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Factors associated with concurrent illicit use of opiates and crack/cocaine among opiate-users in Treatment: Implications for treatment services in England.

Abstract:

Background: The aim of this study was to identify factors associated with concurrent illicit drug use of opiates and crack/cocaine use among individuals receiving of opioid medication-assisted treatment (MAT) in one English rural/urban County Council area.

Methods: 776 opiate users in treatment were assessed using the Addiction Dimensions for Assessment and Personalised Treatment (ADAPT) assessment tool (Marsden et al, 2014). The tool encompasses three domains and 14 subdomains covering addiction severity, recovery strengths and coexisting health and social needs. Data were opportunistically matched to the National Drug Treatment Monitoring System (NDTMS) and the Treatment Outcome Profile (TOP). Two backward stepwise logistic regression models were run to discern the nature of concurrent illicit drug use.

Results: Addiction severity (Odds Ratio [OR] 12.55, Confidence interval [CI] 6.49-24.27), low recovery strengths (OR 2.30, CI 1.30-4.07) and no 'urge/control' (OR 27.45, 13.18-57.16) were strongly associated with concurrent use. Individuals with moderate psychological needs were more likely to be abstinent (OR 2.97, CI 1.67-5.29) compared to those with no need. Abstaining from injecting (OR 2.38, CI 1.15-4.93), alcohol consumption (OR 1.55, CI 1.05-2.30), increasing age (OR 1.03, CI 1.01-1.06) and increased quality-of-life (OR 1.05, CI 1.00-1.10) were associated with abstinence from concurrent use.

Conclusion: Practitioner assessments with self-report data offer unique perspectives on service users' holistic needs. Interventions addressing concurrent use during MAT should consider managing urges and control of illicit Class A use, injecting and alcohol consumption within a stepped-care approach. Packages for developing recovery strengths supporting psychological need and enhancing quality-of-life is recommended.

Keywords

Treatment, Abstinence, Concurrent drug use

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1. Introduction

Chronic drug use will often lead to problematic health conditions (Stein, 1990) alongside social consequences such as financial difficulties, unemployment, homelessness, criminality, the breakdown of families or friendships or comorbid mental health problems (Hammersley et al, 2007; Craig & Hodson, 2000; Reid & Klee, 1999). Studies have consistently shown that problematic heroin and crack or cocaine misusing individuals make significant improvements in curtailing illicit drug use and criminality following treatment (Jones et al, 2009; Gossop et al, 2003; Anglin et al, 1997; Hubbard et al, 1997; Simpson, 1990). Improvements to physical and psychological health have also been noted (Teesson et al, 2008; Gossop et al, 2002).

The importance of identifying factors that promote reductions in illicit drug use therefore are pivotal in determining a positive treatment outcome. Service users who can avoid continued use of Class A substances have been shown to have better outcomes (Litt et al, 2003; Gossop et al, 2002) allied to length of stay in treatment (Jones et al, 2009; Hubbard et al, 2003; Simpson et al, 1997). Sustained use of stimulants whilst simultaneously in receipt of opioid medication-assisted treatments (MAT) has been viewed as associative with unemployment and criminal activities (Darke et al, 2005; Hser & Anglin, 1998; Magura et al, 1998; Grella et al, 1997). Understanding the defining characteristics of concurrent drug use has been shown to be problematic (Beswick et al, 2001; Grella et al, 1997) due to changing dosage levels (Mattick et al, 2007; Best et al, 1999; Hartel et al, 1995). Low coping efficacy has also been shown to be a predictor of continued use whilst in receipt of MAT often as means to manage withdrawal symptoms (Best et al, 1999; Senbanjo et al, 1999). A meta-analysis (Brewer et al, 1998) identified factors associated with concurrent use of illicit substances during treatment that included the extent of previous episodes of abstinence relating to drug and alcohol use, the severity of drug-using prior and whilst in treatment, mental health factors encompassing depression and stress, unemployment, exposure to drug-using peers and treatment factors including the extent of previous engagement with services.

In the UK, treatment provision has been encouraged to become more 'recovery-oriented' whilst accepting a role for MAT (typically comprising methadone and buprenorphine) as part of a holistic package to facilitate recovery (National Treatment Agency, 2012). Although improvements in health-related issues and interpersonal relationships may occur despite continued use of substances whilst in treatment (Laudet & White, 2010; Donovan et al, 2005) individuals in long-term, stable recovery are more likely to report high rates of self-efficacy and are

able to manage a range of social problems (Hser, 2007). Services have incorporated concepts of recovery into a “general wellness” orientated description (Hser, 2007; Rudolf & Watts, 2002), referring to a voluntary and continued control over substance use, that considers housing, employment and other social needs (Laudet, 2007; Timpson et al, 2006). Recovery strengths can be viewed as synonymous with cross-disciplinary strengthen-based approaches which have been shown to establish a wide range of positive outcomes (Pattoni, 2012). Although the pathways to recovery are complex (Best et al, 2008), there remains a need to link appropriate interventions to an individual’s clinical and social needs to help promote recovery (Thornton et al, 2008) including matching interventions to the extent of an individual’s addiction (Timko & Sempel, 2004; McKellan et al, 1997).

The aim of this study is to examine factors that are associated with concurrent use of illicit opiate and/or cocaine among a treatment population in receipt of MAT. It is hypothesized that there are factors associated with continued use of street opiates and cocaine that encompass complex interactions between the nature of an individual’s addiction and their interrelated health or social problems. Brewer et al’s (1998) list of potential factors suggest a range of areas for consideration including examining the extent and nature of an individual’s drug and alcohol use, comorbid mental health problems and social factors such as unemployment. Identification of factors associated with concurrent Class A drug use will aid the development of a holistic recovery-orientated response.

The study reports on an opportunistic data linkage study matching an assessment of a subsample of one area’s MAT population’s holistic needs using a clinical assessment tool, the Addiction Dimensions for Assessment and Personalised Treatment (ADAPT) that has been shown to describe the wide range of clinical, social and other recovery-orientated issues associated with treatment engagement, with self-reported needs derived from the National Drug Treatment Monitoring System (NDMTS) and the Treatment Outcome Profile (TOP) to describe the nature of concurrent illicit opiate and cocaine use.

2. Method

2.1 Setting

The study was conducted across publicly funded specialist treatment services in one mixed rural/urban County Council area in England. The services offered a range of clinical and psychosocial support encompassing mainly

methadone and buprenorphine prescribing including detoxification packages and one to one support including counselling, structured or peer-led group work. Treatment services adhered to a broad recovery model ensuring wellness and stability whilst encouraging reductions in illicit drug use. For the purpose of this study, a subset of the wider treatment population was established based on whether they received MAT. There was limited additional information within the available datasets that allowed for a deeper analysis (for example, by dosage).

2.2 *Measures*

The Addiction Dimensions for Assessment and Personalised Treatment (ADAPT) is a validated 14-item multi-dimensional schedule (Marsden et al, 2014) examining three domains describing ‘addiction severity’ (tolerance and withdrawal, urge and control, overdose risk), ‘health and social complexity’ (physical, psychological, personality, relationships, risk to self and others, housing, finance) and ‘recovery strengths’ (motivation, outlook and management, social network support, skills and participation) . The tool was chosen as a non-intrusive means of capturing the holistic needs of individuals in treatment to support the care-planning process at the 12-week point. ADAPT was selected as an appropriate tool by the treatment provider from other alternative options. The aim of ADAPT is to assist with the assessment and treatment planning process by matching clients to an appropriate intervention type (Marsden et al, 2014).

The items were scored on a binary ‘no problem’ (0) or ‘problem identified’ (1) scale for five questions relating to tolerance/withdrawal, overdose risk, physical health, housing and finance needs. The remaining questions were scored on a four-point Likert scale reporting ‘no issue’ (0), ‘low’ (1), ‘moderate’ (2) or ‘high’ (3) needs. The individual scores for each component were aggregated into the three overarching domains by adding up the composite scores so that ‘low’ need is measured between 0 and 1 for addiction severity, 0 and 2 for coexisting problem complexity and 0 and 5 for recovery strengths. ‘Moderate’ needs score between 2 and 3 for addiction severity, 3 and 5 for coexisting problem severity and 6-8 for recovery strengths. Scores of between 4 and 5 for addiction severity, 6-15 for coexisting problem severity and 9 to 11 for recovery strengths indicate ‘high’ levels of need.

The use of these measures was based on practitioner perceptions of need, and were originally calculated to reflect include age, gender, nature of illicit drug use, treatment received including length of time in treatment (Marsden et al, 2014).

The Treatment Outcome Profile (TOP) is a self-report outcome measurement system embedded within the National Drug Treatment Monitoring System (NDTMS), a national (England and Wales) public health surveillance system. TOP gathers information about service users: current illicit drug use (prescribed medication is not captured); injecting behaviours (yes/no); criminal activity; a 'health and social functioning' component that encompasses psychological and physical health, housing, employment and an assessment of quality of life (Marsden et al, 2008). Socio-demographic information on the treatment population were reported using NDTMS and levels of abstinence or concurrent drug use were captured through linking with the care-planning review process integrating the use of TOP. TOP is completed as part of care planning and is usually completed in 12-week cycles or at the point of discharge. For this study, 93% (n=719) of the TOP data were collected at 12-weeks from initial assessment. Concurrent opiate use therefore was calculated using TOP recoded as a dichotomous variable. The ADAPT assessment was applied to all clients in treatment identified as receiving MAT as of April 2017. Casefiles on clients were reviewed by their respective drug treatment worker. The assessment process was undertaken without interviewing clients directly but rather based on keyworker staff perceptions of their clients' addiction-severity, health and social complexity, and recovery strengths.

The combined use of self-report and a practitioner assessment provides a test for response concordance, but also presents a view of a service user's holistic needs based on the strength of the client-worker relationship where a worker can adequately and dispassionately assess an individual's clinical and social needs. This increases the accuracy of responses and allows for an overview across a caseload by comparing service users' needs to ensure consistency. To support consistency in how workers completed ADAPT, training sessions were delivered with ongoing support was provided by senior management. ADAPT data was captured on a bespoke spreadsheet and matched to NDTMS and TOP data using unique and anonymised client reference numbers.

2.3 *Statistical Analysis*

The subsequent analysis was undertaken on Stata v14. An initial exploration of NDTMS and TOP data was undertaken to check for coverage. Variables were included that met a coverage threshold of no less than 10%. Two questions coexisted across ADAPT, TOP and NDTMS relating to injecting status and housing needs and

were assessed for concordance. These related to whether a service user injected in a binary ‘yes/no’ answer, and an ordinal question differentiating between broad housing needs and reporting no-fixed abode. These questions were answered by the same practitioner and reflect their knowledge of their caseload at that point in time. These questions were found to have 100% percentage concordance across the three formats, which is likely to be due to the relative proximity between completing ADAPT and NDTMS/TOP records. It is possible that practitioners were influenced by knowledge of completing separate schedules with the same information, but discussions with the service provider suggested that practitioners provided an accurate assessment of service user’s injecting and housing status at these points in time. Consequently, the ADAPT measure was utilised for data analysis. Following an initial exploratory phase, a binary logistic regression was used to model concurrent use of opiate and crack/cocaine with 14 prognostic variables available for inclusion: use of alcohol and cannabis (TOP), injecting (TOP), previous treatment history (NDTMS), age (NDTMS), gender (NDTMS), ethnicity (NDTMS), self-referral (NDTMS), criminal justice referral (NDTMS), quality of life (TOP), paid work (TOP) and three ADAPT domains addiction severity score rank, recovery strengths score rank and coexisting problem complexity score rank.

A separate model was created using the same outcome variable (concurrent use versus abstinence), TOP and NDTMS prognostics and the 14-item subsections that comprise the three ADAPT domains to derive greater specificity. In this second modelling exercise, the same 14 prognostic variables were evaluated for inclusion, together with the 14 individual subdomains of the ADAPT framework. The two binary regression models were fitted to model the dichotomous outcome ‘Abstinent Opiate Crack Cocaine’. A prognostic was declared “statistically significant” if its p-value \leq 0.05 (working at 5% significance). A backward stepwise selection method was used for all prognostics shown above. Seven variables were statistically associated with a change in the odds of not using opiates or crack cocaine whilst in treatment.

2.4 *Approvals & Ethics*

An application was made to the NHS Health Research Authority that stated that this study fell within the ‘service evaluation’ definition. Identifiable data only held by the treatment provider and this paper is based on secondary interrogation of anonymised data.

3. Results

3.1 Description of the Treatment Population

776 individuals were identified as in receipt of MAT as of April 2016. The characteristics of participants are shown in Table 1. Nearly three-quarters of the population were male (73%, n=563); with a mean age of 40.7 years (range 19-70 years, standard deviation 7.89) and 94% were recorded as being of white British ethnicity. Over half of the cohort were self-referrals (59%, n=459) with just under one-fifth (19%, n=147) referred via the criminal justice system.

[insert Table 1 about here]

Just under one-fifth (19%) of the cohort were identified by staff as having ‘high’ levels of addiction severity and coexisting health and social problems (Table 2). 41% were also identified as having a low level of addiction severity and just over half (51%) were reported as having low levels of need in relation health and social problems. By way of contrast 18% were shown to have ‘high’ levels of recovery strengths with 42% reported as at a ‘low’ level.

[insert Table 2 about here]

Despite receiving MAT, only 38% of the cohort were abstinent from opiate and crack/cocaine use. Just under three-quarters (73%, n=563) were reported as not using alcohol and 87% (n=675) were not reporting using cannabis at follow-up. 89% (n=687) of the cohort also reported not injecting drugs at the point of the TOP review. The first model (Table 3) suggested a strong relationship between continued use of opiates and crack or cocaine whilst in treatment and the extent of addiction severity as measured by the ADAPT tool, with a less pronounced relationship with concurrent illicit drug use and an individual’s recovery strengths. In comparison to a ‘high’ score, reporting a ‘low’ addiction severity score was associated with an Odds Ratio (OR) of 12.55, 95% Confidence Interval [CI] [6.49, 24.27] suggesting that ‘low’ severity will increase the odds of abstinence by over 12 times that of service users with ‘high’ levels of severity. This is in comparison to individuals who will be

twice as likely to be abstinent if their addiction severity is ‘moderate’ compared to ‘high’ (OR 2.49; 95% [1.30, 4.77]).

There is also an association between service users with higher reported recovery strengths and not using illicit drugs concurrently. Individuals reporting ‘high’ levels of recovery strengths were shown to be twice as likely (OR 2.30; 95%, [1.30, 4.07]) to report abstaining from opiate or crack/cocaine use relative to a low score. The relationship between not using opiate and crack/cocaine with the ADAPT domains became more nuanced when considering the effect of health and social coexisting problems. Contrary to what one may expect, individuals in MAT with ‘moderate’ and ‘high’ coexisting health and social problems were more likely to be abstinent compared to individuals with no needs. Those in MAT were twice as likely to report not using opiates and crack/cocaine if they report ‘high’ (OR 2.20; 95% CI; 1.23, 3.92) or ‘moderate’ (OR 1.91; 95% CI; 1.23, 3.92) health and social coexisting problems compared to a low score.

Other indicators derived from TOP were associated with abstinence from use of opiate and crack/cocaine. Current levels of injecting predicted abstaining from opiate and crack/cocaine (OR 2.38; 95%; [1.15, 4.93]) as did abstaining from alcohol (OR 1.55; 95%; [1.05, 2.30]). Two additional numerical prognostics were shown to be associated with abstinence. Firstly, a ‘quality of life’ measure (derived from a 0-20 Likert scale using TOP) shows for every 1-point increase in an individual’s quality of life measure there is a 5% relative increase in the odds of being abstinent from use of opiate or crack/cocaine drugs (OR 1.05; 95% CI; 1.0, 1.10). Secondly, increasing age was also shown to be associated with no longer using opiates and crack/cocaine (OR 1.03; [1.01, 1.06]) although it should be noted that the effect sizes for these two prognostics were small.

[insert Table 3 about here]

A second logistic regression model (Table 4) examined associations between abstaining from opiate and crack/cocaine and the 14-items subdomains (excluding the main ADAPT domains). Five variables were associated with a change in the odds of abstaining from using opiate and crack/cocaine. Service users with no reported ‘urge’ (‘urge and control’ sub-domain) to use were shown to 27 times more likely to be abstinent compared to users with

a ‘strong and persistent desire’ to use, although the wide confidence levels should be noted (OR 27.45; [13.18, 57.16]).

Psychological health which forms the coexisting problem complexity domain was also a significant factor. Perhaps counter-intuitively, individuals with ‘high’ levels of need in relation to psychological health were shown to be five times more likely to be abstinent compared to having ‘no’ psychological health issues (OR 5.36; [1.09, 26.36]). Caution is advised in the interpretation of this finding due to the wide confidence level shown. Individuals were twice as likely (OR 2.00; [1.3, 3.1]) if they reported ‘low’ levels of need and three times as likely (OR 2.97; [1.67, 5.29]) to be abstinent if a service user stated ‘moderate’ needs. As with the previous model examining the three domains, injecting status (OR 2.58; [1.21, 5.49]), quality of life (OR 1.06, [1.02, 1.11]) and age (OR 1.03; [1.0, 1.1]) were also shown to be associated with abstinence from opiate and crack/cocaine use although the effect sizes for the latter two prognostics were relatively small.

[insert Table 4 about here]

4. Discussion

The findings highlight the relative importance of treating addiction severity, and the ‘urge and control’ subdomain as a corollary to concurrent illicit opiate and crack/cocaine use which confirms previous research (Brewer et al, 1998). The ability to control urges and cravings are often cited as a predictor of relapse (Verheul & Brink, 2005). The strength of this relationship may suggest the need for services to develop a carefully calibrated stepped-care approach, focusing on treating an individual’s immediate addiction needs supported by a package developing recovery strengths (Maremmani et al, 2006). The findings confirm variables associated with continued use include injecting status (Darke et al, 2005), ongoing drinking (Heidbrecht et al, 2018) and a relationship with quality-of-life (Best et al, 2011a; 2011b; Donovan et al, 2005). The correlation between age and abstinence is shown in the wider desistance literature in that involvement in illicit activities are predicted by the ageing process (Kasemian, 2007) encompassing life transitions and experiences (Sampson & Laub, 1993), although this has been shown to be moderated by ongoing opiate use (Pierce et al, 2015).

The findings confirm the importance of developing recovery strengths as means to curtailing illicit drug use, although the causal ordering of this effect cannot be assessed using current data. Compared to Brewer's meta-analysis (1998), no association was noted with unemployment which may be due to large numbers of the treatment population being recorded as unemployed or economically inactive. The association between coexisting problems (which was driven by psychological needs as one of its subdomains) and abstinence may be considered counter intuitive as psychological distress has been theorised to form "negative" recovery capital (Cloud & Granfield, 2008). Prevalence rates for psychological disorders are known to be high among those with substance use issues (Marsden et al, 2000) and dual diagnosis issues have been shown to result in lower acceptance and adherence to treatment programmes, often resulting in poorer treatment outcomes including relapse (Chung, 2005; Grella et al, 2001; Winters, 1999; Kaminer et al, 1992).

Although there is evidence that mental health disorders may precede drug use (Shivola et al, 2008), there may be a link between increased psychological need for those in treatment due to prior drug use causing withdrawal symptoms (Alaja et al, 1997) and withdrawal psychosis (Levinson et al, 1994). An Australian longitudinal cohort study of heroin users in treatment found abstinence was also correlated with elevated levels of psychological distress (Darke et al, 2007). The authors speculated that psychological distress was used a motivator for behavioural changes including becoming drug free.

This study offers a unique opportunity to understand service users' holistic needs (addiction severity, coexisting health and social problems and recovery strengths) based on a validated assessment schedule using practitioner perspectives of their caseload combined with self-report data. Practitioner perspectives offer objective and accurate assessments of an individual's holistic needs based on the strength of the therapeutic relationship and allowing for comparisons to be made across a caseload. This will ensure consistency in establishing the severity of clinical or social needs. There is also an opportunity to further develop and refine the findings using more focused tools that examine the relationship with the other prognostics shown in this study. For example, more work is required to understand the association between mental health issues, engagement in treatment and receipt of MAT with concurrent use.

5. Strengths and Limitations

Few UK studies have focused on the relationship between concurrent illicit drug use and engagement in MAT. This study provides an overview of holistic and recovery-focused factors that are associated with concurrent use of opiates and crack/cocaine whilst in MAT. The large cohort size with no missing or unknown cases enhance the utility of the data collected. Information collected as part of the care-planning process enhances is based on the strength of the worker-client relationship and offers a unique assessment into the complex nature of an individual's narrative whilst in receipt of MAT.

The study also has some limitations. Firstly, the study was based on a single location within one English mixed rural/urban County Council area rather than a multicentre study. Secondly, whilst the study demonstrates statistical associations between concurrent illicit drug use and a range of prognostic variables, it is limited in terms of its explanatory capacity, as certain key variables were not available including dose levels. Finally, ADAPT and NDTMS/TOP were opportunistically matched based on the treatment services' 12-week review process rather than assessing measures over a longer time period (for example, at six months or beyond).

6. Concluding Remarks

This study highlights the extent and nature of concurrent illicit opiate and cocaine use among individuals in receipt of MAT. Our findings suggest there are opportunities for developing coherent and tailored responses that situate concurrent use within a recovery-orientated approach. Interventions aimed at addressing concurrent Class A use whilst in receipt of MAT therefore should consider a stepped-care approach that focuses on managing substance misuse (urges and control, supporting reductions in injecting and alcohol consumption) that is age-specific (e.g. calibrated towards younger service users). This approach should be augmented by interventions enhancing an individual's recovery strengths supporting psychological needs to sustain an improved quality-of-life within an integrated package of care.

7. Disclosure Statement

The authors report no conflict of interest.

8. Acknowledgements

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TABLES

Table 1: Socio-Demographic & Treatment-referral Profile of Participants receiving MAT (n=776)

Client Characteristics	Number	Percentage
Gender		
- Male	563	73%
- Female	213	27%
Ethnic Group		
- White	719	93%
- Non-White	57	7%
Referral Route		
- Self	459	59%
- Criminal Justice	147	19%
- Other	170	22%
	Mean Age/Range	Standard Deviation
Age	40.7 years (19-70 years)	7.89

Table 2: ADAPT Domain Group Strata, (n=776)

	Addiction Severity		Coexisting Health and Social Problems		Recovery Strengths	
	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>
Low	320	41%	394	51%	324	42%
Moderate	311	40%	234	30%	313	40%
High	145	19%	148	19%	139	18%

Table 3: Association between ADAPT and TOP measures and being abstinent from Opiate and/or crack/cocaine: logistic regression (n=776)

	Odds Ratio	P>[z]	95% Confidence Interval
Addiction Severity Rank			
1. Low	12.55	0.000	[6.49, 24.27]
2. Moderate	2.49	0.006	[1.30, 4.77]
3. High	1 (base)		
Recovery Strengths Rank			
1. Low	1 (base)		
2. Moderate	1.37	0.143	[0.90, 2.10]
3. High	2.30	0.004	[1.30, 4.07]
Health and Social Complexity Rank			
1. Low	1 (base)		
2. Moderate	1.91	0.004	[1.23, 2.96]
3. High	2.20	0.008	[1.23, 3.92]
Abstain from Alcohol (TOP)			
No	1 (base)		
Yes	1.55	0.027	[1.05, 2.30]
Abstain from Injecting (TOP)			
No	1 (base)		
Yes	2.38	0.02	[1.15, 4.93]
Quality of Life	1.05	0.039	[1.00, 1.10]
Age	1.03	0.004	[1.01, 1.06]

Table 4: Effect sizes and p-values for dichotomous outcome (14 ADAPT subdomains)

	Odds Ratio	P>[z]	95% Confidence Interval
Urge and Control			
None	27.45	0.000	[13.18, 57.16]
Low	5.61	0.000	[2.86, 11.00]
Moderate	1.20	0.605	[0.60, 2.43]
High	1 (base)		
Psychological Health			
None	1 (base)		
Low	2.00	0.002	[1.29, 3.10]
Moderate	2.97	0.000	[1.67, 5.29]
High	5.36	0.039	[1.09, 26.36]
Abstain from Injecting (TOP)			
No	1 (base)		
Yes	2.58	0.014	[1.21, 5.49]
Quality of Life	1.06	0.009	[1.02, 1.11]
Age	1.03	0.026	[1.00, 1.05]