

## ARTICLE

# Assessment of coexisting psychosis and substance misuse: complexities, challenges and causality

Rajan Nathan & Emily Lewis

**Rajan Nathan**, MBBCh, MMedSc, MRCPsych, DipFSc, MD, is a consultant forensic psychiatrist and Director of Research and Effectiveness at Cheshire and Wirral Partnership NHS Foundation Trust. He is also an Honorary Senior Research Fellow at the University of Liverpool, Visiting Professor at the University of Chester, and Adjunct Professor at Liverpool John Moores University, UK. Through his clinical work over more than two decades in secure hospitals, prisons and the community he has gained extensive experience in the assessment and management of coexisting mental illness and substance misuse and more recently he established and delivered a community dual diagnosis service. **Emily Lewis**, MBChB, MRCPsych, is a trainee psychiatrist with Health Education North West and is currently working at Cheshire and Wirral Partnership NHS Foundation Trust, UK. She is gaining experience and an interest in the acute care setting, where coexisting psychosis and substance misuse are ubiquitous.

**Correspondence** Professor Rajan Nathan. Email: [taj.nathan@nhs.net](mailto:taj.nathan@nhs.net)

First received 3 Apr 2020  
Final revision 25 May 2020  
Accepted 11 Jun 2020

**Copyright and usage**  
© The Authors 2020

## SUMMARY

Substance misuse worsens the prognosis for people suffering psychosis and places them at risk of being denied appropriate mental health service interventions. To increase the chances of its success, the plan of management for patients with coexisting psychosis and substance misuse should be based on a valid formulation of their problems, which in turn is dependent on the clinician having (a) a thorough understanding of the bidirectional and changing ways that substance use and mental illness symptoms can interact, (b) an awareness of their own biased implicit assumptions about causality in explaining these interactions and (c) a framework for assessment and formulation. This article addresses these three areas with reference to the evidence base and to clinical experience in a way that guides mental health clinicians in the assessment of patients with coexisting psychosis and substance misuse.

## LEARNING OBJECTIVES

After reading this article you will be able to:

- understand the complex and two-way causal interactions between substance use and mental illness symptoms or mental disorder
- apply a framework of assessment and formulation for patients with coexisting psychosis and substance misuse
- consider how your approach to assessing coexisting psychosis and substance misuse influences the quality of the information derived from the assessment

## KEYWORDS

Dual diagnosis; psychosis; substance misuse; alcohol disorders; comorbidity.

A substantial proportion of patients presenting with first-episode psychosis meet the criteria for a substance use disorder diagnosis (Brunette 2018) and among those with a substance use disorder there is an increased risk of psychotic symptoms (Brown 2019). The prognosis for people with mental illnesses (including schizophrenia) is markedly worse when there is co-occurring substance misuse

(Pinderup 2018; Khokhar 2018). Despite their greater need, individuals with this mix of problems are more likely to be denied access to appropriate services, which in itself is a plausible contributory factor to the poorer outcomes (Public Health England 2017). Improved approaches to the treatment of patients with a combination of mental illness and substance misuse have been called for (Public Health England 2017). Individualised intervention plans should be based on a formulation of the problems. A necessary condition for a proper assessment and formulation of problems in patients experiencing symptoms of mental illness who use substances is a thorough understanding of the relationship between symptoms/illness and substance use. The way the assessment is undertaken is critical to the quality of information that is derived for use in the process of formulating the problems. It can also have an impact on the patient's engagement with services. This article both describes the complex relationships between mental illness and substance use and presents some practical guidance about how to carry out the assessment of patients with both problems.

Substances are taken to meet needs and acquire benefits (Blevins 2016; Patrick 2016). Specific reasons include getting high, relaxing, reducing negative feelings, responding to peer pressure and engaging in a social activity. In a state of active dependence, repeat substance use is also motivated by a desire to avoid or dampen withdrawal symptoms. Mental illness and substance use co-occur more often than by chance and this co-occurrence can be explained in several ways (Dyer 2019; Petersen 2019). First, using substances increases the risk of symptoms of mental illness via psychosocial or biological processes. Second, symptomatic, psychosocial and neurobiological correlates of mental illness contribute to an increased likelihood of misusing substances. Third, there may be shared risk factors. The different explanations are not mutually exclusive and in many cases there will be multiple and bidirectional effects between mental illness and substance misuse that change over time.

The following exposition of the different ways in which substance misuse and mental illness symptoms may be causally related distinguishes processes as if they were clearly defined and distinct. Although isolating processes may be justified for descriptive purposes, in reality they are overlapping, and it is a better representation of mental processes to conceptualise their causal influence as if they were directional currents rather than distinct vectors. The focus of the article is on psychosis and substance use, although the principles of assessment and formulation apply to co-occurrence of other psychiatric symptoms/disorders with substance use.

### Relationship between substance use/misuse and mental illness symptoms/mental disorder

#### *Mental state changes secondary to substance use*

The use of an illicit substance usually induces acute mental state changes. These are commonly anticipated and desired. Substance use can also lead to adverse effects on the user's mental state (Table 1). Substances that are commonly associated with psychotic experiences in clinical settings include cannabis, synthetic cannabinoids, stimulants (amphetamines, methamphetamines and cocaine) and hallucinogens (Weibell 2016). Psychosis can also occur in association with misuse of inhalants (Mustonen 2018), nitrous oxide (Chien 2020), ketamine (Huang 2020) and steroids (Hall 2005).

The relationship between alcohol use and psychosis is more complex, since psychotic symptoms are a recognised feature of alcohol withdrawal, hallucinations can develop in chronic use (alcoholic hallucinosis) and there are rare reports of idiosyncratic reactions to acute use in which psychotic symptoms occur (Brown 2019). Psychotic symptoms can also be a feature of benzodiazepine withdrawal, and they have been reported in acute intoxication with benzodiazepines (Brown 2019). Acute use of, or withdrawal from, opioids is not generally associated with psychosis (although exceptions have been described) (Freudenreich 2020). To the contrary, the available evidence suggests that opioid agonists can have a positive therapeutic effects on psychosis (Maremmanni 2014, Maremmanni 2020). The explanations for mental state changes secondary to substance use are varied (Table 2).

#### *Substance-induced first episode or relapse/exacerbation of symptoms*

In addition to triggering a first episode of symptoms in an individual who was symptom free or a relapse in a person with a history of mental disorder,

substances may amplify existing symptoms, leading to greater distress and/or dysfunction. Amplification may occur as a result of the direct effects of the substance or because of a more general disinhibiting effect on underlying emotions and urges.

#### *Substance-related increased risk of mental disorder*

Aside from immediate effects of substances on an individual's mental state, substance misuse increases the likelihood of subsequently developing schizophrenia (Nielsen 2017). The effects of substances may differ depending on the developmental stage in which the substance is used. For instance, adolescents appear to be more vulnerable to the adverse effects of cannabis and cannabis use in this period may disrupt normal neurodevelopment (Volkow 2016; Oldani 2019).

It may be assumed that a drug has induced or exacerbated an abnormal mental state if the mental state disturbance arises soon after the substance is taken and resolves once the level of the active metabolites has diminished sufficiently (Ghose 2018). However, it does not necessarily follow that the episode is wholly attributable to the substance, since not all individuals have the same vulnerability to those effects (Engh 2017). The current evidence suggests that individuals who experience drug-induced psychotic episodes are at an increased risk of developing a psychotic disorder (Alderson 2017; Ghose 2018). Thus, about one-third of patients who experience a drug-induced psychosis go on to meet the criteria for a schizophrenia spectrum disorder or bipolar disorder, not having met the criteria for these diagnoses before (Ghose 2018). Further, there is recent evidence of a shared familial and genetic risk between drug-induced psychosis and schizophrenia. Therefore, rather than drug-induced psychosis being conceived of as a stand-alone entity, it is better represented as a manifestation of an underlying vulnerability and a potential risk indicator for a future psychotic illness (Ghose 2018).

#### *Substance-induced non-psychotic mental state changes*

As well as increasing the likelihood of psychotic symptoms, substance use often triggers non-specific unpleasant mental state changes (such as negative affect or dissociative experiences). These lead to increased stress, which is a risk factor for worsening of pre-existing symptoms and/or may reduce tolerance to symptoms. Cognitive impairment associated with substance misuse can further complicate the clinical presentation (Toledo-Fernández 2018).

**TABLE 1** Effects of commonly misused substances

Substance	Signs of intoxication	Withdrawal	Psychiatric symptoms associated with acute use/intoxication	Psychiatric symptoms/disorder associated with chronic use
Alcohol	Disinhibition, increased sociability, mood lability, impaired judgement, slurred speech, incoordination, unsteadiness, impaired attention and memory, nystagmus, aggression	Sweating, tachycardia, tremor, insomnia, nausea, vomiting, hallucinations, illusions, agitation, anxiety, confusion, seizures	Psychotic symptoms, mood disturbance, anxiety, antisocial behaviour, cognitive impairment, alcohol-induced amnesia, stupor	Depressive disorder, anxiety disorders, alcoholic hallucinosis, psychotic disorder, cognitive impairment, Wernicke–Korsakoff syndrome
Cannabis	Euphoria, conjunctival redness, increased appetite, dry mouth, tachycardia, impaired motor coordination, relaxation	Anxiety, irritability, restlessness, anger, sleep disturbance, depressed mood, nausea, reduced appetite	Psychotic symptoms, acute anxiety/panic attack, depressive symptoms, depersonalisation, derealisation	Schizophrenia /exacerbation of psychotic disorders in vulnerable people, increased risk of depressive disorder, neurocognitive impairments (memory, attention), anxiety disorders <sup>a</sup>
Hallucinogens	Perceptual changes (e.g. intensification, synaesthesia, illusions, hallucinations), mood swings, incoordination, tremor, sweating, pupillary dilatation, tachycardia, numbness/diminished responsiveness to pain	No withdrawal symptoms recognised	Psychotic symptoms, anxiety, depressive symptoms, depersonalisation, derealisation	Flashbacks, hallucinogen-persisting perception disorder, psychotic symptoms
Inhalants	Rapid euphoria, dizziness, blurred vision, nystagmus, incoordination, unsteady gait, slurred speech, muscle weakness, lethargy, drowsiness, disinhibition	Similar features to alcohol withdrawal in very heavy regular users	Psychosis, stupor, confusion, impaired memory	Cognitive impairment (varying from mild to dementia), anxiety disorders, depression, psychotic symptoms
Opioids	Initial euphoria followed by apathy and dysphoria, psychomotor agitation or retardation, pupillary constriction, slurred speech, relaxation, drowsiness, impairment of attention or memory	Dysphoria, nausea or vomiting, diarrhoea, myalgia, rhinorrhoea, piloerection, sweating, yawning, fever, insomnia	Cognitive impairment, stupor	Cognitive impairment, depression <sup>a</sup>
Sedatives, hypnotics and anxiolytics	Impaired judgement, slurred speech, incoordination, unsteadiness, behavioural changes (e.g. sexual or aggressive behaviour), labile mood	Prominent anxiety and autonomic hyperactivity, insomnia, transient visual/tactile/auditory/kinaesthetic hallucinations or illusions, tremor, nausea or vomiting, psychomotor agitation, seizures	Cognitive impairment, stupor	Cognitive impairment, depression <sup>a</sup>
Stimulants	Euphoria, increased energy, increased confidence, decreased appetite, autonomic hyperactivity	Irritability, sleep disturbance (hypersomnia or insomnia), fatigue, increased appetite, anxiety, low mood, poor concentration	Psychosis, mania, post-use anxiety and depressive symptoms	Psychotic disorder, anxiety disorder, mood disorder, cognitive impairment

a. Reported but the evidence base is inconsistent.

### Substance-related impairment of functioning and physical health, leading to negative mental experiences

An individual who is misusing illicit substances is at increased risk of non-adherence with treatment and disengagement from support services, leading to reduced mental stability (Dixon 2016; Foglia 2017). Substance misuse, particularly if regular, increases the likelihood of physical ill health (e.g. liver disease) and social, occupational and relationship problems, which in turn may be associated with distress and mental health problems (Hall

2016). The latter can be manifest in the form of a first episode of mental illness or the destabilisation of an existing mental illness.

### Cessation of substance-related amelioration of symptoms

In rare cases, the cessation of substance use may lead to a deterioration in the patient's mental functioning. For example, there have been reports (and R.N. has clinical experience) of patients with psychosis who have reported a reduction in symptoms

**TABLE 2** Proposed mechanisms explaining adverse mental state changes secondary to substance use/misuse

Mechanism	Description
1 Substance-induced first episode of symptoms	The physiological effects of the substance trigger <i>de novo</i> symptoms
2 Substance-induced relapse	The physiological effects of the substance trigger a relapse of symptoms that have previously been experienced
3 Substance-induced exacerbation of symptoms	The physiological effects of the substance exacerbate existing symptoms
4 Substance-related increased risk of mental disorder	The use of substances increases the risk of future mental disorder 'caseness'
5 Withdrawal-state symptoms	Symptoms and signs of a physiological change associated with cessation of the substance in the context of dependence
6 Substance-induced non-psychotic mental state changes	The physiological effects of the substance triggers (or exacerbates) adverse mental phenomena (aside from any effect on symptoms)
7 Substance-related reduction in engagement/adherence	Mental state deterioration due to the reduction in engagement with support and adherence to treatment resulting from the effects of lifestyle changes associated with substance use/misuse
8 Substance-related impairment of functioning and physical health, leading to adverse mental experiences	Adverse mental experiences due to impairment of physical health, relationships, occupational and social functioning consequent on substance use/misuse
9 Cessation of substance-related amelioration of symptoms	Mental state deterioration due to the absence of the dampening effects of substance use on symptoms following cessation of substance use

while taking opioids going on to experience a persistent relapse with onset soon after they start abstaining (Cobo 2006). For this reason, close monitoring is recommended for patients with coexisting psychosis and substance misuse for whom withdrawal of opioid substitution treatment is planned.

### *Substance use secondary to mental state/functioning characteristics*

The direction of causality can also run from mental health factors to substance use and misuse (Table 3). Self-medication is a commonly reported explanation for substance use secondary to mental state disturbance (Torres 2016). It includes a pattern of taking the substance with the intention of reducing symptom intensity and/or symptom-related distress. This may be via a direct effect on symptoms (which include withdrawal symptoms) or an indirect effect by making the individual less distressed or concerned about the symptoms. This article focuses on psychotic symptoms co-occurring with

substance misuse, but it is important to remember that other mental health problems (e.g. attention-deficit hyperactivity disorder and post-traumatic stress disorder) may increase the propensity to use (or misuse) substances (Head 2016; Groenman 2017; Mergler 2018).

The term self-medication can be extended to include a broader range of reasons for substance use as a consequence of mental state disturbance. For example, substance use may be motivated by a desire to reduce negative affect secondary to non-symptom consequences of the mental disorder such as social and interpersonal problems (Fresán 2018). Also, substances may be taken with the intention of ameliorating the side-effects of psychotropic medication. Substance use in response to anti-psychotic-induced dysphoria is one suggested mechanism for which there is some empirical support (Awad 2016).

Mechanisms other than self-medication have been presented to explain the increased propensity for drug use among people with schizophrenia. Impulsivity

**TABLE 3** Proposed mechanisms explaining substance use/misuse secondary to mental state disturbance

Mechanism	Description
1 Self-medication of mental illness symptoms	Use of substance with intention of ameliorating symptoms
2 Self-medication of withdrawal symptoms	Use of substance with the intention of ameliorating withdrawal symptoms
3 Self-medication of non-symptom correlates of mental state disturbance	Use of substance with intention of ameliorating non-symptom adverse mental experiences (e.g. negative affect arising from psychosocial problems)
4 Self-medication of medication side-effects	Use of substance with intention of ameliorating adverse effects of prescribed medication
5 Activation of psychological risk factors for substance misuse	Use of substance because the psychological risk factors for substance use have been activated by a mental state disturbance
6 Substance use secondary to mental health-related lifestyle changes	Use of substance because of change in lifestyle secondary to effects of mental ill health on functioning

and its subfacet, negative urgency (a tendency to act rashly in negative affect states), which are risk factors for substance misuse (Smith 2016; D'Agostino 2019), have been found to be increased in schizophrenia (Hoptman 2016). Recent studies point to the possibility that neurobiological changes in schizophrenia increase proneness to substance misuse (Dyer 2019; Petersen 2019).

### **Shared risk for psychiatric disorder and substance misuse**

There is empirical evidence for shared genetic risks across different psychiatric diagnostic categories, including alcohol and drug misuse (Carey 2016; Pettersson 2016). More specifically, substance misuse and schizophrenia have been shown to have a shared genetic liability (Hartz 2017). If such liability is manifest initially in adolescent substance use, this use may increase the vulnerability to both later substance misuse and psychosis (Khokhar 2018), illustrating the interactive and dynamic nature of the relationship between substance use and psychosis.

Similarly, stress (arising from early adversity and/or more recent life events) is both a shared risk factor for psychosis and substance use (Mizrahi 2016; Valentino 2019; Kisely 2020) and a risk factor that may, in combination with substance use, cumulatively increase the risk of psychosis (Arranz 2018). A history of multiple acute and chronic adverse experiences over the life course (e.g. trauma, deprivation, homelessness, loss and abandonment) may compromise mental health and personality functioning over and above the increased risk of psychosis and substance misuse (Padgett 2012).

It has been proposed that individuals who are at risk of antipsychotic-induced dysphoria (which is a risk factor for self-medication with substances) are also at increased risk of substance misuse, indicating a very specific type of shared risk underpinning coexisting psychosis and substance misuse (Awad 2016). Certain personality traits (such as neuroticism) have been found to be associated with both schizophrenia and substance misuse (Ohi 2016; Rogers 2018).

### **Assessment approach for coexisting psychosis and substance misuse**

The assessment of patients with co-occurring psychiatric psychopathology and substance use should be informed by a recognition of the potential complexities in the relationship between substances and symptoms (Avery 2017; Givon 2019). It follows from the earlier description of the multiple and bidirectional explanatory processes that the oft-assumed categorical dichotomy between, on the one hand, a substance-induced mental/behavioural

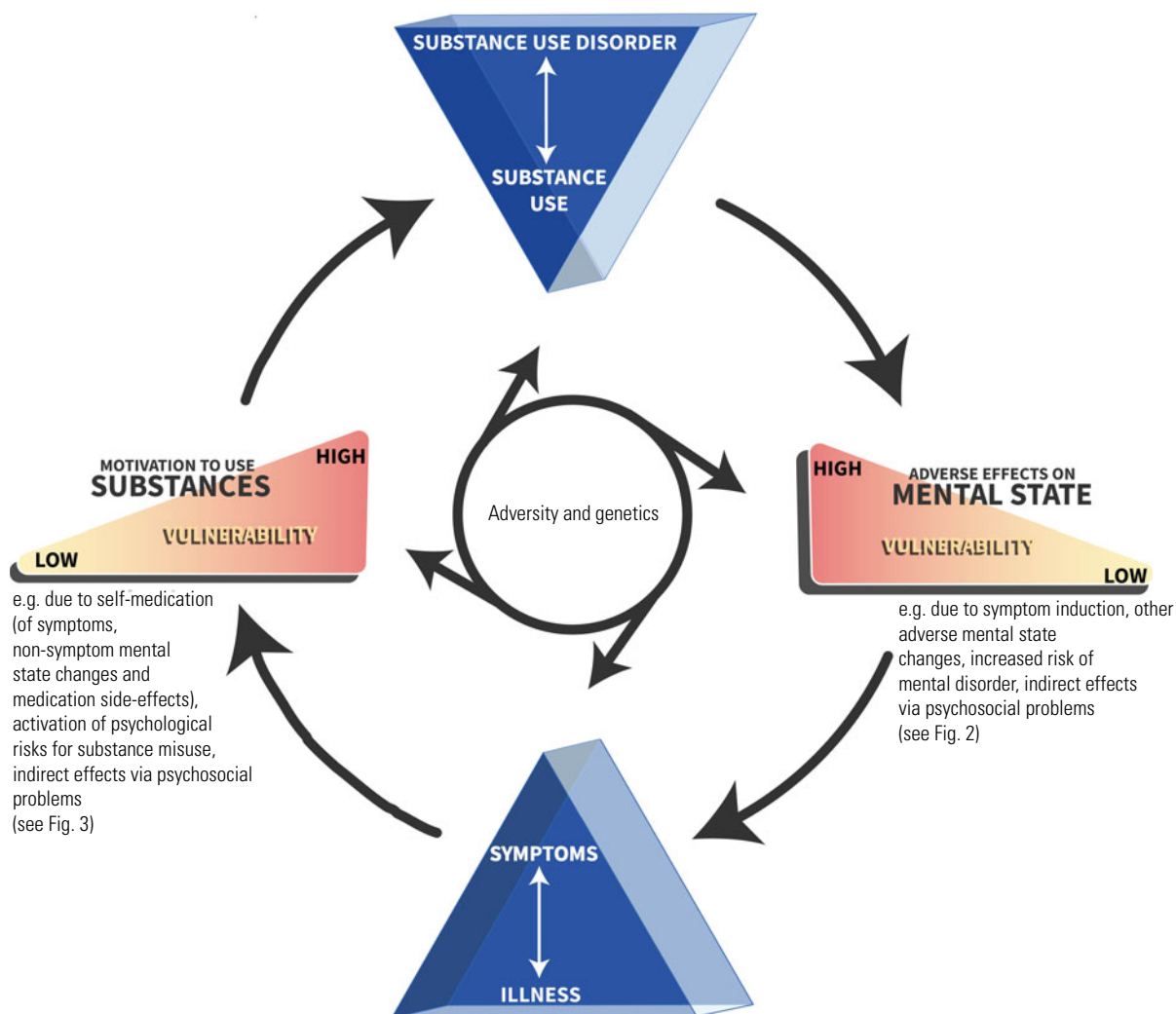
condition and, on the other hand, a so-called primary mental illness that coexists with (but is not caused by) substance use is in many cases likely to be a gross oversimplification. Questions have even been raised about whether the reductionist basis of the term dual diagnosis misleads the clinician into seeing a straightforward relationship between substance use and mental illness where it usually does not exist (Pycroft 2016). A pictorial representation of the problem (such as that presented in Fig. 1) can help the clinician keep in mind the dynamic nature of the relationship between use/misuse and symptoms/disorder.

The second implication of accepting the complexity is that even a thorough assessment may not lead to an unambiguous depiction of the nature of the relationship (Ghose 2018; Brown 2019). Nevertheless, the clinician should endeavour to explore for the different mechanisms that explain the relationship, so that an informed formulation can guide the best clinical approach.

Building a longitudinal account of the relationship over time between substance use and mental illness symptoms may shed some light on directions of causality (Givon 2019). The prototypical drug-induced picture (which is accounted for by explanatory processes 1, 2 and 3 in Table 2) comprises a clear sequence from drug use to onset or worsening of symptoms and then symptom remission following drug abstinence. However, if there is an opportunity for a comprehensive assessment in everyday practice, such a picture often still does not come into clear focus. This may be because the complex bidirectional influences that are commonly present in the same patient confound such a straightforward unidirectional formulation. The clinician's focus on 'what came first' can come to unhelpfully dominate the assessment, at the expense of understanding the patient's needs (Hawkins 2004). However, it is essential to identify those occasional cases where there appears to have been a discrete time-limited episode of symptoms following the use of a substance that is known to induce psychosis.

Research into the differences between substance-induced conditions and primary mental illness has found evidence of substantial overlap of psychopathology (Pauselli 2018; Wearne 2018), suggesting that symptom profile alone has limited value in delineating the explanatory formulation.

A good theoretical understanding of the topic under consideration and the collation of as much relevant information as possible are necessary conditions for any psychiatric assessment, but they are not sufficient. Attention must also be paid to subjective aspects of the assessment process, particularly for patients who are at risk of being excluded from services (Green 2019). Stigma, negative attitudes



**FIG 1** Pictorial representation of the interaction between substance use/misuse and mental illness symptoms/disorder.

and the nature of the relationship between practitioners and patients are all potential barriers impeding access to appropriate services for patients with coexisting psychosis and substance misuse. To reduce the potential effect of these factors, as well as developing an improved explicit understanding of coexisting psychosis and substance misuse, clinicians should reflect on how certain implicit processes may influence their therapeutic stance and approach to formulation. Of particular importance to clinical scenarios where co-occurring problems interact with each other (such as in coexisting psychosis and substance misuse) are implicit causal assumptions that influence the clinician's judgements about the nature of the interaction between the problems.

### *Biased causal assumptions*

An innate predisposition to understanding cause and effect can be traced to the survival advantages of the consequent ability to make anticipatory evaluations of one's environment and, specifically, to

make general predictions about future events (Stuart-Fox 2015). Although making sense of the complex interrelationship between a large array of events draws on explicit reasoning processes, humans have an innate tendency to implicitly generate causal representations (Muentener 2014). Such implicit causal reasoning processes provide an estimate to guide immediate action, but they are prone to produce erroneous conclusions in the face of complex data. Since the causal inferences can occur in the moment without the opportunity for reflective analysis, the underlying processes are more likely to be implicit or at least to rely on pre-existing explanatory paradigms.

Clinical experience suggests that practitioners are particularly vulnerable to making assumptions that favour a formulation involving a causal chain from drug use to mental illness symptoms (often informally described as 'drug-induced'). The notion of 'drug-induced psychosis' is not only overly simplistic, but the way that it is used in practitioners'

explanatory narratives can give the impression that the psychotic symptoms have a lesser status in comparison with psychotic symptoms that are not seen to be causally related to substance use (Wilson 2017). Another common causal inference assumes that the patient's motivation to attend for assessment is linked to an underlying desire to obtain more substances (prescribed substances in this scenario) (so-called 'drug-seeking'). These types of causal assumption contribute not only to the clinician's interpretation of the patient's responses to questions, but also to the approach to questioning adopted by the clinician. Thus, the clinician is prone to seek out and pay attention to information confirming their biased assumptions. It is not just a matter of the choice of questions and therefore the answers being influenced by a confirmatory bias. Patients' feedback in clinical settings indicates that they often recognise clinicians' biases and sometimes they respond in a way that interferes with the assessment. Examples of responses by patients include emphasising a narrative contrary to the one being suggested by the clinician, expressing frustration and/or disengaging from the process. Although understandable, they may be interpreted by the clinician as further evidence in favour of their preconceptions. For instance, if a patient responds oversensitively to a pattern of questioning that appears to be focusing on one causal explanation at the expense of other explanations (such as a drug-induced condition as opposed to an underlying mental illness), the clinician may take this as evidence that the person lacks insight that the 'real' problem is their drug use or that they are trying to exaggerate or even feign mental illness symptoms. The patient may, at the same time, interpret the clinician's approach as invalidating, since whatever the causal explanation, to them the symptoms are also a 'real' problem. Reaching an informed opinion about the nature of the relationship between substance use and symptoms is likely to be made more difficult by an assessment dynamic in which the clinician is revealing their biases in a way that may provoke a negative response from the patient.

### *Assessment model*

A number of steps can be taken to reduce the influence of pre-existing causal assumption biases on the assessment process and the quality of the therapeutic relationship (Box 1).

First, a model of understanding that relies on the notions of vulnerability to, and the dimensional expression of, psychopathology facilitates a more nuanced explanatory formulation of psychiatric symptoms that co-occur with substance use (Szerman 2019). In such a model, psychiatric

### **BOX 1** Principles of assessment and formulation for patients with coexisting psychosis and substance misuse

- Use a vulnerability/dimensional model of psychopathology in developing an explanatory formulation
- Remain mindful of the complexity of the relationship between substance use and psychiatric symptoms
- Develop an awareness, and resist the interfering influence, of the distorting effect of implicit causal reasoning processes on assessment and formulation
- Adopt an overt and genuine 'not knowing' approach to assessment
- If a clear explanatory formulation does not emerge from the assessment, tolerate uncertainty

symptoms are seen as a reflection of a vulnerability to developing this type of psychopathology. Approaching the assessment using a framework of the dimensional expression of psychopathology not only is more consistent with the empirical evidence (Ayhan 2016), but it also encourages attention to symptoms even if it is not possible to be clear about diagnosis. Thus, although active substance misuse may make a definitive diagnosis difficult, it should not be the basis of rejecting the possibility that there is an underlying vulnerability that may be manifest in symptoms even if abstinence were achieved. Removing the pressure to definitively decide whether or not there is a diagnosable mental disorder and focusing on exploring the nature and degree of symptoms allows a more considered approach to exploring the relationship between symptoms and substance use and reduces the risk of patient disengagement. This dimensional approach to the assessment does not preclude a categorical approach to decision-making, such as whether to commence a treatment or refer to a service. Where such a decision needs to be made, this can be done using the best-fit formulation at the time of the decision, while at the same time acknowledging, if necessary, that the formulation is provisional and should remain under review in light of ongoing assessments (Brendel 2003). The dimensional framework also allows problems on different dimensions (such as substance misuse and mental illness symptoms) to be addressed even if it is not possible to reduce the relationship to either a simple drug-induced condition or mental illness.

Second, the clinician should retain an awareness of the potential for the multiple, changing two-way interactions between substance use and symptoms in the same patient (Fig. 1).

Remaining mindful of the complexity of the relationship between substance use and psychiatric

symptoms helps with the application of the third element of this model: the clinician should reflect on and resist the influence of their own biased causal representations of the relationship between substance use and mental disorder. These may comprise a tendency to apply oversimplified explanations (such as those relying on the false dichotomy between mental illness and a drug-induced condition) and/or to favour certain causal narratives. As already noted, the narratives that involve substances having a primary causal role appear to be widely prevalent, despite the empirical evidence suggesting a more complex explanation even for those cases where there appears to be a temporal sequence involving substance use first, followed by symptoms.

Fourth, clinicians should represent their open-mindedness overtly in assessment. Adopting a 'not knowing' stance in which the clinician remains genuinely curious reduces the constraining influence of predetermined theoretical explanations that the patient may experience as invalidating, with negative consequences for the quality of both the interaction and the information arising from it (Anderson 1992).

Fifth, if a clear explanatory formulation does not emerge from the assessment (which, in light of the potential for complexity, should not be a surprise), the clinician should be able to tolerate uncertainty rather than imposing unwarranted certainty (Brendel 2003). As already highlighted, if it is necessary to make a decision while there is still uncertainty, the clinician may indicate their preferred formulation on the basis of the available information and advise that the formulation should remain under review.

### *Management considerations*

A comprehensive review of models of treatment for patients with coexisting psychosis and substance misuse is beyond the scope of this article, but in general the approach to management should involve collaborative care planning, attention to physical health and wider social needs, partnership working between health and other support services, adaptation of specialist mental health services for the needs of patients with coexisting psychosis and substance misuse, psychologically informed approaches and the avoidance of excluding these patients from specialist mental health services because of substance misuse (National Institute for Health and Clinical Excellence 2016; Crockford 2017; Baker 2020).

With specific reference to pharmacological treatment of psychotic symptoms, it is worth noting that standard treatments used in non-comorbid patient groups may not be appropriate for patients with coexisting psychosis and substance misuse. For instance, maintenance treatments for opioid dependence are sometimes preferable to

abstinence-based treatments, which may destabilise individuals with comorbid psychosis and substance misuse. It should be noted, though, that methadone can induce QTc prolongation, as can many psychiatric drugs, so patients with comorbid conditions need extra monitoring for this complication, and medications that are more likely to induce QTc prolongation should be avoided if possible. Individuals who misuse substances are at increased risk of hepatic disease (due to, for example, hepatitis C and the toxic effects of alcohol), resulting in a greater potential for medication toxicity.

There are also specific additional risk considerations in this group. For example, parental mental health problems and substance misuse, together with domestic violence, make up the so-called 'toxic trio' for childhood maltreatment (Brandon 2009). People with coexisting mental problems and substance misuse are at increased risk of being targeted by dealers' attempts to infiltrate provincial towns (known as 'county lines' dealing) through processes such as 'cuckooing' (in which a dealer takes over premises for use as a provincial base for drug dealing) (Coomber 2018; Williams 2019).

### **Conclusions**

When developing a formulation of the problems experienced by a patient with symptoms of mental illness who uses substances, the practitioner needs to keep in mind the complex interrelation between substance use and mental illness symptoms. There are three types of high-level explanation: (a) substance use adversely affects mental state; (b) mental state disturbances increase the likelihood of substance use; and (c) shared factors increase the risk of both substance misuse and mental illness. Each of these types of causal relationship may be accounted for by a combination of different mechanisms, which can act in different directions and take effect directly and indirectly. It may be difficult to unpick the exact configuration of explanatory processes in a single case, but the assessment is more likely to contribute to a valid formulation if the clinician recognises the potential for complexity, is able to tolerate uncertainty and addresses any biased causal assumptions they hold in relation to explaining coexisting psychosis and substance misuse. A model in which the occurrence of symptoms is taken to be an indication of vulnerability to that type of psychopathology and the expression of those symptoms is seen to occur on a dimension (from a diagnostically subthreshold form to one that allows the diagnostic criteria to be met) not only is more in keeping with the empirical evidence base, but also facilitates formulation and clinical



## MCQ answers

1 c 2 e 3 d 4 d 5 b

decision-making in cases where there is coexisting psychosis and substance misuse.

### Author contributions

Both authors contributed substantially to the conception, writing and final manuscript.

### Declaration of interest

None.

ICMJE forms are in the supplementary material, available online at <https://doi.org/10.1192/bja.2020.45>.

### References

- Alderson HL, Semple DM, Blayney C (2017) Risk of transition to schizophrenia following first admission with substance-induced psychotic disorder: a population-based longitudinal cohort study. *Psychological Medicine*, **47**: 2548–2555.
- Anderson H, Goolishian H (1992) The client is the expert: a not-knowing approach to therapy. In *Therapy as Social Construction* (eds S McNamee, K Gergen): 25–39. Sage Publications.
- Arranz S, Monferrer N, Algora MJ, et al (2018) The relationship between the level of exposure to stress factors and cannabis in recent onset psychosis. *Schizophrenia Research*, **201**: 352–9.
- Avery JD, Barnhill JW (2017) *Co-occurring Mental Illness and Substance Use Disorders: A Guide to Diagnosis and Treatment*. American Psychiatric Publishing.
- Awad AG (2016) The neurobiology of comorbid drug abuse in schizophrenia and psychotic disorders. In *Neuropathology of Drug Addictions and Substance Misuse* (ed VE Preedy): 82–8. Academic Press.
- Ayhan Y, McFarland R, Pletnikov MV (2016) Animal models of gene–environment interaction in schizophrenia: a dimensional perspective. *Progress in Neurobiology*, **136**: 1–27.
- Baker AL, Denham AM, Pohlman S, et al (2020) Treating comorbid substance use and psychosis. In *A Clinical Introduction to Psychosis: Foundations for Clinical Psychologists and Neuropsychologists* (eds JC Badcock, G Paulik): 511–36. Academic Press.
- Blevins CE, Abrantes AM, Stephens RS (2016) Motivational pathways from antecedents of alcohol use to consequences: a structural model of using alcohol to cope with negative affect. *American Journal of Drug and Alcohol Abuse*, **42**: 395–403.
- Brandon M, Bailey S, Belderson P (2009) *Understanding Serious Case Reviews and their Impact: A Biennial Analysis of Serious Case Reviews 2005-07*. Department for Children, Schools and Families.
- Brendel DH (2003) Reductionism, eclecticism, and pragmatism in psychiatry: the dialectic of clinical explanation. *Journal of Medicine and Philosophy*, **28**: 563–80.
- Brown HE, Kaneko Y, Donovan AL (2019) Substance-induced psychosis and co-occurring psychotic disorders. In *Substance Use and the Acute Psychiatric Patient: Emergency Management* (eds AL Donovan, SA Bird): 111–24. Humana.
- Brunette MF, Mueser KT, Babbins S, et al (2018) Demographic and clinical correlates of substance use disorders in first episode psychosis. *Schizophrenia Research*, **194**: 4–12.
- Carey CE, Agrawal A, Buchholz KK, et al (2016) Associations between polygenic risk for psychiatric disorders and substance involvement. *Frontiers in Genetics*, **7**: 149.
- Chien WH, Huang MC, Chen LY (2020) Psychiatric and other medical manifestations of nitrous oxide abuse: implications from case series. *Journal of Clinical Psychopharmacology*, **40**: 80–3.
- Cobo J, Ramos MM, Peláez T, et al (2006) Psychosis related to methadone withdrawal. *Acta Neuropsychiatrica*, **18**: 50–1.

Coomber R, Moyle L (2018) The changing shape of street-level heroin and crack supply in England: commuting, holidaying and cuckooing drug dealers across 'county lines'. *British Journal of Criminology*, **58**: 1323–42.

Crockford D, Addington D (2017) Canadian schizophrenia guidelines: schizophrenia and other psychotic disorders with coexisting substance use disorders. *Canadian Journal of Psychiatry*, **62**: 624–34.

D'Agostino AR, Peterson SJ, Smith GT (2019) A risk model for addictive behaviors in adolescents: interactions between personality and learning. *Addiction*, **114**: 1283–94.

Dixon LB, Holoshitz Y, Nossel I (2016) Treatment engagement of individuals experiencing mental illness: review and update. *World Psychiatry*, **15**: 13–20.

Dyer ML, Eassey KE, Heron J, et al (2019) Associations of child and adolescent anxiety with later alcohol use and disorders: a systematic review and meta-analysis of prospective cohort studies. *Addiction*, **114**: 968–82.

Engh JA, Bramness JG (2017) Psychosis relapse, medication non-adherence, and cannabis. *Lancet Psychiatry*, **4**: 578–579.

Foglia E, Schoeler T, Klammer E, et al (2017) Cannabis use and adherence to antipsychotic medication: a systematic review and meta-analysis. *Psychological Medicine*, **47**: 1691–705.

Fresán A, Robles-García R, Tovilla-Zarate C-A (2018) The prevalence and effects of cannabis use among individuals with schizophrenia and related psychotic disorders. In *The Complex Connection Between Cannabis and Schizophrenia* (eds MT Compton, M Manseau): 271–88. Academic Press.

Freudenreich O (2020) *Psychotic Disorders*. Springer International Publishing.

Ghose S (2018) Substance-induced psychosis: An indicator of development of primary psychosis. *American Journal of Psychiatry*, **175**: 303–304.

Givon L (2019) Substance/medication-induced mood disorders and co-occurring mood and substance use disorders: evaluation and management in emergency department and psychiatric emergency service settings. In *Substance Use and the Acute Psychiatric Patient: Emergency Management* (eds AL Donovan, SA Bird): 95–110. Humana.

Green A, Pycroft A (2019) *Multi-Agency Working in Criminal Justice: Theory, Policy and Practice*: 223–236. Policy Press.

Groenman AP, Janssen TW, Oosterlaan J (2017) Childhood psychiatric disorders as risk factor for subsequent substance abuse: a meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*, **56**: 556–69.

Hall RCW, Hall RCW, Chapman MJ (2005) Psychiatric complications of anabolic steroid abuse. *Psychosomatics*, **46**: 285–90.

Hall WD, Patton G, Stockings E, et al (2016) Why young people's substance use matters for global health. *Lancet Psychiatry*, **3**: 265–79.

Hartz SM, Horton AC, Oehlert M, et al (2017) Association between substance use disorder and polygenic liability to schizophrenia. *Biological Psychiatry*, **82**: 709–15.

Hawkins C, Gilbert H (2004) *Dual Diagnosis Toolkit: Mental Health and Substance Misuse. A Practical Guide for Professionals and Practitioners*. Turning Point/Rethink.

Head M, Goodwin L, Debell F, et al (2016) Post-traumatic stress disorder and alcohol misuse: comorbidity in UK military personnel. *Social Psychiatry and Psychiatric Epidemiology*, **51**: 1171–80.

Hoptman MJ, Ahmed AO (2016) Neural foundations of mood-induced impulsivity and impulsive aggression in schizophrenia. *Current Behavioral Neuroscience Reports*, **3**: 248–255.

Huang MC, Lin SK (2020) Ketamine abuse: past and present. In *Ketamine* (eds K Hashimoto, S Ide, K Ikeda) 1–14. Springer.

Khokhar JY, Dwiell LL, Henricks AM, et al (2018) The link between schizophrenia and substance use disorder: a unifying hypothesis. *Schizophrenia Research*, **194**: 78–85.

Kisely S, Mills R, Strathearn L, et al (2020) Does child maltreatment predict alcohol use disorders in young adulthood? A cohort study of linked notifications and survey data. *Addiction*, **115**: 61–8.

Maremmani AG I, Rovai L, Rugani F (2014) Substance abuse and psychosis. The strange case of opioids. *European Review for Medical and Pharmacological Sciences*, **18**: 287–302.

- Maremmani AG, Pallucchini A, Rovai L (2018) The long-term outcome of patients with heroin use disorder/dual disorder (chronic psychosis) after admission to enhanced methadone maintenance. *Annals of General Psychiatry*, **17**: 14.
- Mergler M, Driessen M, Havemann-Reinecke U, et al (2018) Differential relationships of PTSD and childhood trauma with the course of substance use disorders. *Journal of Substance Abuse Treatment*, **93**: 57–63.
- Mizrahi R (2016) Social stress and psychosis risk: common neurochemical substrates? *Neuropsychopharmacology*, **41**: 666–74.
- Muentener P, Schulz L (2014) Toddlers infer unobserved causes for spontaneous events. *Frontiers in Psychology*, **5**: 1496.
- Mustonen A, Niemelä S, McGrath JJ, et al (2018) Adolescent inhalant use and psychosis risk: a prospective longitudinal study. *Schizophrenia Research*, **201**: 360–6.
- National Institute for Health and Clinical Excellence (2016) *Co-existing Severe Mental Illness and Substance Misuse: Community Health and Social Care Services NICE Guideline NG58*. NICE.
- Nielsen SM, Toftdahl NG, Nordentoft M, et al (2017) Association between alcohol, cannabis, and other illicit substance abuse and risk of developing schizophrenia: a nationwide population based register study. *Psychological Medicine*, **47**: 1668–77.
- Ohi K, Shimada T, Nitta Y, et al (2016) The Five-Factor Model personality traits in schizophrenia: a meta-analysis. *Psychiatry Research*, **240**: 34–41.
- Oldani L, Grancini B (2019) Cannabis-induced psychosis. In *Clinical Cases in Psychiatry: Integrating Translational Neuroscience Approaches* (eds AC Altamura, P Brambilla) 115–35. Springer.
- Padgett DK, Smith BT, Henwood BF, et al (2012) Life course adversity in the lives of formerly homeless persons with serious mental illness: context and meaning. *American Journal of Orthopsychiatry*, **82**: 421–30.
- Patrick ME, Bray BC, Berglund PA (2016) Reasons for marijuana use among young adults and long-term associations with marijuana use and problems. *Journal of Studies on Alcohol and Drugs*, **77**: 881–8.
- Pauselli L (2018) Cannabis-induced psychotic disorders. In *The Complex Connection between Cannabis and Schizophrenia* (eds MT Compton, M Manseau): 183–197. Academic Press.
- Petersen SM, Toftdahl NG, Nordentoft M, et al (2019) Schizophrenia is associated with increased risk of subsequent substance abuse diagnosis: a nation-wide population-based register study. *Addiction*, **114**: 2217–26.
- Pettersson E, Larsson H, Lichtenstein P (2016) Common psychiatric disorders share the same genetic origin: a multivariate sibling study of the Swedish population. *Molecular Psychiatry*, **21**: 717–21.
- Pinderup P (2018) Challenges in working with patients with dual diagnosis. *Advances in Dual Diagnosis*, **11**: 60–75.
- Public Health England (2017) *Better Care for People with Co-occurring Mental Health and Alcohol/Drug Use Conditions: A Guide for Commissioners and Service Providers*. PHE.
- Pycroft A, Green A (2016) Challenging the cultural determinants of dual diagnosis in the criminal justice system. In *Mental Health, Crime and Criminal Justice: Responses and Reforms* (ed J Winstone): 147–66. Palgrave Macmillan.
- Rogers MM, McKinney C, Asberg K (2018) Substance use predicted by parental maltreatment, gender, and five-factor personality. *Personality and Individual Differences*, **128**: 39–43.
- Smith GT, Cyders MA (2016) Integrating affect and impulsivity: the role of positive and negative urgency in substance use risk. *Drug and Alcohol Dependence*, **163**: S3–12.
- Stuart-Fox M (2015) The origins of causal cognition in early hominins. *Biology & Philosophy*, **30**: 247–66.
- Szerman N, Parro-Torres C, Dida-Attas J, et al (2019) Dual disorders: addiction and other mental disorders. integrating mental health. In *Advances in Psychiatry* (A Javed, K Fountoulakis): 109–27. Springer.
- Toledo-Fernández A, Brzezinski-Rittner A, Roncero C, et al (2018) Assessment of neurocognitive disorder in studies of cognitive impairment due to substance use disorder: a systematic review. *Journal of Substance Use*, **23**: 535–50.
- Torres C, Papini MR (2016) Emotional self-medication and addiction. In *Neuropathology of Drug Addictions and Substance Misuse* (ed VE Preedy): 71–81. Academic Press.
- Valentino RJ (2019) Editorial for neurobiology of stress special issue on stress and substance abuse throughout development. *Neurobiology of Stress*, **11**: 100178.
- Volkow ND, Swanson JM, Evins AE, et al (2016) Effects of cannabis use on human behavior, including cognition, motivation, and psychosis: a review. *JAMA Psychiatry*, **73**: 292–7.
- Wearne TA, Cornish JL (2018) A comparison of methamphetamine-induced psychosis and schizophrenia: a review of positive, negative, and cognitive symptomatology. *Frontiers in Psychiatry*, **9**: 491.
- Weibell MA, ten Velden Hegelstad W, Johannessen JO (2016) Substance-induced psychosis: conceptual and diagnostic challenges in clinical practice. In *Neuropathology of Drug Addictions and Substance Misuse* (ed VE Preedy): 50–7. Academic Press.
- Williams AG, Finlay F (2019) County lines: how gang crime is affecting our young people. *Archives of Disease in Childhood*, **104**: 730–2.
- Wilson P, Shaw E, Williams T (2017) *Faculty of General Adult Psychiatry Annual Conference – 5 to 6 October 2017, Abstract Book*. 75–76. Royal College of Psychiatrists.

## MCQs

Select the single best option for each question stem

**1 Patients presenting for the first time with psychosis in the context of drug misuse:**

- a very rarely go on to meet the criteria for a schizophrenia spectrum disorder or bipolar disorder
- b are experiencing symptoms that can be wholly attributable to the substances taken
- c are at an increased risk of developing a psychotic disorder
- d are no more vulnerable to psychosis than individuals who misuse substances without developing psychosis
- e can be assumed to be suffering from drug-induced psychosis.

**2 The following substances commonly trigger psychotic experiences, except:**

- a cannabis
- b cocaine
- c LSD
- d amphetamines
- e heroin.

**3 As regards explanations for co-occurrence of mental illness and substance use, which of the following statements is false?**

- a the relationship between mental illness and substance use can change over time
- b the different explanations are not mutually exclusive
- c the relationship can be bidirectional
- d the relationship is always straightforward and unidirectional
- e the interactions between the mental illness and substance use are multiple and complex.

**4 Of the following, which describes the most typical profile of symptoms in alcohol withdrawal?**

- a diarrhoea, myalgia, rhinorrhoea, piloerection, yawning and insomnia
- b there is no recognised withdrawal syndrome
- c fatigue, increased appetite, anxiety and low mood
- d sweating, tachycardia, tremor, insomnia, vomiting, hallucinations, anxiety and seizures
- e disinhibition, increased sociability, nystagmus, slurred speech.

**5 The recommended assessment model for patients with co-occurring substance use and psychopathology includes:**

- a concentrating exclusively on diagnosable disorders
- b exploring the relationship between symptoms and substance use in an overtly open-minded manner
- c establishing what came first to decide whether there is a primary mental illness
- d assuming until otherwise disproven that the psychosis is caused by the substance use
- e relying on pre-existing causal assumptions.