



## Treating substance abuse is not enough: Comorbidities in consecutively admitted female prisoners



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### HIGHLIGHTS

- A majority of 62% of females have substance use disorders at admission to prison.
- Opiates are the most frequent substances of addiction in 35% of this population.
- Addictions are highly comorbid with affective, personality and anxiety disorders.
- Comorbidities do not differ between subgroups addicted to different substances.
- Interventions should be generic, robust and flexible to cover different disorders.

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### ABSTRACT

**Introduction:** Several studies have pointed to high rates of substance use disorders among female prisoners. The present study aimed to assess comorbidities of substance use disorders with other mental disorders in female prisoners at admission to a penal justice system.

**Methods:** A sample of 150 female prisoners, consecutively admitted to the penal justice system of Berlin, Germany, was interviewed using the Mini-International Neuropsychiatric Interview (MINI). The presence of borderline personality disorder was assessed using the Structured Clinical Interview II for DSM-IV. Prevalence rates and comorbidities were calculated as percentage values and 95% confidence intervals (CIs).

**Results:** Ninety-three prisoners (62%; 95% CI: 54–70) had substance use disorders;  $n = 49$  (33%; 95% CI: 24–42) had alcohol abuse/dependence;  $n = 76$  (51%; 95% CI: 43–59) had illicit drug abuse/dependence; and  $n = 53$  (35%; 95% CI: 28–44) had opiate use disorders. In the group of inmates with substance use disorders, 84 (90%) had at least one other mental disorder;  $n = 63$  (68%) had comorbid affective disorders;  $n = 45$  (49%) had borderline or antisocial personality disorders; and  $n = 41$  (44%) had comorbid anxiety disorders.

**Conclusions:** Female prisoners with addiction have high rates of comorbid mental disorders at admission to the penal justice system, ranging from affective to personality and anxiety disorders. Generic and robust interventions that can address different comorbid mental health problems in a flexible manner may be required to tackle widespread addiction and improve mental health of female prisoners.

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### 1. Introduction

The number of imprisoned women has been increasing faster than the number of male prisoners worldwide and it has been suggested that female prisoners may have specific health care needs (van den

Bergh, Gatherer, & Moller, 2009; Walmsley, 2014). Despite this, most of the research so far has been conducted in male prisoners (Jordan, Schlenger, Fairbank, & Caddell, 1996). Existing evidence suggests that female prisoners have comparatively higher rates of addiction than male prisoners (Binswanger et al., 2010; Butler, Allnutt, Cain, Owens, & Muller, 2005; Fazel & Baillargeon, 2011; Steadman, Osher, Robbins, Case, & Samuels, 2009; von Schönfeld et al., 2006). However, prevalence estimates for female prisoners have only been reported from few countries so far (Fazel, Bains, & Doll, 2006). Moreover, they showed important variations between 10 and 24% for alcohol abuse/dependence

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and 30 and 60% for drug abuse/dependence for the one-year prevalence rates in a previous review (Fazel et al., 2006). The variations may be due to cultural and legal contexts. Drug abuse/dependence in consecutively admitted female prisoners might have been increasing over time. Different studies from the US reported lifetime prevalence rates of 26% in 1988 (Daniel, Robins, Reid, & Wilfley, 1988) and 44% in 1996 (Jordan et al., 1996). More recent research from Australia showed that 62% of female prisoners had used illegal drugs in the six months prior to arrest without specifying whether criteria for abuse or dependence were fulfilled (Johnson, 2006). A study of newly committed female prisoners conducted in Ireland had reported 48% prevalence of drug use disorders (Wright et al., 2006). Heroin had been identified as the most frequent substance causing dependence in female prisoners in the UK (Brooke, Taylor, Gunn, & Maden, 1998; Maden, Swinton, & Gunn, 1990). However, the types of illegal drugs of addiction were frequently not further specified in previous research. In all, the prevalence rates of drug associated disorders in female prisoners were estimated to be 13 times higher than those in the general population (Fazel et al., 2006).

Addiction frequently co-occurs with other mental disorders in the general population (Compton, Thomas, Stinson, & Grant, 2007; van Emmerik-van Oortmerssen et al., 2014). The description of such comorbidities for prison populations had been identified as research necessity in a recent meta-analysis (Fazel & Seewald, 2012). The priority is then to develop adequate treatments, which acknowledge the primary substance of addiction and comorbidities with other mental disorders, the so called 'dual disorders' (Mundt et al., 2013). Previous research has demonstrated, with respect to nicotine addiction of prisoners, that treatment was superior to mere forced abstinence in smoke free jails, which by itself had hardly any effect on the addiction after release (Clarke et al., 2013). Most previous prison mental health studies have been conducted with samples from all existing prisoners with varying times spent in imprisonment. Research should assess addiction and comorbidities in newly received prisoners using structured clinical interviews to assess states of addiction prior to admission. At a later stage of imprisonment, reduced access to substances inside penal justice systems may lead to negative scores on the standardized interview schedules resulting in missed diagnoses. Studies sampling from newly received prisoners will include mainly people with short-term and repeat sentences, among them people with addiction. In contrast, studies of all existing inmates tend to include a larger proportion of long-term prisoners, for many of whom the addiction may not be the most relevant problem.

Previous prison mental health studies from Germany recruited already existing prisoners at varying stages of imprisonment and they included all male or mixed gender samples with relatively small numbers of females (Dudeck et al., 2009; von Schönfeld et al., 2006). The severity of traumatic experiences was significantly related with the prevalence of substance use disorders in a study from Germany (Driessen, Schroeder, Widmann, von Schönfeld, & Schneider, 2006). The present study conducted in Berlin, Germany, aimed to assess the prevalence rates of substance use disorders and their comorbidities with other mental disorders in female prisoners newly committed to the penal justice system.

## 2. Methods

This was a cross-sectional study of a sample of consecutively admitted female prisoners in Berlin, Germany.

### 2.1. Sample

The sample was recruited from the central prison admission facility for females, which serves the state of Berlin, Germany, an urban area with 3.5 million people, including the open, semi-open and closed systems. The facility does not serve women regarded to have reduced legal responsibility due to mental disorders in terms of §20 or §21 of

the German Criminal Law. We aimed to recruit a total sample of 150 participants. The sample size was expected to yield percentage estimates with reasonable 95% confidence intervals (CIs) for the total sample, i.e. 10% (95% CI: 5–15) or 20% (95% CI: 14–26). Prisoners with all types of verdict such as people in detention, remand prisoners and convicted prisoners were included in the study. The interview was usually scheduled within a week after imprisonment and always within the first month of imprisonment. Exclusion criteria for the study were the inability to communicate in German and a lack of capacity to provide informed consent.

### 2.2. Measures

Age, marital and employment status and educational and income levels were assessed on structured questions. The variables were dichotomized as living alone or with partner, education as low (comprising the categories 0–2 of the International Standard Classification of Education [ISCED] with all levels of education up to lower secondary levels of education) and high educational level (comprising the categories 3–6 of the ISCED with all educational levels from upper secondary level and higher (UNESCO Institute for Statistics, 2011)). Employment status was dichotomized to employed (including people in training under the age of 28 years) and unemployed (including people in training of 28 years or older and retired people). This classification is in accordance with German legislation which requires the long term unemployed to take part in trainings to continuously qualify for social benefits (Mundt et al., 2014). The income level was dichotomized to € < 990 and € ≥ 990 per month, which was the line of relative poverty for a single person household in 2010 ([http://www.diw.de/de/diw\\_01.c.411565.de/presse/diw\\_glossar/armut.html](http://www.diw.de/de/diw_01.c.411565.de/presse/diw_glossar/armut.html)). The background of migration was assessed using an instrument developed by Schenk et al. (2006). The type of criminal offense was recorded.

### 2.3. Mini-International Neuropsychiatric Interview

The fully structured Mini-International Neuropsychiatric Interview (MINI) 6.0 [German version] was conducted to assess mental health and substance use disorders. The MINI was developed by Sheehan and Lecrubier (Sheehan et al., 1998) to categorize mental disorders according to the fourth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The concordance between the MINI and longer interview schedules such as the Structured Clinical Interview for DSM-IV (SCID) is characterized by good or very good kappa values for most diagnoses (Sheehan et al., 1997). The inter-rater reliability of the MINI is characterized by kappa coefficients above 0.75 for all diagnoses and 0.9 for the majority of the diagnoses (Sheehan et al., 1997). The test–retest reliability introducing a second clinician for the rating was very good with kappa values above 0.75 for most diagnoses and below 0.40 for only one diagnosis (current mania) (Sheehan et al., 1997).

### 2.4. Structured Clinical Interview for DSM-IV

The MINI covers the antisocial personality disorders as only axis II diagnosis. Therefore, the interview schedule was supplemented by the module for borderline personality disorder (BPD) of the SCID (Fydrich, Renneberg, & Schmitz, 1997). The inter-rater reliability of the borderline module in the SCID-II was shown to have a kappa value of 0.78 (Arntz et al., 1992). The 1–3 week test–retest reliability of the borderline module was shown to have a kappa value of 0.48 (First et al., 1995).

### 2.5. Fagerström Test of Nicotine Dependence

Current smoking and the degree of nicotine dependence were assessed using the Fagerström Test of Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Reliability

estimates for the FTND were 0.56 (Payne, Smith, McCracken, McSherry, & Antony, 1994). The FTND was shown to be a valid self-report measure among alcohol- and drug dependent individuals (Burling & Burling, 2003). Scores of FTND ≥ 6 were considered high degrees of nicotine dependence.

2.6. Procedure

The capacity to give informed consent was tested by assessing the potential participant's ability to understand the purpose of the study. The field team consisted of two clinical psychologists trained and supervised by a senior consultant psychiatrist in using the instruments. The interviews lasted for 45–60 min and were held in a separate room of the prison to ensure confidentiality. The data were collected between April 2012 and May 2013. All interviewees provided written informed consent. The study was approved by the Ethics Board of the Charité Universitätsmedizin Berlin (EA1/302/11) and by the legal justice department of the State of Berlin, Germany (reference AL, 20.01.2012).

2.7. Analyses

Socio-demographic characteristics and prevalence rates of mental disorders were calculated as percent values. For the prevalence rates, 95% confidence intervals (CIs) using a bootstrap algorithm were computed. The mean and the standard deviation of the mean (SD) were calculated for the age. The statistical analyses were made using SPSS version 20.0.

3. Results

3.1. Recruitment

Fig. 1 shows the flow of recruitment for the study. During the recruitment period, 338 women entered the central facility for the admission of female prisoners to the penal justice system in Berlin.

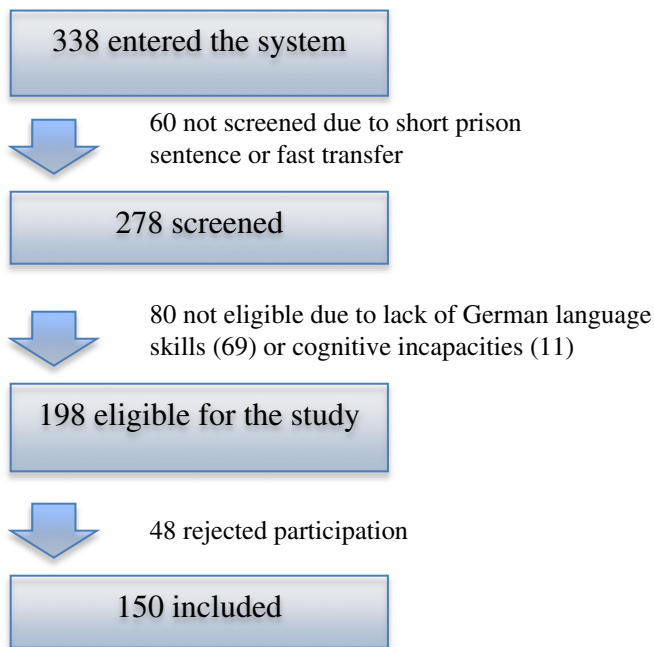


Fig. 1. Flow chart of the recruitment.

Of those, 278 women were screened for recruitment, 198 fulfilled the inclusion criteria and 150 agreed to participate in the survey.

3.2. Socio-demographic characteristics of the sample

The sample had a mean age of 34.3 ± 10.8 years. Most of the female prisoners, n = 139 (93%), were living alone; n = 89 (59%) had low educational levels corresponding to ISCED 0–2; n = 113 (75%) were unemployed; n = 114 (76%) were living below the poverty line; n = 124 (83%) were non-migrants and 104 prisoners (69%) were mothers of children. The index crimes were sorted to the following offense categories: n = 69 (46%) failure to pay a fine; n = 35 (23%) theft or fraud; n = 16 (11%) remand prisoners under investigation; n = 10 (7%) crimes related to drugs (possession or dealing); and n = 6 (4%) crimes related to immigration.

Table 1  
Prevalence rates of mental and substance use disorders in female prisoners.

Mental disorder	Total sample, N = 150		
	N	%	95% CI
≥ 1 disorder	136	91	85–95
≥ 2 disorder	107	71	64–78
Lifetime affective disorders	97	65	57–72
Major depression	8	5	2–9
Recurrent major depression	12	8	4–13
Previous major depression	20	13	8–19
Previous recurrent major depression	20	13	8–19
Mania	0		
Previous mania	3	2	0–5
Bipolar I disorder	13	8	5–13
Previous bipolar I disorder	13	8	5–13
Bipolar II disorder	2	1	0–3
Previous bipolar II disorder	6	4	1–7
Current affective disorder with psychotic features	1	1	0–2
Lifetime affective disorders with psychotic symptoms	8	5	2–9
Substance use disorders without nicotine <sup>a</sup>	93	62	54–70
Alcohol abuse/dependence	49	33	25–41
Alcohol abuse	18	12	7–17
Alcohol dependence	31	21	15–27
Illicit drug abuse/dependence	76	51	43–59
Illicit drug abuse	5	3	1–7
Illicit drug dependence	71	47	39–55
• Opiates	53	35	28–44
○ Heroin	41	27	20–35
○ Opiate substitution	19	13	8–20
• Marihuana	28	19	13–26
• Cocaine	25	17	11–23
• Amphetamines	14	9	5–15
• Hallucinogenics	3	2	0–4
• Gamma-hydroxybutyric acid	2	1	0–3
Current smoking	121	81	75–87
Nicotine dependence (FTND: 6–10 points)	62	41	33–50
Anxiety disorders	65	43	36–51
Current panic disorder	7	5	1–8
Lifetime panic disorder	25	21	15–28
Agoraphobia	18	12	7–17
Social anxiety disorder	7	5	1–8
Generalized anxiety disorder	3	2	0–5
Obsessive compulsive disorder	11	7	3–11
Posttraumatic stress disorder	39	26	19–33
Current psychotic disorder	3	2	0–5
Lifetime psychotic disorder	8	5	2–9
Anorexia nervosa	4	3	1–5
Bulimia nervosa	0		
Personality disorder (BPD/ASPD)	53	35	28–43
Antisocial personality disorder	41	27	20–38
Borderline personality disorder	22	15	9–21
Risk of suicide			
• None	70	47	38–55
• Low	63	42	34–51
• Medium	5	3	1–6
• High	12	8	4–13

<sup>a</sup> One year prevalence rates; BPD = borderline personality disorder; APD = antisocial personality disorder.

### 3.3. Mental disorders in female prisoners with substance use disorders, with alcohol use disorders, with illicit drug use disorders and with opiate addiction

Prevalence rates of mental and substance use disorders are shown in Table 1. Most prisoners,  $n = 136$  (91%; 95% CI: 85–95), had at least one mental disorder;  $n = 97$  (65%; 95% CI: 57–72) had at least one affective disorder;  $n = 93$  (62%; 95% CI: 54–70) had any one-year prevalence of substance use disorders without nicotine;  $n = 31$  (21%; 95% CI: 15–27)

and BPD in 22 prisoners (15%; 95% CI: 9–21). Low risk of suicide was present in  $n = 63$  (42%; 95% CI: 34–51), medium risk in  $n = 5$  (3%; 95% CI: 1–6) and high risk in  $n = 12$  (8%; 95% CI: 4–13) of the sample.

Comorbidities of mental health and substance use disorders are shown in Table 2. Ninety percent of the people with addiction had at least one other mental disorder. Addiction co-occurred with affective disorders in  $n = 63$  (68%), with anxiety disorders in  $n = 41$  (44%), with personality disorders in  $n = 44$  (47%) and with suicidal ideation

**Table 2**  
Substance use disorders and their comorbidities in female prisoners. Patterns of comorbidities are shown for subgroups of prisoners with alcohol use, drug use and opiate use disorders.

Mental disorder	Substance use disorders (without nicotine) N = 93		Alcohol use disorders N = 57		Illicit drug use disorders N = 76		Opiate use disorders N = 53	
	N	%	N	%	N	%	N	%
≥2 disorder	84	90	45	92	71	93	49	93
Lifetime affective disorders	63	68	34	69	52	68	34	64
Major depression	3	3	0		3	4	2	4
Recurrent major depression	9	10	5	10	8	11	7	13
Previous major depression	10	11	4	8	9	12	8	15
Previous recurrent major depression	15	16	7	14	13	17	9	17
Mania	0		0		0		0	
Previous mania	2	2	1	2	2	3	2	4
Bipolar I disorder	11	12	8	16	8	11	3	6
Previous bipolar I disorder	9	10	6	12	7	9	2	4
Bipolar II disorder	1	1	1	2	0		0	
Previous bipolar II disorder	3	3	2	4	2	3	1	2
Current affective disorder with psychotic features	1	1	1	2	0		0	
Lifetime affective disorders with psychotic symptoms	6	6	4	8	4	5	3	6
Alcohol abuse/dependence	49	53			32	42	19	36
Alcohol abuse	18	19	18	37	12	16	5	9
Alcohol dependence	31	33	31	63	20	26	14	26
Illicit drug abuse/dependence	76	82	32	65				
Illicit drug abuse	5	5	3	6	5	7	1	2
Illicit drug dependence	71	76	29	59	71	93	52	98
• Opiates	53	57	19	39	53	70		
○ Heroin	41	44	12	24	41	54	41	77
○ Opiate substitution	19	20	9	18	19	25	19	36
• Marihuana	28	30	14	29	26	34	17	32
• Cocaine	25	27	12	24	25	33	20	38
• Amphetamines	14	15	9	18	14	18	8	15
• Hallucinogenics	3	3	2	4	3	4	0	
• Gamma-hydroxybutyric acid	2	2	2	4	2	3	1	2
• Current smoking	86	92	45	92	70	92	53	100
Nicotine dependence (FTND: 6–10 points)	46	49	27	55	35	46	27	51
Anxiety disorders	41	44	23	47	32	42	21	40
Current panic disorder	5	5	3	6	4	5	3	6
Lifetime panic disorder	19	20	7	14	12	16	10	19
Agoraphobia	12	13	9	18	6	8	5	9
Social anxiety disorder	6	7	5	10	4	5	2	4
Generalized anxiety disorder	2	2	2	4	1	1	1	2
Obsessive compulsive disorder	7	8	5	10	6	8	4	8
Posttraumatic stress disorder	26	28	15	31	23	30	15	28
Current psychotic disorder	0		0		0		0	
Lifetime psychotic disorder	7	8	5	10	6	8	5	9
Anorexia nervosa	3	3	2	4	2	3	2	4
Bulimia nervosa	0		0		0		0	
Personality disorder (BPD/ASPD)	44	47	18	37	37	49	27	51
Antisocial personality disorder	35	38	18	37	29	38	24	45
Borderline personality disorder	16	17	11	24	13	17	7	13
Risk of suicide								
• None	39	42	21	43	33	43	24	45
• Low	42	45	24	49	32	42	22	42
• Medium	2	2	1	2	1	1	1	2
• High	10	11	3	6	10	13	6	11

had alcohol dependence and  $n = 71$  (47%; 95% CI: 39–55) had illicit drug dependence. The most important illicit substances of addiction were opiates, marihuana, cocaine and amphetamines (see Table 1). Anxiety disorders were prevalent in 65 prisoners (43%; 95% CI: 36–51); APD was prevalent in 41 prisoners (27%; 95% CI: 20–35)

in  $n = 54$  (58%). People with different types of addiction, such as alcohol use disorders, illicit drug use disorders and among them the subgroup with opiate addiction had comorbidities with a range of different psychiatric disorders. There was no specific pattern of comorbidities associated with addiction or any of the different types of addiction.

## 4. Discussion

### 4.1. Main results

About two thirds of the consecutively admitted female prisoners had substance use disorders, mainly associated with opiates. Of the prisoners with addiction, 90% had at least one other mental disorder. Different types of addiction frequently co-occurred with affective, personality and anxiety disorders.

### 4.2. Strengths and limitations

This is the first study that systematically explores the comorbidity of substance use disorders and mental disorders in female prisoners at admission to the penal justice system. The study recruited consecutively admitted women so that the sample included newly received female prisoners regardless of their length or type of verdict. Independent researchers established diagnoses using standardized instruments.

The study also has several limitations. Firstly, the recruitment was carried out in one site responsible for all admissions of female prisoners in one German metropolitan area and it remains unclear as to what degree the findings can be generalized to other regions in Germany or internationally to other legal, social and cultural contexts. Secondly, the sample did not include non-German speaking prisoners, and the prevalence of both addiction disorders and other comorbid mental disorders may be different in migrants.

### 4.3. Comparison against the literature

The prevalence rates of mental health and substance use disorders found in our study are much higher than those in the female general population in Germany (Jacobi et al., 2014). This is in line with most previous prison research (Fazel et al., 2006). Whereas the rates of serious mental illnesses were within the expected range from previous prison studies (Fazel & Seewald, 2012), the rate of alcohol addiction was even higher than expected from the literature (Fazel et al., 2006).

Most previous prison mental health studies used sampling designs including all existing inmates. Those studies recruited largely longer-term prisoners as compared to studies sampling from all admissions to a system. In samples of all existing prisoners at least part of the sample is under forced abstinence when the assessment took place. They may therefore be less meaningful to assess addictions and comorbidities. The most comparable study to ours reported prevalence rates of female prisoners in the US (Gunter et al., 2008). It used the same diagnostic instrument and the same sampling strategy (Gunter et al., 2008). Surprisingly similar rates were found for current major depression (14% US vs. 13% present), PTSD (23% US vs. 26% present), substance use disorders (68% US vs. 62% present) and APD (27% US vs. 27% present), whereas even higher rates were reported for current bipolar disorder (25% US vs. 10% present). Given that our study showed very similar prevalence rates of mental health and substance use disorders in the total sample compared to the study conducted in the US, the comorbidities reported in this study may be generalizable to wider contexts including the US. Female prisoners with substance use disorders and several subgroups with specific addictions (to alcohol, drugs and opiates) very commonly also had affective, personality and anxiety disorders without any specific patterns of comorbidities. The rates of comorbid anxiety disorders or depression in female prisoners with opiate addiction were higher than the rates of those comorbidities reported for people with opiate addiction in community addiction treatments (Goldner, Lusted, Roerecke, Rehm, & Fischer, 2014). The findings indicate that the development of adequate interventions for prisoners has to consider addiction commonly co-occurring with a range of comorbidities. Any pure addiction focus or focusing on a specific dual disorder may not be sufficient to plan the provision of adequate services.

### 4.4. Implications for research, politics and health service development

Prevalence rates of mental health and substance use disorders of prison populations could be more similar across different international contexts than previously thought, if studies using the same structured interview and the same sampling strategy were compared. Effective interventions need likely to be non-specific with respect to the disorder, generic, robust and flexible. They not only need to contain elements to sustain abstinence beyond imprisonment but also need to allow for comorbidities of a range of other mental health conditions. Interventions not focussing on pathologies or deficits at all, such as resource-oriented therapies could be a promising option for future developments (Priebe, Omer, Giacco, & Slade, 2014).

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The funder had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

#### Contributors

JM, APM, SP, NK and AS designed the study; JM and SK collected the data; JM, SK, and APM analyzed the data; JM, APM, and SP drafted the manuscript; SK, NK, and AS revised the manuscript for important intellectual content.

#### Conflicts of interest

There are no conflicts of interest for any of the authors.

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