Dean's Grand Rounds Webinar:

Ketamine misuse, an increasing problem – consequences and responses

Thursday 16 October 2025 | 4.00pm - 5.30pm

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ROYAL COLLEGE OF PSYCHIATRISTS

Dean's Grand Rounds

Dr Faye Graver

Consultant Addiction Psychiatrist

KETAMINE IN A NUTSHELL

Dr Faye Graver

Consultant Addiction Psychiatrist

Clinical Director of Substance Misuse Services

Betsi Cadwaladr University Health Board

AIMS

- Describe the psychopharmacology of ketamine
- Provide an update on the prevalence of ketamine misuse in the UK
- Describe the acute and chronic adverse effect of ketamine misuse on multiple organ systems

PSYCHOPHARMACOLOGY

- NMDA receptor antagonism: – blocks the N-Methyl-D- Aspartate receptor subtype of glutamate receptor, disrupting excitatory neurotransmission. This leads to dissociative anaesthesia – trance like state with amnesia, sedation and analgesia
- Opioid receptor interaction:- Ketamine interacts with μ, δ, and κ opioid receptors providing some analgesia
- **Monoaminergic Effects**: It increases synaptic levels of serotonin, dopamine, and norepinephrine, which may underlie its rapid antidepressant properties
- **Cholinergic and Muscarinic Effects**: Ketamine acts as a partial antagonist at muscarinic receptors, which may explain its bronchodilatory and sympathomimetic effect
- **Sodium Channel Blockade**: It has mild local anaesthetic properties due to sodium channel inhibition

PHARMACOKINETICS

- **Administration Routes**: Ketamine can be given intravenously (IV), intramuscularly (IM), orally, intranasally, or even rectally. IV onset is rapid—within 30 seconds; IM onset is around 6 minutes; Intranasal between 5-15 mins
- Usual route – Intranasal or oral when misused
- Duration: 30–120 minutes depending on dose/route.
- **Metabolism**: It is metabolized in the liver primarily via CYP450 enzymes into *norketamine*, an active metabolite with similar but less potent effects.

EPIDEMIOLOGY — UK

- Estimated annual users: ~299,000 people (age 16–59) reported use in year ending Mar 2023 — largest number on record.
- Rising treatment admissions: 3,609 people started treatment for ketamine problems in 2023–24 (up from 426 in 2014–15)
- Higher prevalence among young adults (16–24); estimates around 3–3.8% in some reports.

ACUTE EFFECTS & HARMS

- Acute ketamine toxicity presentations can include impaired consciousness, agitation, hallucination, delirium, confusion, euphoria, dissociation, nausea, tachycardia and hypertension.
  - These are usually short lived (4-12 hours) and usually don't need intervention
- At larger doses there can be more pronounced psycholoigical effects including severe dissociations ("k-hole")
- Frequent use can cause short and long term memory impairment
- Cardiovascular: tachycardia, hypertension; respiratory depression uncommon but possible with co-ingestants.
- Behavioural risks: impaired coordination, accidents, risky sexual behaviour, polydrug harms.

CHRONIC EFFECTS 1

- Dependency
- Cognitive deficits – long and short term memory
- Psychiatric effects –
  - Emotional instability and mood swings
  - Depersonalization/dissociation
  - Anxiety and depression
  - Suicidal ideation
  - Hallucinations and delusions during intoxication but can persist and resemble schizophrenia -usually in individuals with previous psychotic episodes

CHRONIC EFFECTS 2

- Liver toxicity
  - Hepatocellular injury via direct toxicity – inflammation and raised LFTs
  - Cholangiopathy – bile duct damage, inflammation, fibrosis and strictures
- Gastrointestinal issues – K cramps, bloating, constipation/altered bowel habits, nausea/vomiting and weight loss
- Respiratory depression possible if used in high doses or in context of polysubstance use
- Cardiovascular issues
  - Hypertension, tachycardia, arrhythmias (especially in context of structural issues of electrolyte imbalances) especially when in conjunction with existing cardiac issues or poly substance use

CHRONIC EFFECTS 3

- ENT
  - Cjronic nasal inflammation and damange - rhinitis and epistaxis
  - Septal perforation – nasal collapse and repeated infections
  - Sinusitis – chronic inflammation, infections and pain
  - Post nasal drip and sore throat
  - Vocal changes – relating to irritation of the vocal cords
  - Upper airway inflammation

KETAMINE-INDUCED LOWER URINARY TRACT ISSUES

- **Ketamine-Induced Cystitis**
  - **Ketamine bladder syndrome** is a painful condition caused by chronic ketamine use. The drug's metabolites irritate the bladder lining, leading to:
    - Urgency
    - Frequency,
    - Dysuria,
    - Haematuria
    - Pelvic or loin pain
- **Bladder wall damage**: Repeated exposure causes inflammation, ulceration, and fibrosis, which can lead to:
  - *Reduced bladder capacity*
  - *Incontinence*
  - *Scarring and shrinkage*: In severe cases, the bladder becomes non-functional

KIDNEY DAMAGE

- **Hydronephrosis**: Damage to the bladder can cause urine to back up into the kidneys, leading to swelling and pressure on kidney tissues
- **Renal impairment**: Chronic obstruction and inflammation may result in:
- Reduced kidney function
- Proteinuria
- Progressive renal failure in extreme case

PRACTICAL CLINICAL POINTS

- Ask about ketamine when younger adults present with LUTS, pelvic pain, cognitive complaints, psychosis or treatment-resistant mood symptoms.
- Document frequency/route/dose; screen for polydrug use and mental health comorbidity.
- Clear communication with primary care – urinary symptoms often misdiagnosed as repeated UTIs
- Refer to urology, ENT (plus gastroenterology if needed) and addiction services early; inform patient that stopping use is the single most effective intervention for bladder recovery.
- Good joint working with relevant services including young persons services/school nurse

SUMMARY

- Ketamine: NMDA antagonist with therapeutic uses but rising recreational misuse in the UK.
- Marked increase in prevalence and treatment demand; significant bladder and psychiatric harms in heavy users.
- Early recognition, support with cessation, urology follow-up and addiction support are essential.

REFERENCES

- Office for National Statistics / CSEW (Drug misuse England & Wales) — Year ending Mar 2024. (ONS)
- Home Office news: review of ketamine classification; prevalence figures (Jan 2025).
- Substance misuse treatment statistics 2023-24 (NHS/GOV.UK) — treatment admissions for ketamine.
- Anderson DJ et al., Ketamine-induced cystitis review (2022).
- Belal M. et al., BAUS consensus statements on ketamine-related urinary tract dysfunction (2024).
- Zanos P., et al., Ketamine metabolite pharmacology (2018) and other pharmacology reviews.

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Dr Irene Guerrini

Consultant Psychiatrist

South London and Maudsley NHS
NHS Foundation Trust

Addictions Clinical Academic Group (CAG)

Ketamine use in the community – case series including psychiatric vulnerabilities

Irene Guerrini MD, PhD
Consultant Psychiatrist and Clinical Lead for Bexley Addictions- South London & Maudsley NHS Trust
Visiting Senior Clinical Lecturer Institute of Psychiatry, Psychology & Neuroscience, King's College London

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Adults entering treatment in 2023 to 2024

(Adult substance misuse treatment statistics 2023 to 2024: report- Office for Health Improvement and Disparities)

- Trend of rising numbers entering treatment over the last decade
- 2,211 people in 2023, doubling from 2019, and 3,609 starting treatments in 2023-2024
- Over eight times higher than it was in 2014 to 2015 (426 cases)

BEXLEY KETAMINE PROJECT

Retrospective Case series

(100 cases)

- Gender: 70% males
- Mean age: 26±5.5yrs
- Age ≤25: 37%
- Mean age onset : 19±5yrs
- Mean ketamine dose (gr): 2.74±1.9
- Ketamine only: 38%
- Ketamine uropathy: 45%
- MH problems: 66%

BEXLEY KETAMINE PROJECT DATA ANALYSIS

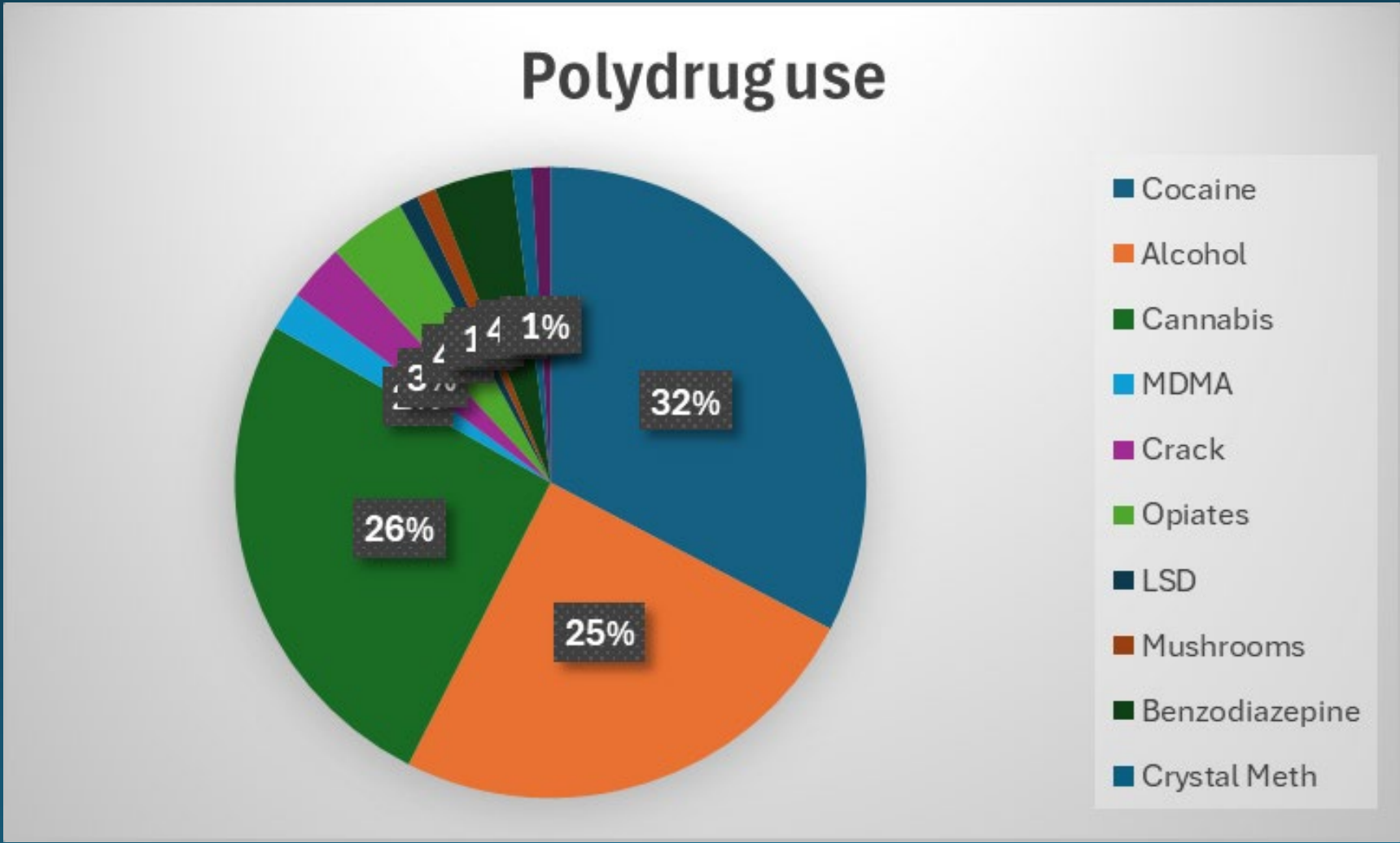
Table 1

Comparison between types of users (infrequent, frequent, and daily users)

Variable	Infrequent (≤ 3 days/week)	Frequent (4-6 days/week)	Daily
Number of patients	29	31	40
Gender			
Male	19 (65.5%)	24 (77.4%)	27 (67.5%)
Female	8 (27.6%)	5 (16.1%)	12 (30.0%)
Others	2 (6.9%)	2 (6.5%)	1 (2.5%)
Mean age at triage (SD, Range), years	26.28 (7.17, 19-47)	25.26 (5.26, 18-42)	26.23 (4.24, 18-34)
Mean age started ketamine use (SD), years	19.29 (5.87)	19.10 (4.05)	19.35 (3.70)
Mean length of use (SD), years[a]	7.11 (4.85)	6.16 (4.30)	6.88 (3.18)
Mean ketamine dose (SD), grams/day	1.75 (0.96)	3.24 (1.96)	2.78 (1.59)
Mean frequency of use (SD, Range), days/30	6.03 (3.54, 1-10)	18.29 (3.44, 15-25)	
Prevalence of polysubstance use, n (%)	23 (79.3%)	18 (58.1%)	21 (52.5%)
Prevalence of KIU symptoms, n (%)	4 (13.8%)	16 (51.6%)	25 (62.5%)

Relative frequencies are displayed for each group.

BEXLEY KETAMINE PROJECT DATA ANALYSIS

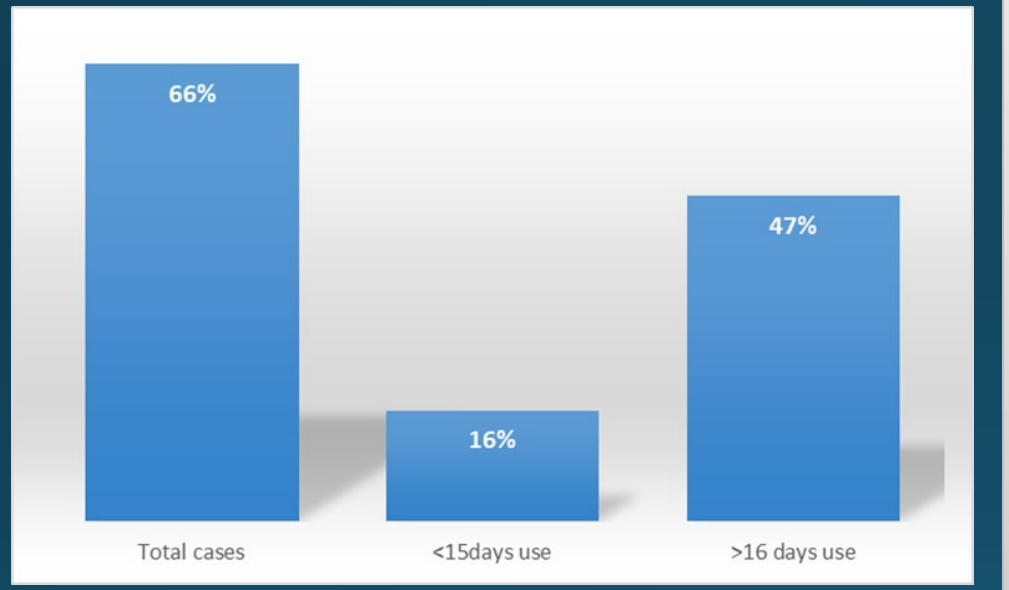


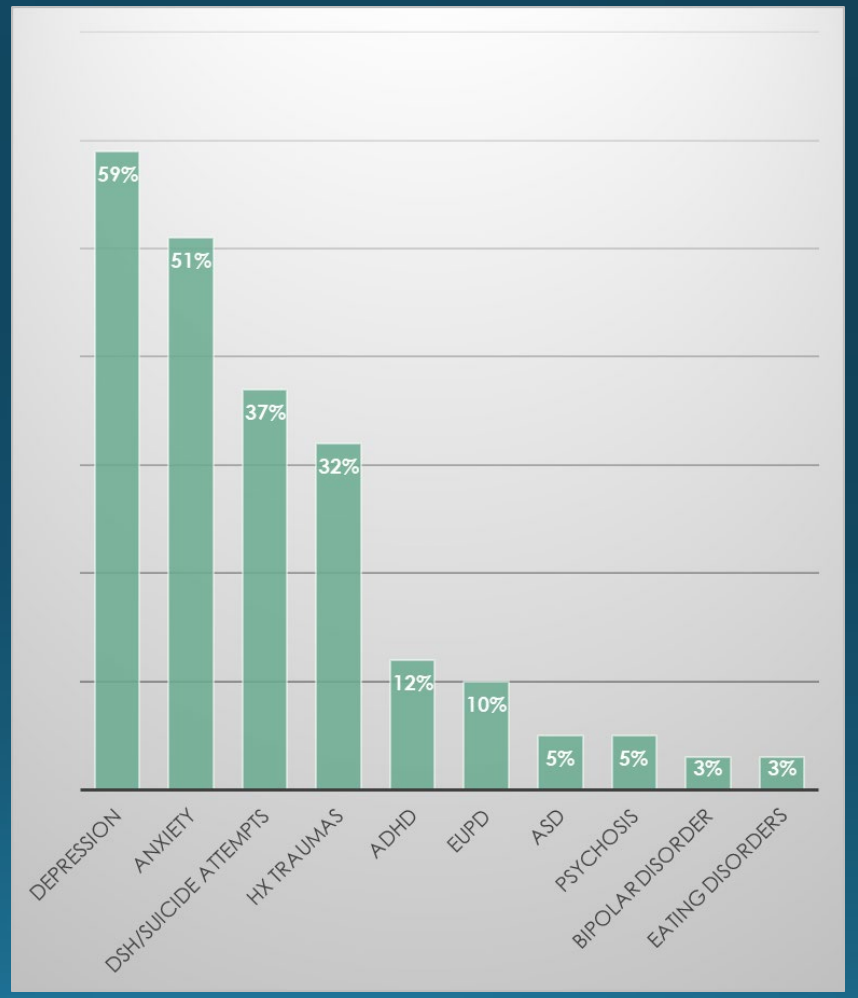
Ketamine Use Disorders and Mental Health

Ketamine users have higher scores on depression symptoms when compared to non-users. Severe depressive symptoms have been reported in 35% of long-term users (Fan N et al, 2016; Guerrini et al., 2025).

Cheng and co-authors reported that 59% and 38.7% of chronic ketamine users presented with moderate-to-severe depression and anxiety symptoms (Cheng L et al, 2020; Guerrini et al., 2025).

BEXLEY KETAMINE PROJECT
MENTAL HEALTH COMORBITY





Guerrini I., unpublished data

	Mental Health	No Mental Health	Statistical significance
Age <25 yrs (%)	42	12	**p-value**: 0.0353
Age started ketamine (yrs)	18±4	20±6	**t ≈ 1.59, df ≈ 40.5, p ≈ 0.12**
Ket alone (%)	20	16	**p-value: 0.2048**
Ketamine (gr)	2±1	3±2	**t ≈ 2.18, df ≈ 56, p ≈ 0.03**
Frequency (days)	21±10	16±10	**t ≈ 0.89, df ≈ 50, p ≈ 0.37**
Frequent use (%)	48	17	**p-value**: 0.0566
Daily use (%)	30	8	**p-value**: 0.0676
Uropathy (%)	32	13	**p-value**: 0.5526

Analysis of Mental Health vs No Mental Health subgroups

Conclusions

Ketamine users engaging in structured treatment are predominantly young males, more than a third are below the age of 25 yrs old, and more than two third are using multiple drugs and alcohol.

The infrequent users (≤3 days per week) have less physical and mental comorbidities indicating the importance of harm reduction interventions and early engagement in treatment.

Ketamine users with mental health problems attend T3 services at an earlier age when compared to users with no mental comorbidities. The ketamine dose per using session and mental health problems are significantly correlated whilst frequency of use show only a statistical trend.

This analysis is limited by the retrospective nature of the data. Mental health problems in ketamine use disorders are still largely unexplored in the research field and warrant further prospective studies.

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Dr Stephen Kaar

Consultant Addictions Psychiatrist

Specialist inpatient unit

Greater Manchester Mental Health
NHS Foundation Trust

Ketamine Detoxification

Dr Stephen Kaar

BSc (Hons) MRCPsych PhD

Consultant Addictions Psychiatrist, Chapman Barker Unit (CBU)

Declarations

- Chief Investigator of NIHR funded study into Ketamine Assisted Psychotherapy for Alcohol Use Disorder
- Principal investigator in GLP1 study for Alcohol Use Disorder with Eli Lilly

Aims

Greater Manchester Mental Health NHS Foundation Trust

- Briefly introduce CBU and inpatient detox
- Present our ketamine detoxification data over last 9 years
  - Trends on admission numbers
  - Demographics of the treatment population
  - Use patterns
  - Lower urinary tract symptoms
  - Hepatitis
- Briefly summarise detox regime

Chapman Barker Unit (CBU)

Specialist Inpatient Detoxification Unit

Greater Manchester Mental Health
NHS Foundation Trust

- Consultant addiction psychiatrist led
- <u>Accept referrals nationally</u>
- Two admission pathways:
  1. Planned admissions (26 beds)
  2. RADAR (8 beds) via A&E (GM only)
- CQC rated OUTSTANDING

SCAN Consensus Project
Inpatient Treatment of Drug and Alcohol Misusers in the National Health Service

"recommends that dedicated NHS specialist services are the optimal setting for the delivery of inpatient treatment to service users with severe alcohol or drug problems"

Drummond 2006

CBU Treatment pathways

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- Alcohol/opioid/polysubstance detoxification
- Severe dependence e.g. history of DTs, psychosis
- Co-sum disorders including clozapine
- Alcohol related brain injury use of MCA and DOLs and CoP
- Micro-dose induction of methadone to buprenorphine to LAI opioids
- Christie pathway –alcohol detox for newly diagnosed cancer
- Homelessness pathway with fibro scanning
- Special populations – pregnancy, forensic risk, low BMI
- GBL/GHB and other novel psychoactive substance detoxification

- **Ketamine detoxification !**

Change in CBU Ketamine detox admissions over time

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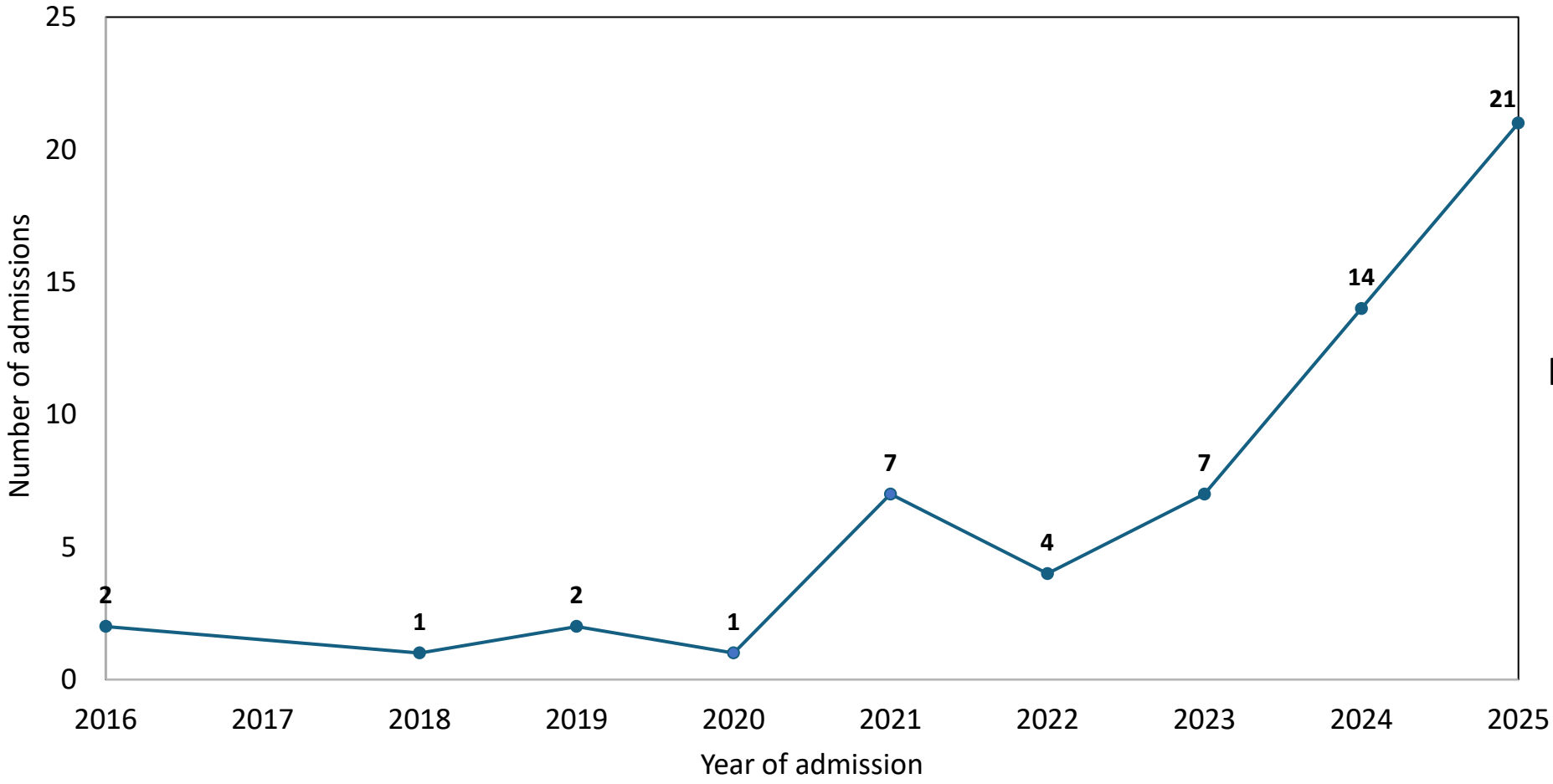

36% (n=21) admitted between Jan-Aug 2025

Number of admissions increased significantly between 2016 and 2025 ($p < 0.001$)

CBU Ketamine Detox Sample (Jan 2016 - Aug 2025)

Greater Manchester Mental Health
NHS Foundation Trust

- N = **59** ketamine detox admissions
- N = **23** ketamine only admissions (39%)
- N = **35** male (59%), **24** female admissions (41%)
- Mean age = **25** years old (SD: 6.0, Range: 17 – 45)
- Mean duration of admission = **15** days (SD: 4.8, Range: 6 – 35)
- Method
  - N = **55** inhaled
  - N=4 using IV, N=2 using IM, N=1 orally
- N = **47** (**80%**) completed detox

Distribution of daily ketamine use (g)

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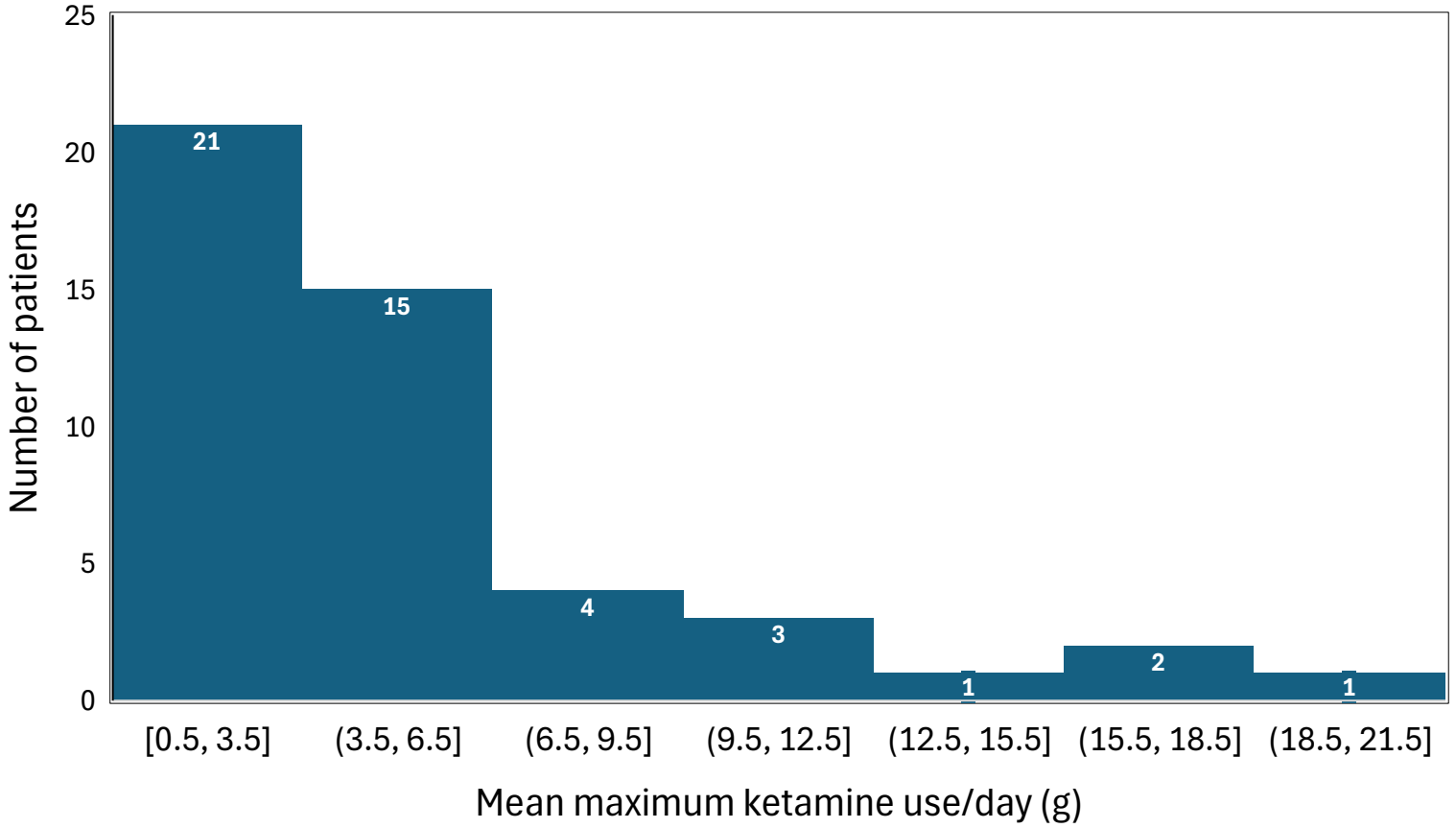
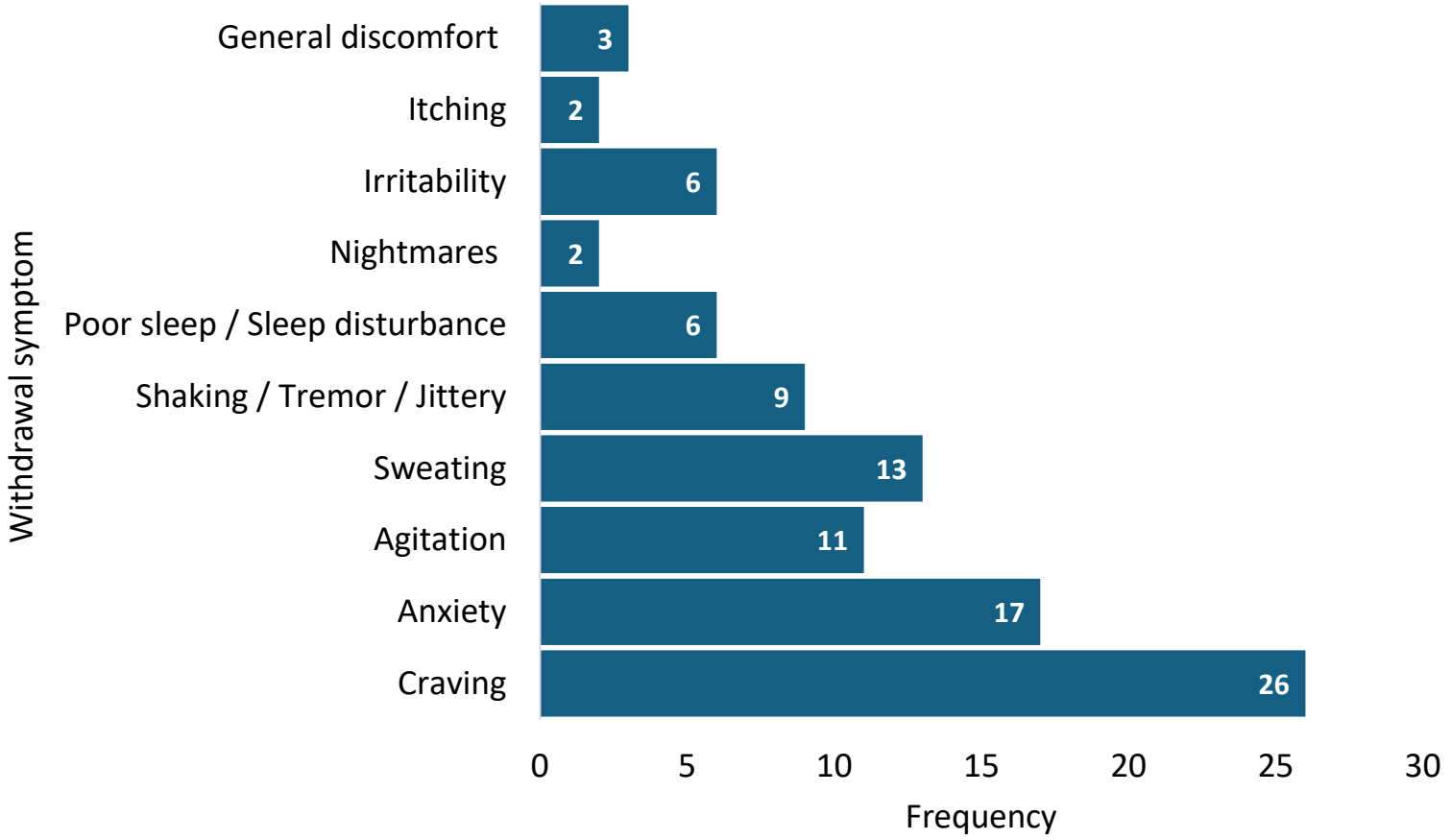


Mean maximum ketamine use/day (g)
*for those where this was recorded
(n=47)
Mean = **5.4g/day**
SD: 4.3
Minimum = **0.5g/day**
Maximum = **20g/day**

Withdrawal symptoms



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NHS Foundation Trust

- Withdrawal symptoms described **N=42**
  - **Cravings = 62%**
  - **Anxiety = 40%**
  - **Sweating = 31%**
- Had no withdrawal symptoms N=6
- Withdrawal symptoms not documented N=11

Other substances involved

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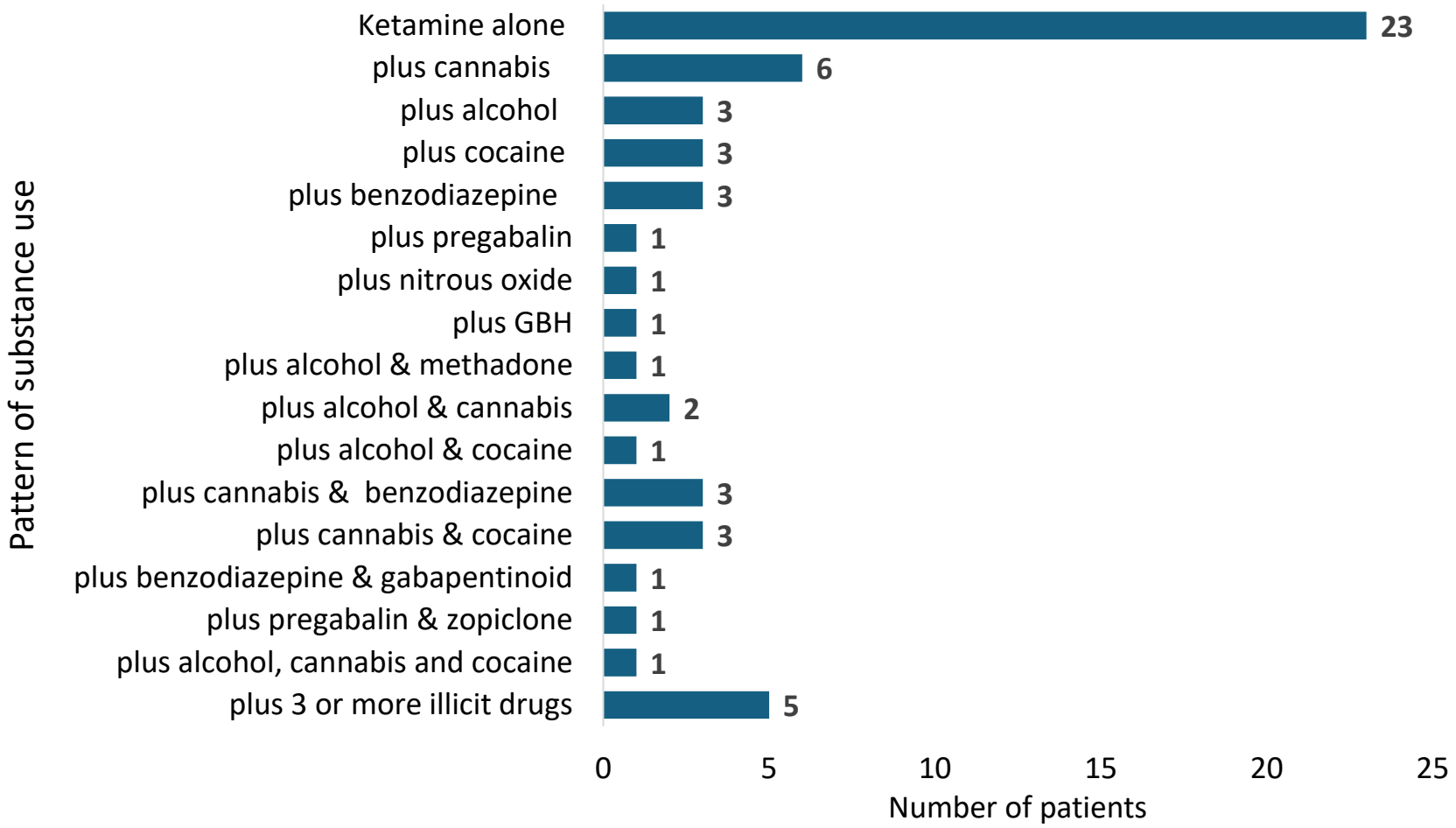

Dose relationship: Lower Urinary Tract Symptoms (LUTS) and raised liver transaminases (ALT)

Greater Manchester Mental Health NHS Foundation Trust

Parameter		Mean (SD) daily Ketamine use (grams) N=47
Gender N=47	Male (N=29)	5.9g (5.1)
	Female (N=18)	4.5g (2.1)
Type of use N=47	Ketamine use alone (N=20)	7.2g (5.1)
	Multiple drug use (N=27)	4.0g (2.9)
Presence of Lower Urinary Tract Symptoms (LUTS) N=47	Yes (N=40)	5.9g (4.4)
	No (N=7)	2.6g (1.9)
Presence of LUTS (Ketamine-only users) N=20	Yes (N=18) No (N=2)	7.4g (5.4) 5.0g (0.0)
ALT on admission (ref 7-40IU/L). *N=32 who had ALT on admission & discharge recorded	Normal (N=11)	5.0g (5.3)
	Raised (N=21)	6.5g (4.6)
ALT on discharge (ref 7-40IU/L) *N=32 who had ALT on admission & discharge recorded	Normal (N=5) Raised (N=27)	3.2g (1.7) 6.5g (5.0)

LUTS and Gender

		LUTS symptoms	p value
Gender	Male (N=35) Female (N=24)	Yes = 28 No = 7 Yes = 20 No = 4	0.506 (Fisher's Exact Test)
*Gender *Ketamine-only users	Male (N=12) Female (N=11)	Yes = 11 No = 1 Yes = 10 No = 1	1.000 (Fisher's Exact Testing)

Change in ALT in Ketamine only group

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NHS Foundation Trust

Parameter	Mean (SD)	T (df)	p (t-test)	r (Pearson)	p (r)
Mean ALT level of ketamine alone users on admission. (ref 7-40IU/L) N=20	103.5 (87.4)	-3.481 (19)	0.002	0.222	0.347
Mean ALT level of ketamine alone users on discharge. (ref 7-40IU/L) N=20	220.4 (143.0)				

t= t test, p=level of significance, r= Pearsons correlation, p= level of significance.

Brief overview of CBU inpatient management

Greater Manchester Mental Health NHS Foundation Trust

- Diazepam reducing regime e.g. 5mg QDS plus 2-5mg PRN up to BD/TDS
- Encourage oral hydration
- Monitor LUTS and repeated urine dipsticks and MC&S
- Monitor U+Es
- Monitor LFTs
- Optimise medication to reduce burden on liver and kidneys

- Analgesia – naproxen, nefopam, diclofenac, paracetamol (?) depending on LFTs and renal function, codeine (?)

- Mebeverine if retention and frequency, solfenacin if frequency but not retention

- Agitation – promazine others also use promethazine

Acknowledgements

- Sarah Shackleton (fourth-year medical student) for data collection and full analysis of ketamine data
- Dr Onsuwale Oni for initial analysis of preliminary ketamine data
- All the staff at the CBU

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Addictions Clinical Academic Group (CAG)

Developing a community ketamine service

Irene Guerrini MD, PhD
Consultant Psychiatrist and Clinical Lead for Bexley Addictions- South London & Maudsley NHS Trust
Visiting Senior Clinical Lecturer Institute of Psychiatry, Psychology & Neuroscience, King's College London

KING'S HEALTH PARTNERS

BEXLEY KETAMINE PROJECT

Service users views about treatment provisions for Ketamine Use Disorders

- Professionals do not understand ketamine addiction.
- Services are tailored for Class A drug users
- Limited interventions for young adults with a ketamine addiction
- They don’t relate to older Class A users in the group settings
- Limited availability for inpatient detoxes and residential rehab
- Lack of understanding of the impact of ketamine addiction by primary care, A&E staff and other medical professions

KETAMINE PATHWAY- RATIONALE

- Improving clients' experience
- Treatment retention
- Avoiding early drop-outs
- Client-tailored interventions
- Complex needs provisions (mental and physical health)

KETAMINE PROJECT

Ketamine specific pathways with rapid access to treatment for ketamine clients. Priority Triage assessment for under 25 yrs old. Blood tests for FDS-U&E-LFTs. BBV testing

Ketamine fact information sheet, harm reduction pack and sniffing tubes. Ketamine checklists and craving scales.

Ketamine specific weekly group interventions based on psychoeducation and MI interventions plus one-to-one keyworking. Medical assessment and MSE. "Off label" prescribing of Naltrexone* for Relapse Prevention if appropriate. Weight monitoring.

Direct referral to Functional Urology and liver scan if needed

Psychology referral.

Inpatient detox and Residential Rehab option.

*(Roberts E, Sanderson E, Guerrini I. J Addict Med. 2024 Sep-Oct 01;18(5):574-579- Verma R, Colley T, Waldock C, Bird L, Guerrini I. Naltrexone in the Treatment of Ketamine Use Disorders: A Case Report and Literature Review. J Addict Med. 2025 Oct 2. doi: 10.1097/ADM.0000000000001589.)

CONCLUSIVE REMARKS

Development of model of care

Ketamine specific clinical interventions and treatment guidelines

Joint working protocols/guidelines with urology services, mental health services, hepathology, primary care professionals

Epidemiological and clinical research studies on prevalence and treatment outcomes of ketamine addiction.

Training for A&E, GPs, and other professionals on ketamine related physical conditions (bladder symptoms, acute abdominal pain, seizures, low mood, short-term memory problems- significant weight loss)

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Dr Tracey Myton

Consultant in Addiction Psychiatry

Greater Manchester Mental Health NHS Foundation Trust

Developing an integrated ketamine service

Dr Tracey Myton

Consultant in Addiction Psychiatry

Greater Manchester Mental Health NHS Foundation Trust

Improving Lives

Steps towards ‘integrated service’ in Bolton

- NHS provider of addiction services
- Local acute Trust was already funding one session/week of addiction psychiatrist for addiction liaison
- Enthusiasm and tenacity of ST4 doctor who saw a few ketamine users and began to liaise with exceedingly obliging local urologist
- ST doctors then provided teaching to staff and suggested a pathway for referrals
- Community addiction service can now refer directly to urology
- Opportunity to have an hour for MDT each month in acute outpatient department

Urologist's perspective

- 'Fringe patients' - rarely see YP and rarely this ill
- Patience with DNAs
- Out of scheduled timetable, essentially voluntary work
- Understands what community addiction service offers
- Hadn't appreciated the (unbelievable) complexities of commissioning
- Became Trustee for Early Break

Complemented by robust PSI

- GMMH has an online Ketamine PSI group
- Seemed to be necessary as younger ketamine users may not relate to older patients
- Discussion of specific GI and urinary symptoms
- Four sessions – harm reduction, mutual support, discussion of urinary symptoms
- Prime purpose is not preparation for detox which would be separate

Liaison in Bolton – challenges

- IT system challenges
- Success has rested on enthusiasm of individual clinicians
- Teaching needs regular repetition
- Transition from YP to adult services is tricky
- No evidence yet that we retain these people in treatment
- Not specifically commissioned
- Imminent change of provider of community addiction service and loss of continuity

Panel discussion/Q&A

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We'd love to hear your feedback

- CPD certificates of attendance will be sent via email next week.
- The recording of this webinar will be available to watch on-demand next week.