategies	Atomoxetine
	Behavioural management plan	Alpha-2 agonists
	Dialectical behavioural therapy	Stimulants (careful use in prison setting)
Organic pathology	De-escalation strategies	Antipsychotics
Acquired brain injury	Behavioural management plan	Anticonvulsants
Ictal syndromes		
Intellectual disability	De-escalation strategies	Benzodiazepines
	Behavioural management plan	Mood stabilisers
		Antipsychotics

identified studies. Detailed research in prison populations has been constrained by multiple factors: the challenges of gaining ethical approval to study medications in prison populations, concern over increased propensity for litigation by prisoners against prison authorities, and finally the limited funding available for studies using off-label indications or off-patent medications [38].

To briefly summarise the available prison literature, several anticonvulsants have been trialled for managing aggression. Across two double-blinded, placebo-controlled, crossover studies of 13 and 60 Texan prisoners respectively [42, 43], phenytoin use in prison inmates was found to significantly reduce the incidence of impulsive aggressive acts, but made no impact on premeditated aggression. A retrospective cohort study of 168 offenders from Connecticut found divalproex sodium useful for managing impulsive aggression in prisoners, even without the presence of a bipolar affective disorder diagnosis [44]. Mattes [38] argues that the ideal agent for treating aggressiveness in prison is an anticonvulsant with a low side-effect profile, suggesting oxcarbazepine as a preferred

option. This is based on oxcarbazepine having good evidence in temporal lobe epilepsy, which is an association that may potentially be exploited given the likely role of the temporal lobe in aggression [45]. Targeted research to evaluate this assertion would be useful.

Regarding lithium, there is some limited evidence that it may be useful in the management of persistently aggressive prisoners. One prospective non-controlled study of 27 Californian inmates with longstanding history of recurrent violence found that treatment with lithium was effective at both reducing the intensity of angry affect and delaying the aggressive response to provocative stimuli [46]. A double-blind, placebo-controlled study from Connecticut of 66 prisoners with chronic impulsive aggressive behaviour found that prisoners treated with lithium had significantly fewer behavioural infractions while receiving treatment [47]. However, lithium use has seemingly fallen out of favour due to difficulties around monitoring and its side-effect profile [38].

Given this limited prison-specific literature, an evidence-based approach for managing aggression and violence in the prison setting must draw inferences from both the forensic

and the general psychiatric literature. Indeed, extensive translational research indicates that there is good evidence for atypical antipsychotics, anticonvulsants and lithium in the management of aggressive behaviour [13, 39]. It is also not unreasonable to extrapolate the findings from strategies employed in a forensic health facility to the non-therapeutic prison environment, although with the added need to consider practicalities around clinical oversight and monitoring. A number of other special considerations for the prison context will be detailed later in this paper. It must be reinforced that prescription of psychotropic medications is generally not indicated in the absence of a major mental illness. In particular, medical management (i.e. chemical restraint) of poor behaviour is not appropriate or justifiable.

Perhaps the one major exception to the principle of following standard psychiatric treatment algorithms in prison is with ADHD. Guidelines for general management of ADHD recommend stimulant medication as the first-line pharmacological treatment [48, 49]. However, this is a controversial topic in the custodial setting, as multiple challenges arise around the prescribing of a controlled substance within a prison environment. This includes risks of diversion, high rates of substance dependence disorders and possible malingering in order to obtain a prescription [50]. As such, it has been proposed that non-stimulant pharmacological approaches for ADHD may be preferred, such as the use of an alpha-2 agonist (e.g. clonidine or guanfacine) and noradrenaline reuptake inhibitor (e.g. atomoxetine) [51]. Appelbaum [50] has proposed a treatment protocol where pharmacological management for ADHD in prison initially involves non-stimulant drugs with the introduction of stimulants only considered after treatment failure with these alternative medications. Again, care must be taken to confirm the diagnosis before prescribing, particularly with regards to ensuring diagnostic criteria are met and obtaining historical evidence of onset of symptoms in childhood [50]. However,

while it is prudent to be mindful of the potential risks with stimulant use, undertreatment of the disorder is associated with high morbidity and increased risk of problematic behaviours such as violence and aggression. As such, clinicians should be wary of denying patients effective treatment.

The level of acuity of the violence also guides the type of pharmacological approach. Table 3 lists the recommended pharmacological avenues to explore based on level of acuity for common conditions associated with prison violence. Most institutions will have a preferred rapid tranquilisation protocol, which will list oral and intramuscular agents with rapid onset of effect to provide acute de-arousal. These medications most commonly belong to the benzodiazepine and antipsychotic classes. Longer-term approaches make use of medication regimens that are considered gold standard for the disorder in question, such as clozapine for schizophrenia, lithium for bipolar disorder or a selective serotonin reuptake inhibitor for depression. In a certain subsection of aggressive prisoners with a persistent underlying psychotic illness, the use of long-acting injectable antipsychotics may need to be considered. Treatment adherence is identified as one of the few modifiable risk factors for aggression and there is evidence that use of a regular antipsychotic depot can effectively reduce incidence of aggression in the setting of non-compliance [52].

The use of rapid tranquilisation in prisons is controversial, due to safety concerns. Only doctors who have previously been involved with and reviewed the individual should prescribe such medications. Furthermore, if medication has been given, close post-administration monitoring of effect is needed with particular care around respiratory functioning and conscious levels. This should properly be done by a trained health professional, which may be difficult to safely instigate in prison and therefore may necessitate transfer to an appropriate health facility (whether inside a prison or externally) [53]. Local policy may mandate for the transfer

Table 3 Pharmacological approaches to aggression and violence in prison based on acuity

Acute conditions	Pharmacological strategies
Acute psychosis	Rapid tranquilisation protocol
Substance-induced pathology	Manage withdrawal (e.g. benzodiazepines, methadone, antipsychotics)
Attention-deficit/hyperactivity disorder (ADHD)	Alpha-2 agonist Noradrenaline reuptake inhibitor
Aggression secondary to personality disorder	Rapid tranquilisation protocol
Non-acute conditions	Pharmacological strategies
Long-term management of psychosis	Clozapine
Long-term management of bipolar affective disorder	Lithium
Long-term management of depression	Selective serotonin reuptake inhibitor Serotonin-noradrenaline reuptake inhibitor
Epilepsy	Optimise anticonvulsant cover (involve neurologist)

of any prisoner administered a rapid-acting tranquiliser to a healthcare facility.

Finally, when prescribing psychotropic medications in prison, it is important to be mindful of the risks of diversion, abuse and dependence. Psychotropic agents with particular potential for misuse include benzodiazepines, bupropion, pregabalin, gabapentin and quetiapine [54]. The high rates of pre-existing substance dependence in prisoners can lead to prisoners seeking out prescription medications to fulfil their dependency needs [54]. Moreover, due to restricted access to illicit substances, prescription medications frequently obtain a high market value between prisoners and this can incentivise drug-seeking behaviours. A separate issue is iatrogenic dependence, with the open-ended prescription of benzodiazepines for aggression being particularly high risk. These potential harms may be reduced by awareness of the risks, judicious prescribing, close monitoring and time-limited use wherever possible [54].

4 Special Considerations

4.1 Legal Framework

Although prisoners are deprived of certain rights by the act of incarceration, the protection of their fundamental human rights is enshrined in international law. The United Nations' International Covenant on Civil and Political Rights mandates that prisoners are treated with humanity and respect [55] and the United Nations Standard Minimum Rules for the Treatment of Prisoners states that all prisoners should have access to psychiatric care [56]. Both prison and health staff have an obligation to ensure these rights are respected. The Standard Minimum Rules also stipulate that individuals cannot be detained in prison for specialised mental health treatment [56]. Consequently, in most jurisdictions, prisoners can only receive psychiatric treatment on a voluntary basis while in the prison setting. This means prisoners should not be treated against their will. Prisoners refusing treatment as a result of their illness will therefore need to be assessed according to the criteria of the local mental health legislation, before potentially being transported to an appropriate therapeutic facility if involuntary treatment is justified. The subsequent continuation of involuntary treatment in prison, either in the form of oral medication or long-acting injectables, may need approval under a community management order as sanctioned by the relevant mental health tribunal or similar authority.

For a patient to receive treatment voluntarily, they must satisfy the key criteria of capacity and consent. A flowchart of the suggested decision-making algorithm is depicted in Fig. 1. Capacity is defined as the ability of

a person to understand, synthesise, weigh up and retain information regarding a particular medical decision and then communicate this decision in a consistent way [57]. Capacity is always decision-specific, meaning that an individual can retain capacity for certain care decisions but not others. A patient who is found not to have capacity to make a particular decision may need a substitute decision maker chosen for them. This process is likely to differ significantly between legal jurisdictions, but involves the appointment of a guardian who will then make the treatment decision on behalf of the prisoner. In situations where a guardian may be required and there is sufficient clinical urgency to act before a guardian can be appointed, most jurisdictions have capacity for urgent intervention to proceed using duty-of-care principles such as two-doctor consent. An urgent guardianship application should then be conducted to decide the ongoing direction of treatment. This process is analogous to what would occur for a member of the general community who is deemed to not have medical decision-making capacity.

The second criterion for voluntary treatment is the provision of informed consent. This is a fundamental ethical principle in medicine that speaks to the right of individuals to bodily autonomy, such that they can control their own treatments. Informed consent requires a health professional to convey relevant information about the nature, risks and likely outcomes of a certain treatment and that the patient is able understand and use this information to make a decision that is free from coercion [58]. Unfortunately, prisons have historically had a chequered history of upholding this right [1]. If a patient does not consent to treatment, the clinician must assess whether the patient's ability to consent is impaired by the presence of a psychiatric disorder. For example, the refusal of treatment may be due to severe negative cognitions in depression or delusional beliefs in psychosis. If this is the case, consideration must be made as to whether the patient meets local criteria for a psychiatric admission or compulsory community-based treatment.

Nevertheless, such a process of considered assessment may not always be practical. Certain acute incidents of aggression and violence can result in emergency situations where it is unsafe or impossible for a formal capacity or psychiatric assessment to occur before intervention is required. Intervention must then proceed according to local correctional protocol, which is likely to be carried out by prison officers and precede involvement of health professionals. Unfortunately, these situations are likely to involve the use of physical restraint [53]. In all such cases where acute violence has prevented sufficient time for a full assessment, principles of duty-of-care should be diligently followed.

4.2 Intellectual and Cognitive Ability

Prison environments contain significant numbers of inmates with impaired intellectual and cognitive functioning. A large meta-analysis has suggested that the prevalence of intellectual disability in prison is between 0.5–1% [59]. Although not proportionally higher than in the general community, it is an important sub-population that can pose a number of management challenges. For example, individuals with intellectual disabilities can have difficulties with self-control, anger management and aggression [60], which are all risk factors for violence.

Even more so than in general prison psychiatry, the preferred interventions for managing violence and aggression in this population are psychological and behavioural approaches, such as self-control training or anger management [60]. Frequently, challenging behaviours such as violence and aggression are a direct result of the individual's cognitive ability rather than a separate pathology [61]. However, if thorough assessment of an individual also reveals a co-morbid psychiatric diagnosis, optimising pharmacological management may be at least partially effective in reducing these problematic behaviours. This is the "behaviour versus diagnosis" dilemma and is a particularly challenging assessment task for clinicians [61].

Use of psychotropic medication in this population should be undertaken with caution, as there is an increased likelihood for individuals with intellectual disability to exhibit idiosyncratic responses to medications and greater sensitivity for side effects [61]. These paradoxical reactions may include causing or exacerbating aggression and violence, particularly from benzodiazepine and antipsychotic use. Another relevant concern relates to antipsychotics, which can lower the seizure threshold, as intellectual disability is already associated with higher seizure risk [60]. Furthermore, peri-ictal states can be associated with aggression and violence in their own right. As such, the principle for using psychotropic medication in intellectual disability should be one of therapeutic scepticism with cessation of treatment if no clear benefit is demonstrated.

4.3 Special Populations

4.3.1 Cultural Considerations

It has been well established across many countries that disadvantaged populations, such as indigenous people or other ethnic minority groups, often have significantly higher incarceration rates than the general population [62]. This population is highly vulnerable, as there may be a language barrier, lack of familiarity with the dominant cultural practices, poor awareness of legal rights and even ingrained discrimination.

Many ethnic minority populations also have increased rates of mental illness [63].

Misdiagnosis of odd or problematic behaviours, including violence and aggression, is unfortunately a recognised problem [64]. It is important as incorrect diagnosis leads to ineffective treatment strategies and persistence of the underlying issues. Psychiatric disorders are not purely biological entities, with sociocultural factors equally important components. Cultural variations in phenomenology and the presence of certain culture-bound syndromes can lead to misattributions of diagnosis. This is perhaps especially fraught in psychosis, with evidence to suggest that brief reactive psychosis is frequently misdiagnosed as schizophrenia in certain minority groups [64]. More nuanced formulation of the aetiology of aggression and violence in culturally diverse populations may favour use of non-pharmacological approaches, such as use of community members or traditional healers. Moreover, use of interpreters or cultural-liaison in the assessment phase may afford similar benefits. It is important to understand an individual's behaviour in a cultural context and also consider that incarceration removes an individual from their cultural context and community, potentially exacerbating their underlying mental state. A reduction in the rate of aggression and violence may be achievable by remaining mindful of this issue through ensuring culturally appropriate care of prisoners.

4.3.2 Adolescent Populations

Incarceration of minors is an important issue. Behavioural disturbance is common in this population and is often driven by factors such as developmental and attachment trauma. Use of psychotropic medications in the general adolescent population is a controversial area, as there is evidence to suggest that medication classes such as antidepressants do not have the same level of efficacy as for adults and may have increased rates of side effects, including suicidal thoughts [65]. Issues around parental consent can also be challenging. In general, it is recommended that management be primarily focused on non-pharmacological strategies with limited and highly judicious use of psychotropic medications if absolutely necessary.

5 Physical Health Considerations

It is also important to consider the potential for behavioural disturbance and aggression as a result of physical illnesses. As detailed previously, important examples include epilepsy, acute confusional state (delirium) and substance withdrawal or intoxication [26–28]. Close collaboration with primary health and physician services within prison are essential to screen for such disorders

and treat where appropriate. Appropriate treatment of these underlying conditions can improve symptoms of aggression and violence without the need to resort to use of psychotropics.

Substance use disorders are highly problematic within prison populations, with the prevalence at the point of entry estimated to be between 10% and 48% for male prisoners and 30% and 60% for females [66]. Surprisingly, despite these high rates, many prisons do not have dedicated detoxification facilities or programmes [67]. There is strong evidence for the use of opioid-substitution programmes for the treatment of opioid dependence in prison [68], including reduction in mortality, incidence of blood-borne infections and recidivism following release. Moreover, use of substitution therapy results in fewer problematic behaviours, including violence and aggression [68]. Careful screening for symptoms of dependence and supervised administration can help reduce the diversion and over-prescription risks that have been previously discussed in the context of stimulant use. Moreover, for newly incarcerated individuals who are tobacco smokers, it is important to consider nicotine replacement therapy due to the potentially significant impact nicotine withdrawal may have on agitation or aggression [35].

Another key consideration for the physical health of violent individuals is the requirements for ongoing monitoring for those prescribed psychotropic medication. Of particular concern is the metabolic syndrome associated with atypical antipsychotics [36]. Use of these medications on a regular basis requires close attention to be paid to parameters such as blood pressure, waist circumference, body-mass index and lipid profile. Medications such as clozapine and lithium require more detailed monitoring to prevent cardiac and renal toxicity, respectively, as well as monthly testing for agranulocytosis with clozapine. Regular general health check-ups are required for any patient in prison who is commenced on a psychotropic medication to control aggression and violence. Again, local guidelines should be consulted; however, at a minimum, this should occur at least 6-monthly.

6 Future Directions in Research

Plainly, dedicated research into the management of aggression and violence in prison populations is required to help clarify current knowledge and ensure applicability of recommendations. Many recommendations have been extrapolated from existing evidence developed in other settings that are fundamentally therapeutic in nature. At a local level,

development of formal guidelines in each legal jurisdiction will be of great benefit in guiding practice for clinicians.

7 Conclusions

The provision of psychopharmacological intervention for violence and aggression is more complex in prison settings than in therapeutic environments. Clear assessment for the presence of major mental illness is crucial, with appropriate pharmacological interventions being targeted and time-limited. Optimisation of general psychiatric care may be an important preventer of aggressive behaviour. There are naturally differences across international borders, and the broad principle is to act according to the prevailing legislation in the relevant jurisdiction. However, in most jurisdictions, prisoners can only be treated on a voluntary basis whilst in the prison setting. It is therefore vital to establish both capacity to understand treatment and consent prior to use of medication. Acute violence and aggression secondary to psychiatric illness may necessitate transfer of a prisoner to an appropriate healthcare facility. Problematic behaviour alone should not be managed with pharmacotherapy, and clinicians must be mindful of protecting patient rights.

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