UCLA
UCLA Previously Published Works

Title

Circumstances of initiation into new-type drug use among adults in Shanghai: Are there differences by types of first new-type drug used?

Permalink

https://escholarship.org/uc/item/9855w9qm

Journal

Drug and Alcohol Dependence, 131(3)

ISSN

0376-8716

Authors

Ding, Yingying
He, Na
Detels, Roger

Publication Date

2013-08-01

DOI

10.1016/j.drugalcdep.2012.12.019

Peer reviewed

Circumstances of initiation into new-type drug use among adults in Shanghai: Are there differences by types of first new-type drug used?

Yingying Ding [a,b], Na He [a], Roger Detels [b,*]

[a] Department of Epidemiology, School of Public Health, Fudan University, and the Key Laboratory of Public Health Safety of Ministry of Education, Shanghai, China
[b] Department of Epidemiology, UCLA Fielding School of Public Health, Los Angeles, CA, USA

ARTICLE INFO

ABSTRACT

Background: This study investigated circumstances of initiating new-type drug use among adult new-type drug users and differences among those who first used methamphetamine, ecstasy and ketamine.
Methods: A total of 276 participants were recruited, using respondent-driven sampling (RDS) from nine seeds recruited through NGOs, social workers and outreach workers in Shanghai, China.
Results: Methamphetamine was the most frequently reported first new-type drug used (37.1%), followed by ecstasy (35.6%) and ketamine (20.0%). 38.7% of participants initiated new-type drug use before the age of 21 years. 47.8% knew at initiation that club drugs can be harmful. Most were introduced to new-type drug use by friends, spouses or boy/girlfriends. The three most common reasons for initiation were curiosity, peer influence, and wishing to dull one's emotions. Those first using methamphetamine were more likely to be female, have a monthly individual income less than 3000 Yuan (approx. $476), initiate use at 21 years or older and at private setting than those first using ecstasy and ketamine.
Conclusions: There is an urgent need for drug education efforts in China to raise awareness of the harms of new-type drugs, as well as to increase knowledge about the paradox of new-type drug effects. Drug prevention and intervention programs should be tailore to target populations and their social context.

1. Introduction

China has recently experienced a significant increase in the use of new-type drugs (UNODC, 2011), which refers to a category of recreational drugs emerging in China in recent years, as distinguished from opium and heroin (Yang and Xia, 2010). At the end of 2010, 0.43 million people in China were using new-type drugs (ATS, ketamine, etc.), accounting for 28% of the 1.54 million registered drug users (UNODC, 2011; National Narcotics Control Commission, 2011). The most common new-type drugs in China are methamphetamine, ecstasy, and ketamine (UNODC, 2011). In western countries, these drugs are often called "club drugs" (NIDA, 2010), because their initial popularity was in "raves" (all-night dance parties), attracting primarily adolescents and young adults (Koesters et al., 2002). However, they are now widely used in other settings (Lankenau and Clatts, 2002; Degenhardt et al., 2008). Ecstasy, methamphetamine, GHB, Rohypnol and ketamine are some of the drugs included in this group (NIDA, 2010), and cocaine and marijuana were also included in some studies (Gahlinger, 2004; Romanelli et al., 2003).

Recently, policy makers have begun to acknowledge the need for preventing drug abuse before it starts, which is believed to be the most effective strategy to protecting vulnerable groups from developing dependence and avoiding the negative consequences of drug abuse (UNODC, 2009). Prior studies have indicated that initiation of drug use usually occurs in adolescence and early adulthood (Spooner, 2009) for many different reasons, including curiosity, peer influence, escape from boredom, and coping with stress (De Micheli and Formigoni, 2002). Initial use is usually in a social context with partners or friends (Parsons et al., 2007). Initial use of club drugs has been documented in few studies (Brecht et al., 2007; Parsons et al., 2007; Sherman et al., 2008; Vervaeke et al., 2008). A study of methamphetamine users found that the internal reasons for initial use were curiosity, to lose weight, to enhance hard work, and to forget life's problems (Sherman et al., 2008). A study of gay and bisexual men indicated that most participants initiated use in a house/apartment or a club/bar, and in a social context rather than alone (Parsons et al., 2007).

Nevertheless, research focusing on new-type drugs in China is limited, probably because recreational use is a relatively recent trend. A study of detained (incarcerated) club drug users in Shanghai reported peer influence and sensation-seeking as the main reasons for using drugs (Yang and Xia, 2010). Designing

* Corresponding author at: Department of Epidemiology, 71-269 CHS, UCLA Fielding School of Public Health, Los Angeles, CA 90095-1772, USA. Tel.: +1 310 206 2837; fax: +1 310 206 1601.
E-mail address: detels@ucla.edu (R. Detels).

Table 1
Seeds' ages, gender, occupation and recruitment attainment.

Seed ID	Age	Gender	District[a]	Occupation	No. of recruits	No. of waves linked	Total no. of recruits linked
1	36	F	Hongkou	Service industry	2	8	83
2	39	M	Minhang	Unemployed	1	1	1
3	55	M	Minhang	Retired	2	1	2
4	25	M	Putuo	Service industry	4	1	4
5	35	M	Minhang	Enterprise	1	1	1
6	25	M	Xuhui	Solo business owner	1	4	23
7	30	F	Minhang	Solo business owner	4	5	29
8	25	M	Huangpu	Unemployed	1	3	23
9	19	M	Huangpu	Service industry	5	8	101

[a] Refers to district in Shanghai, which has 16 districts and one county.

prevention and early intervention programs requires knowledge of reasons for and context of drug use initiation; however, there has not been a study that has thoroughly examined these issues in China. Therefore, the purpose of this study was to investigate the circumstances of initiating new-type drug use in China, focusing mainly on methamphetamine, ecstasy and ketamine. Given that, unlike ecstasy and ketamine, methamphetamine is more frequently used in settings other than in clubs (Sherman et al., 2008), and given the different physiological and psychological effects of these drugs (Gahlinger, 2004), we further examined the differences among those first using methamphetamine, ecstasy, or ketamine with regards to sociodemographics and reasons for and contexts of initiation, which may help in designing prevention and interventions tailored to specific drugs and populations.

2. Methods

2.1. Participants and procedures

Study subjects were 276 new-type drug users recruited between May and October 2011 in Shanghai, China. Eligibility criteria included being 18 years or older, being a resident of Shanghai, not in any formal drug abuse treatment program within the past 30 days, and self-reported use of methamphetamine, ecstasy/MDMA, and or ketamine once in the past three months and three times or more in the past 12 months.

Participants were recruited via respondent-driven sampling (RDS). Due to the illegal status of drug use in China, there is no list of new-type drug users for probability sampling. RDS was developed for hidden and hard-to-reach populations, and has been employed successfully to recruit drug users in several studies (Hathaway et al., 2010; Platt et al., 2006; Wang et al., 2005). Nine eligible "seeds" who met the inclusion criteria were recruited. Among them, two were recruited from referred by NGO personnel who knew them; three were approached by social workers; four were recruited by outreach workers. Five seeds were recruited at the first month of data collection, two seeds were recruited 1 month after and two seeds recruited 1 month after that. After the seeds completed their interviews, they were asked to refer others "like themselves" who had used new-type drugs recently. The specific eligibility criteria were not given, which helped to prevent ineligible individuals from using that information to gain entry into the study. As suggested by Heckathorn (1997), three coupons were given to each participant. Additional coupons (a maximum of 3) were given to 16 individuals when the recruitment process slowed or because certain subpopulations were particularly difficult to reach (e.g., female, specific occupation, etc.). When a referee called or came to participate in the study, they were asked a series of questions that allowed project staff to make a preliminary eligibility determination, which was confirmed again upon presentation at the project interview office.

Prior to conducting interviews, all eligible persons were provided with appropriate information to facilitate the informed consent process. Methods were approved by the Institutional Review Board of the University of California, Los Angeles and the Ethics Board of Fudan University. All participants had the option of completing a self-administered paper-and-pencil survey either in a private room at Fudan University or in another place they preferred. On average, interviews took 30–45 min to complete. Participants received $US 15 for completing the study questionnaires, and $US 6 for each successful referral from their social and sexual networks.

2.2. Measures

2.2.1. First new-type drug used.
The specific drugs of interest in this study were methamphetamine, ecstasy, ketamine, LSD, marijuana, cocaine, magu, happy water, magic mushroom, and cough mixture for non-medical use. First new-type drug used was measured by asking "Which of the following new-type drugs (i.e., ten above-mentioned drugs) you have used first?"

2.2.2. Circumstances of initiating use of new-type drugs.
This explored the circumstances of a participant's experience of first new-type drug. Participants were asked their age at initiation of new-type drug use, whether they were aware of potential harm from new-type drugs at that time, whether they ever used other drugs (i.e., heroin, opiates, or morphine) prior to initiation, persons who initiated them into new-type drug use, where they took new-type drugs at initiation, and their reasons for initiation (multiple choices).

In addition, the following characteristics were collected: gender, age, marital status, educational level, occupation, monthly individual income, and sexual orientation. Solo business owner (i.e., *getihu*) refers to individuals who are self-employed, small business owners, or laborers.

2.3. Statistical analysis

Initially, sample population proportions and estimated population proportions and 95% confidence intervals (CI) generated by the RDS Analysis Tool 6.0 (RDSAT) were reported. The latter are weighted proportions, which account for differential social network sizes and homophily (Salganik and Heckathorn, 2004). Relative network size was based on the response to the question: "How many other new-type drug users (i.e., club drug users) in Shanghai do you know now and do they also know you?"

Chi-square and Anova were used to examine differences in sociodemographic and circumstances among those who first used methamphetamine, ecstasy and ketamine. Stepwise multinomial logistic regression was further used to determine which sociodemographic and circumstances was associated with type of first drug used (i.e., methamphetamine (referent), ecstasy, and ketamine).

Variables that had a *p*-value less than 0.10 in the bivariate analyses were selected for entry into the multinomial model or based on prior knowledge of their relationship with type of new-type drug first used. A backward stepwise procedure was used, the significance level for variable removal from the model was set at 0.15. The individualized weights generated by RSDAT for the dependent variable were used to weight the data set for multivariate analysis (Heckathorn, 2007). Statistical analyses were performed using SAS, version 9.2.

3. Results

A total of nine seeds were identified and 276 participants were recruited. 705 recruitment coupons were distributed, 292 (41.4%) were returned, of whom 267 (91.4%) completed the survey, 25 (8.6%) were excluded due to being found ineligible during screening. As shown in Table 1 of the nine referral chains, four (44.4%) had a length of four or more recruitment waves. These four referral chains produced 236 recruits, accounting for 85.5% of the total recruits. Stabilization with respect to the age, gender and occupation groups was obtained after five to six waves (Data not shown).

3.1. Sample characteristics

Crude estimates showed that 72.8% respondents were male and had a median age of 26 years (range: 18–55). Only 25.4% had ever been married and 66.3% had finished high school. The majority (85.5%) was employed, and 64.1% had a monthly income of 3000 Yuan or above. About one-fifth (20.6%) self-identified as homosexual or bisexual (Table 2).

3.2. Circumstances of initiating new-type drug use

Crude estimates indicated that 37.1% reported methamphetamine as their first new-type drug used, followed by ecstasy (35.9%) and ketamine (20.0%). At initiation, the median age of participants was 22 years, 47.8% knew that drug use could be harmful, and 12.7% had ever used heroin or opiates before. Approximately 59.1% were introduced by friends and 40.9% were introduced by sex partners. 68.5% initiated at entertainment venues, 31.5% at private places. Curiosity was most frequently cited as the reason for initiation (54.4%), followed by peer influence (28.6%), dulling their emotions (20.7%), pleasure seeking (17.0%), being sociable (13.0%), enhancing sexual function (7.3%) and losing weight (6.9%) (Table 2).

3.3. Differences by type of new-type drugs first used

Results from bivariate analysis indicated that compared to those first using methamphetamine, those first using ecstasy and ketamine were significantly more likely to be male, report a monthly individual income of ≥3000 Yuan and initiating use at entertainment venues, but significantly less likely to report initiating use at 21 years or older and initiating use for losing weight (Table 3).

Results from multinomial logistic models showed that those who were male, had a monthly individual income of ≥3000 Yuan, and reported initiating use at entertainment venues had a significantly greater odds of first using ecstasy and ketamine compared to methamphetamine. Those who were older, reported initiating use at 21 years or older, being introduced by other sex partners or friends (vs. spouses or boy/girlfriends) and initiating use to enhance sex function had a significantly lower odds of first using ecstasy compared to methamphetamine. It is notable that those who reported initiating use at 21 years or older had a

marginally significantly lower odds of first using ketamine compared to methamphetamine (Table 4).

4. Discussion

The unemployment rate in our sample was similar to findings from other studies of new-type drug users (Parsons et al., 2007, 2009), but much lower than for users of heroin or opiates (Bao et al., 2012; Sordo et al., 2012). Some participants reported using

Table 2
Socio-demographics, sexual orientation, and circumstances of initiating club drug use of the sample (*n* = 276).

Variables	Crude % (*n*)	Weighted % (95% CI)
Sociodemographics		
Age (years), median (range)	26(18–55)	
Gender		
Female	27.2 (75)	29.6 (23.0–36.5)
Male	72.8 (201)	70.4 (63.6–77.0)
Education		
Junior high school or less	33.7 (93)	33.6 (25.7–41.7)
Senior high school or equivalent	41.7 (115)	39.6 (32.7–46.4)
College level or higher	24.6 (68)	26.8 (20.6–33.5)
Marital status		
Never married	74.6 (206)	72.9 (66.4–78.5)
Ever married	25.4 (70)	27.1 (21.5–33.6)
Occupation		
Enterprise, public institution or government	19.2 (53)	20.2 (14.2–25.9)
Service industry or solo business owner	66.3 (183)	67.2 (60.4–74.3)
Retired, unemployed or student	14.5 (40)	12.7 (8.3–17.8)
Monthly individual income (Yuan)		
<3000 ($US 476)	35.9 (99)	40.3 (32.5–47.8)
≥3000	64.1 (177)	59.7 (52.2–67.5)
Sexual identity		
Heterosexual	79.4 (219)	85.2 (78.5–91.8)
Gay/lesbian or bisexual	20.6 (57)	14.8 (8.2–21.5)
Circumstances of initiating club drug use		
Type of club drug first used		
Methamphetamine	37.1 (102)	37.4 (30.2–44.4)
Ecstasy	35.9 (99)	35.3 (28.1–40.6)
Ketamine	20.0 (55)	18.7 (14.4–25.2)
Magu	0.4 (1)	0.1 (0.1–0.3)
Marijuana	2.2 (6)	2.3 (0.2–5.0)
Cocaine	1.4 (4)	3.2 (0.7–5.1)
Cough mixture for nonmedical use	2.9 (8)	2.8 (1.4–5.6)
Happy water	0.4 (1)	0.2[a]
Magic mushrooms	0.0 (0)	
LSD	0.0 (0)	
Age at initiation (years), median (range)	22 (15–49)	
<21	38.7 (99)	64.8 (57.1–72.6)
≥21	61.3 (157)	35.4 (27.4–42.9)
Knew of potential harm prior to initiation	47.8 (132)	45.6 (39.4–52.4)
Used heroin or opiates prior to initiation	12.7 (35)	11.1 (6.2–16.4)
Persons introducing to first use		
Spouse, boy/girlfriend	24.6 (68)	23.6 (18.3–28.7)
Other sex partners	16.3 (45)	15.7 (11.4–20.6)
Friends or other	59.1 (163)	60.7 (54.2–67.4)
Venue of first use		
Nightclub or bar	30.1 (83)	23.9 (19.0–29.6)
Dance club	19.6 (54)	18.1 (13.8–23.5)
Karaoke bar	18.8 (52)	21.5 (15.4–25.6)
Their own or a friend's home	21.7 (60)	24.5 (19.8–30.4)
Hotel	8.7 (24)	10.2 (6.1–14.9)
Other	1.1 (3)	1.9 (0.7– 4.1)
Reasons for initiation		
Curiosity	54.4 (150)	52.3 (45.5–58.6)
Peer influence	28.6 (79)	24.8 (20.2–30.4)
Dull their own emotions	20.7 (57)	22.9 (17.0–29.0)
Pleasure-seeking	17.0 (47)	16.8 (11.3–22.1)
Socializing with others	13.0 (36)	14.0 (9.2–19.2)
Enhance sexual function	7.3 (20)	6.0 (3.6–9.4)
Lose weight	6.9 (19)	7.3 (4.0–11.0)
Other	4.4 (12)	3.8 (1.9–5.9)

[a] Number in cell size was too small to calculate confidence limits in RSDAT.

Table 3

Differences in socio-demographics, sexual orientation, and circumstances of initiating new-type drug use among those first using methamphetamine, ecstasy and ketamine (n = 256).

Variables	Crude % (n)				Weighted % (95% CI)		
	Meth (n = 102)	Ecstasy (n = 99)	Ketamine (n = 55)	p-value	Meth (n = 102)	Ecstasy (n = 98)	Ketamine (n = 55)
Age (years), median (range)	26 (18–53)	26 (18–55)	26 (18–45)	0.340			
Gender (male)	58.8 (60)	77.8 (77)	80.0 (44)	0.003	52.2 (38.6–66.9)	86.4 (82.0–94.4)	82.9 (70.2–90.9)
Education (≥ senior high school)	60.8 (62)	69.7 (69)	70.9 (39)	0.297	60.1 (49.3–75.6)	70.1 (62.5–81.0)	80.0 (66.3–89.8)
Marital status (ever married)	23.5 (24)	38.7 (27)	21.5 (14)	0.830	22.4 (13.0–31.3)	25.1 (16.0–35.0)	41.4 (24.5–57.3)
Occupation				0.097			
Enterprise, public institution or government	15.7 (16)	18.2 (18)	23.6 (13)		15.3 (6.9–24.8)	18.8 (11.6–30.9)	43.7 (16.4–68.3)
Service industry or solo business owner	63.7 (65)	71.7 (71)	69.1 (38)		68.4 (57.0–80.3)	65.4 (50.3–72.2)	54.0 (28.9–78.6)
Retired, unemployed or student	20.6 (21)	10.1 (10)	7.3 (4)		16.3 (8.1–25.8)	15.8 (10.3–25.9)	3.3 (0.7–7.7)
Monthly individual income (≥3000 Yuan)	49.0 (50)	70.7 (70)	78.2 (43)	<.001	40.9 (32.0–55.5)	72.7 (63.7–83.3)	81.5 (73.4–91.1)
Self-identified as gay/lesbian or bisexual	17.8 (17)	22.1 (21)	21.8 (12)	0.640	12.6 (4.5–22.5)	16.4 (9.1–30.0)	12.8 (4.9–22.6)
Age at initiation (≥21 years old)	70.6 (72)	55.6 (55)	54.5 (30)	0.046	68.9 (57.5–76.1)	54.0 (42.9–64.5)	54.0 (35.2–69.0)
Knew of potential harm prior to initiation	50.0 (51)	43.3 (43)	52.7 (29)	0.477	43.5 (33.4–57.6)	43.4 (38.7–58.9)	65.1 (52.2–77.4)
Used heroin or opiates prior to initiation	13.7 (14)	12.1 (12)	16.7 (9)	0.764	9.2 (3.4–16.5)	13.3 (7.1–21.3)	39.2 (30.1–54.2)
Persons introducing them to first use				0.708			
Spouse, boy/girlfriend	20.6 (21)	25.2 (25)	23.6 (13)		11.7 (6.9–19.5)	30.4 (19.9–39.7)	16.6 (6.8–28.3)
Other sex partners	13.7 (14)	17.2 (17)	20.0 (11)		16.8 (6.9–22.1)	16.5 (9.3–24.1)	23.1 (10.9–34.1)
Friends or other	65.7 (67)	57.6 (57)	56.4 (31)		71.5 (63.9–82.5)	53.1 (42.9–65.5)	60.3 (47.5–75.1)
Venue of first use				<.001			
Their own or a friend's home or hotel	55.9 (57)	7.1 (7)	25.4 (14)		53.9 (45.5–66.4)	11.2 (4.0–17.8)	34.7 (17.3–50.5)
Entertainment venue or other	44.1 (45)	92.9 (92)	74.5 (41)		36.1 (33.6–54.5)	88.8 (82.2–96.0)	65.3 (82.7–49.5)
Reasons for initiation							
Curiosity	48.0 (49)	62.6 (62)	47.3 (26)	0.067	45.7 (36.5–57.9)	57.9 (44.5–64.0)	35.1 (23.5–51.8)
Peer influence	27.4 (28)	28.3 (28)	29.1 (16)	0.975	24.3 (17.1–35.9)	19.4 (11.8–25.3)	28.2 (17.1–43.7)
Dull their own emotions	16.7 (17)	23.2 (23)	27.3 (15)	0.262	19.3 (9.1–31.3)	26.4 (17.7–37.8)	27.6 (18.0–40.3)
Pleasure-seeking	11.8 (12)	20.2 (20)	20.0 (11)	0.215	10.3 (3.9–14.0)	24.1 (11.6–29.2)	20.1 (6.7–44.1)
Socializing with others	9.8 (10)	11.1 (11)	21.8 (12)	0.080	8.2 (2.7–15.3)	10.5 (3.8–18.5)	30.1 (14.7–43.0)
Enhance sex function	9.8 (10)	4.0 (4)	10.9 (6)	0.197	8.3 (3.1–18.4)	1.3 (0.2–4.2)	14.3 (5.5–24.3)
Lose weight	11.8 (12)	4.0 (4)	5.4 (3)	0.093	12.2 (4.3–21.5)	2.4 (1.1–6.4)	4.5 (2.2–10.7)
Other	2.9 (3)	4.0 (4)	5.4 (3)	0.737	2.3 (1.6–5.2)	2.2 (1.1–6.2)	0 (0–0)

methamphetamine to be able to work long hours or stay focused on a task (Parsons et al., 2007). This suggests that new-type drugs may not have a serious impact on employment in the first years of use. Our data also indicated that one-fifth of users identified themselves as gay/bisexual, which is higher than their prevalence in the general population (Liu et al., 2006). This may be due to the high rates of new-type drug use among gay/bisexual populations (Liu and Detels, 2012; Parsons et al., 2006a,b).

The finding that the median age for initiating use was 22 years was consistent with other studies, indicating that many young adults are initiating the use of club drugs in their teens or early twenties (Lenton et al., 1997). Drug prevention efforts should target young Chinese in particular to reduce their likelihood of trying club drugs. However, it is of note that compared to ecstasy and ketamine, those who reported first using methamphetamine were more likely to initiate use in adulthood. The reason remains unclear, although earlier reports indicate that drug users tend to use ecstasy first, followed by ketamine, then methamphetamine (Halkitis and Palamar, 2008). The popularity of these drugs in different populations and social contexts in China may play a role.

We found that about 12% had used heroin before initiation of new-type drugs, indicating the usefulness of new-type drug prevention measures for heroin users referred for treatment. We also observed that almost half of the respondents had little or no knowledge about the harm from new-type drugs prior to initiation. In China, new-type drugs emerged and became popular in

Table 4

Multinomial logistic regression model examining correlates of first using ecstasy and first using ketamine compared to first using methamphetamine (n = 256).

Variables	Ecstasy vs. meth		Ketamine vs. meth	
	Adjusted OR (95% CI)	p-Value	Adjusted OR (95% CI)	p-Value
Age (years)	1.14 (1.07–1.22)	<.001	1.03 (0.96–1.11)	0.355
Gender (male)	5.74 (2.47–13.34)	<.001	3.92 (1.50–10.23)	0.005
Monthly individual income (≥3000 Yuan)	3.59 (1.66–7.78)	0.001	6.62 (2.67–16.41)	<.001
Age at initiation (≥21 years old)	0.18 (0.07–0.46)	<.001	0.39 (0.15–1.05)	0.062
Persons introducing them to first use				
Spouse, boy/girlfriend	1.00		1.00	
Other sex partners	0.24 (0.07–0.91)	0.035	0.77 (0.19–3.12)	0.716
Friends or other	0.21 (0.07–0.60)	0.003	0.47 (0.15–1.49)	0.201
Venue of first use				
Their own or a friend's home or hotel	1.00		1.00	
Entertainment venue or other	21.73 (7.93–59.54)	<.001	2.55 (1.08–6.01)	0.033
Reasons for initiation				
Socializing with others	0.56 (0.18–1.75)	0.319	2.24 (0.77–6.53)	0.139
Enhance sex function	0.12 (0.02–0.73)	0.021	1.67 (0.37–7.56)	0.508
Pleasure-seeking	2.74 (0.94–8.01)	0.066	1.23 (0.38–3.95)	0.734

Base-category: first using methamphetamine. Covariates were selected using backward stepwise logistic regression; variables available for selection included age, gender, occupation, monthly individual income, age at initiation, persons introducing them to first use, venue of first use, and four reasons for initiation (such as socializing with others, to enhance sex function, pleasure-seeking, to lose weight).

recent years and received relatively little attention in the media and research. Many people believe that they are not as harmful or as addictive as heroin. Therefore, efforts to raise public awareness of the harms of new-type drugs are urgently needed. However, these efforts may be effective only for a small proportion of population, as some of the participants tried drugs even when they knew their harms prior to initiation. The reasons for initiation are complex and numerous (Sherman et al., 2008; Spooner, 2009).

In our study, the major reasons for initiating use were similar for methamphetamine, ketamine and ecstasy. Curiosity was cited as the most frequent reason for initiation, which is consistent with other studies (Payne, 2007; Sherman et al., 2008). Although research suggested that person is usually expected to be curious to learn what she/he does not know (Loewenstein, 1994), it seems that the curiosity is rooted in high expectations about the effects of drugs originating from the claims put forward by illegal marketing strategies. Some users were intrigued by these effects regardless of negative consequences (Payne, 2007). As earlier reports (De Micheli and Formigoni, 2002; Spooner, 2009) and our data indicated, many users initiated use of drugs to fulfill physical or emotional needs. However, these effects are short-term, and the reverse occurs in the long term (Gahlinger, 2004; Parks and Kennedy, 2004), which should be emphasized in drug education programs. The findings also highlight the need of interventions to support young people in developing healthy lifestyles and emotional coping skills. One-third of the participants cited peer pressure or being sociable as primary reasons for initiation, and 60% were introduced by friends, which concur with numerous previous studies indicating the powerful influence of peers on initiating use of drugs (Daneshmandan et al., 2011; Sherman et al., 2008; Wood et al., 2008).

We noted that enhancing sex function was more likely to be cited as a reason for initiation into methamphetamine than ecstasy. The association between methamphetamine and sexual risk behaviors has been well established in diverse populations (Halkitis et al., 2005; Semple et al., 2004; Taylor et al., 2007). Although enhancing sex function is cited as a reason for initiating use of methamphetamine by only a small proportion of participants, future research is needed to examine whether it is a common reason for continued use of methamphetamine and the factors affecting its impact on risky sexual behaviors.

An interesting finding was that those who first used methamphetamine were more likely to be female. Brecht et al. (2004) suggested that females were more likely to be introduced to methamphetamine and continue to use it with spouses or boyfriends. Our data also indicated that methamphetamine users were more likely to have started using it for weight loss, and it was a common reason given by females. This may partly account for gender differences in types of drugs first used. However, the small sample size in our study precluded stratification by gender. Our data suggest that gender differences should be examined in future research and be taken into account for future interventions.

Because of the popularity of new-type drugs at dance parties, raves, and nightclubs, they are often referred to as "club drugs" (Gahlinger, 2004). However, these drugs are widely used in other settings (Fendrich et al., 2003), which is further supported by our finding that more than half initiated methamphetamine in private locations. In contrast, only a small proportion of participants initiated ecstasy or ketamine use in private locations. These data suggest that future investigations and interventions for methamphetamine use should not focus only on club-goers, but on various populations. Given the relatively high prevalence of illicit drug use among rural-to-urban migrants in China (Chen et al., 2008; Wong et al., 2011) and that about two-thirds of our sample were not local residents (data not shown), changing social patterns contribute to new-type drug use in China.

There are limitations to our data that should be noted. First, the sample is not random, and RDS is prone to some sources of bias, such as homophily and different network sizes (Salganik and Heckathorn, 2004). Moreover, only 41.4% of potential subjects returned the distributed coupons, and they may differ from those did not return with coupons. Another possible source of selection bias from RDS was providing more than three recruitment coupons to individuals who have very large personal networks and may therefore be over-represented in the sample. However, this process could have also afforded more depth in the population by recruiting more difficult-to-access subpopulations, such as females and those with high social status, thereby rendering a more representative sample. Second, the small sample size did not provide enough power to detect small significant differences by types of first drugs used; however, on the whole, our findings were consistent with other studies. Third, no biological assays were used to test for recent drug use. It is possible that some participants claimed drug use to gain entry into the study and their reports may not reflect the true situation of new-type drug initiation. In addition, reliance on self-reporting may cause information bias, especially questions about initiation, which might have occurred several years ago for most participants.

Despite these limitations, our findings have important implications for prevention, intervention, and future research that address new-type drug use in China. First, there is an urgent need for drug education efforts to raise public awareness of the dangers of new-type drugs and increase knowledge about the paradox of their effects. Moreover, our findings underscore the importance of tailoring interventions to different populations and social contexts. For example, interventions for methamphetamine should not focus only on club-goers, and should also take into account gender differences, while interventions for ecstasy and ketamine should pay more attention to club-goers and entertainment venues. More research is needed to investigate the popularity of different new-type drugs in different populations and social contexts, as well as the reasons for their use, so that intervention strategies can be carefully tailored to specific populations and gender.

Role of funding source

Contributors

Yingying Ding designed the study, carried out data collection and analysis, and prepared this manuscript. Roger Detels served as advisor and faculty member at UCLA in the U.S., and oversaw design of the study and preparation of the manuscript. Na He served as advisor and faculty member at Fudan University in China, and provided guidance for study design and data collection and analysis, as well as review of the manuscript. All of the authors have approved the final manuscript should be true and included in the disclosure.

Conflict of interest

None.

References

Bao, Y.P., Du, C., Lu, H.Y., Lian, Z., Qiu, Y., Mu, Y., Yan, S.Y., Liu, Z.M., 2012. The investigation of HIV and HCV infection and risk factors among opiate drug users in Beijing. China. Am. J. Drug Alcohol Abuse 38, 140–145.

Brecht, M.L., O'Brien, A., von Mayrhauser, C., Anglin, M.D., 2004. Methamphetamine use behaviors and gender differences. Addict. Behav. 29, 89–106.

Brecht, M.L., Greenwell, L., Anglin, M.D., 2007. Substance use pathways to methamphetamine use among treated users. Addict. Behav. 32, 24–38.

Chen, X., Stanton, B., Li, X., Fang, X., Lin, D., 2008. Substance use among rural-to-urban migrants in China: a moderation effect model analysis. Subst. Use Misuse 43, 105–124.

Daneshmandan, N., Narenjiha, H., Tehrani, K., Assari, S., Khoddami-Vishteh, H.R., 2011. Initiation to the first drug use among substance-dependent persons in Iran. Subst. Use Misuse 46, 1124–1141.

De Micheli, D., Formigoni, M.L., 2002. Are reasons for the first use of drugs and family circumstances predictors of future use patterns? Addict. Behav. 27, 87–100.

Degenhardt, L., Roxburgh, A., Black, E., Bruno, R., Campbell, G., Kinner, S., Fetherston, J., 2008. The epidemiology of methamphetamine use and harm in Australia. Drug Alcohol Rev. 27, 243–252.

Fendrich, M., Wislar, J.S., Johnson, T.P., Hubbell, A., 2003. A contextual profile of club drug use among adults in Chicago. Addiction 98, 1693–1703.

Gahlinger, P.M., 2004. Club drugs: MDMA, gamma-hydroxybutyrate (GHB), Rohypnol, and ketamine. Am. Fam. Phys. 69, 2619–2626.

Halkitis, P.N., Green, K.A., Mourgues, P., 2005. Longitudinal investigation of methamphetamine use among gay and bisexual men in New York City: findings from project BUMPS. J. Urban Health 82, i18–i25.

Halkitis, P.N., Palamar, J.J., 2008. Multivariate modeling of club drug use initiation among gay and bisexual men. Subst. Use Misuse 43, 871–879.

Hathaway, A.D., Hyshka, E., Erickson, P.G., Asbridge, M., Brochu, S., Cousineau, M.M., Marsh, D., 2010. Whither RDS? An investigation of respondent driven sampling as a method of recruiting mainstream marijuana users. Harm Reduct. J. 9, 15.

Heckathorn, D.D., 1997. Respondent-driven sampling: a new approach to the study of hidden populations. Soc. Problems 44, 174–199.

Heckathorn, D.D., 2007. Extensions of respondent driven sampling: analysing continuous variables and controlling for differential recruitment. Sociol. Methodol. 37, 151–207.

Koesters, S.C., Rogers, P.D., Rajasingham, C.R., 2002. MDMA ('ecstasy') and other 'club drugs'. The new epidemic. Pediatr. Clin. N. Am. 49, 415–433.

Lankenau, S.E., Clatts, M.C., 2002. Ketamine injection among high risk youth: preliminary findings from New York City. J. Drug Issues 32, 893–905.

Lenton, S., Boys, A., Norcross, K., 1997. Raves, drugs and experience: drug use by a sample of people who attend raves in Western Australia. Addiction 92, 1327–1337.

Liu, H., Yang, H., Li, X., Wang, N., Liu, H., Wang, B., Zhang, L., Wang, Q., Stanton, B., 2006. Men who have sex with men and human immunodeficiency virus/sexually transmitted disease control in China. Sex. Transm. Dis. 33, 68–76.

Liu, S., Detels, R., 2012. Recreational drug use: an emerging concern among venue-based male sex workers in China. Sex. Transm. Dis. 39, 251–252.

Loewenstein, G., 1994. The psychology of curiosity: a review and reinterpretation. Psychol. Bull. 116, 75–98.

National Narcotics Control Commission, 2011. Annual Report on Drug Control in China. Ministry of Public Security of People's Republic of China 2011, Beijing, China, Retrieved from http://www.mps.gov.cn/n16/n80209/n80481/n804535/2804926.html (18.10.12).

NIDA, 2010. Club Drugs, Retrieved from http://www.drugabuse.gov/drugs-abuse/club-drugs (18.05.12).

Parks, K.A., Kennedy, C.L., 2004. Club drugs: reasons for and consequences of use. J. Psychoactive Drugs 36, 295–302.

Parsons, J.T., Halkitis, P.N., Bimbi, D.S., 2006a. Club drug use among young adults frequenting dance clubs and other social venues in New York City. J. Child Adolescent Subst. Abuse 15, 1–14.

Parsons, J.T., Kelly, B.C., Wells, B.E., 2006b. Differences in club drug use between heterosexual and lesbian/bisexual females. Addict. Behav. 31, 2344–2349.

Parsons, J.T., Kelly, B.C., Weiser, J.D., 2007. Initiation into methamphetamine use for young gay and bisexual men. Drug Alcohol Depend. 90, 135–144.

Parsons, J.T., Grov, C., Kelly, B.C., 2009. Club drug use and dependence among young adults recruited through time-space sampling. Public Health Rep. 124, 246–254.

Payne, J., 2007. Women drug users in North Cumbria: what influences initiation into heroin in this non-urban setting? Sociol. Health Illn. 29, 633–655.

Platt, L., Wall, M., Rhodes, T., Judd, A., Hickman, M., Johnston, L.G., Renton, A., Bobrova, N., Sarang, A., 2006. Methods to recruit hard-to-reach groups: comparing two chain referral sampling methods of recruiting injecting drug users across nine studies in Russia and Estonia. J. Urban Health 83, i39–i53.

Romanelli, F., Smith, K.M., Pomeroy, C., 2003. Use of club drugs by HIV-seropositive and HIV-seronegative gay and bisexual men. Top. HIV Med. 111, 25–32.

Salganik, M.J., Heckathorn, D.D., 2004. Sampling and estimation in hidden populations using respondent-driven sampling. Sociol. Methodol. 34, 193–239.

Semple, S.J., Patterson, T.L., Grant, I., 2004. The context of sexual risk behavior among heterosexual methamphetamine users. Addict. Behav. 29, 807–810.

Sherman, S.G., German, D., Sirirojn, B., Thompson, N., Aramrattana, A., Celentano, D.D., 2008. Initiation of methamphetamine use among young Thai drug users: a qualitative study. J. Adolesc. Health 42, 36–42.

Sordo, L., Chahua, M., Bravo, M.J., Barrio, G., Brugal, M.T., Domingo-Salvany, A., Molist, G., De la Fuente, L., ITINERE Project Group, 2012. Depression among regular heroin users: the influence of gender. Addict. Behav. 37, 148–152.

Spooner, C., 2009. Causes and correlates of adolescent drug abuse and implications for treatment. Drug Alcohol Rev. 18, 453–475.

Taylor, M.M., Aynalem, G., Smith, L.V., Montoya, J., Kerndt, P., 2007. Methamphetamine use and sexual risk behaviours among men who have sex with men diagnosed with early syphilis in Los Angeles County. Int. J. STD AIDS 18, 93–97.

United Nations Office on Drugs and Crime (UNODC), 2009. Reducing The Adverse Health and Social Consequences of Drug Abuse: A Comprehensive Approach, Retrieved from http://www.unodc.org/docs/treatment/Reducing_the_Adverse_Health_and_Social_Consequences_of_Abuse.pdf (11.01.12).

United Nations Office on Drugs and Crime (UNODC), 2011. Patterns and Trends of Amphetamine-Type Stimulants and Other Drugs: Asia and the Pacific, Retrieved from http://www.unodc.org/documents/ATS/ATS Global Assessment 2011.pdf 461 (18.10.12).

Vervaeke, H.K., van Deursen, L., Korf, D.J., 2008. The role of peers in the initiation and continuation of ecstasy use. Subst. Use Misuse 43, 633–646.

Wang, J., Carlson, R.G., Falck, R.S., Siegal, H.A., Rahman, A., Li, L., 2005. Respondent-driven sampling to recruit MDMA users: a methodological assessment. Drug Alcohol Depend. 78, 147–157.

Wong, F.Y., He, N., Huang, Z.J., Young, D., O'Conor, C., Ding, Y.Y., Fu, C., Arayasirikul, S., 2011. Migration and illicit drug use among two types of male migrants in Shanghai China. Sex. Transm. Dis. 38, 57–62.

Wood, E., Stoltz, J.A., Zhang, R., Strathdee, S.A., Montaner, J.S., Kerr, T., 2008. Circumstances of first crystal methamphetamine use and initiation of injection drug use among high-risk youth. Drug Alcohol Rev. 27, 270–276.

Yang, X., Xia, G., 2010. Causes and consequences of increasing club drug use in China: a descriptive assessment. Subst. Use Misuse 45, 224–239.