A retrospective review of trends and clinical characteristics of methamphetamine-related acute psychiatric admissions in a South African context

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Abstract
Objective: Epidemiological studies indicate that methamphetamine (MA) abuse poses a major challenge to health in the Western Cape. The objectives of this study were to retrospectively assess the trends, clinical characteristics and treatment demand of MA-related admissions to a psychiatric ward in this region. **Method:** The clinical records of patients admitted to an acute psychiatric admission ward at Tygerberg Hospital from 1 January 2002 to 30 June 2002 and 1 January 2006 to 30 June 2006, were retrospectively reviewed. Admission numbers including those of adolescent and adult substance users were compared for both study periods. Study samples comparing demographic profile, admission status, length of stay, psychopathology, treatment requirements and referral pattern to other disciplines between MA users and non-users were collected for the 2006 period. **Results:** There was a significant ($p < 0.01$) increase in adolescent substance user admissions between the study periods. A significant ($p < 0.01$) increase in adolescent and adult MA user admissions was also noted. MA users were significantly ($p = 0.04$) younger than non-MA users, whilst the former presented mainly with psychotic features associated with aggression, requiring involuntary admission of an average of 8 weeks. MA users required significantly ($p = 0.007$) more benzodiazepines compared to non-MA users. **Conclusion:** Although MA use is relatively recent to the Western Cape, its adverse psychiatric effects and consequences have become a major challenge. These effects in both adolescent and adult patient populations and the associated impact on psychiatric services demand urgent intervention strategies as well as prospective study.

Keywords: Admissions; Methamphetamine; Psychopathology; Psychosis; South Africa

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Introduction

Crystal Methamphetamine (C-MA), a form of d-Methamphetamine (MA) is a highly addictive synthetic stimulant also known in Cape Town as ''Tik''.[1] Due to its ease of synthesis from inexpensive and readily available chemicals, MA abuse has escalated worldwide, with more than 35 million people regularly abusing MA.[2,3,4] Especially in countries like Asia, Australia, United States, Scandinavia[3,5] and South Africa, its abuse poses a major challenge to the health sector.[6,7]

Repeated use of MA or other forms of the drug may lead to abuse and subsequent dependence that is associated with symptoms of intoxication and withdrawal.[3] Abuse is also associated with amphetamine-induced disorders as listed in the DSM–IV-TR, i.e. mood-, anxiety-, sleep-, as well as sexual disorders.[8] The latter may be associated with risky sexual behaviour and increased vulnerability to Human Immunodeficiency Virus (HIV) infection.[1,9] Moreover, MA users are also known to exhibit and experience agitation, aggression, violent behaviour, impulsivity, depression, poor motivation, decreased memory and concentration.[3,10] Interestingly, studies found that rates of psychosis in regular MA users were up to eleven times higher than that of the general population.[5,11,12,13]

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Psychotic symptoms include paranoia, auditory hallucinations, persecutory delusions, and labile or inappropriate affect that may include uncontrollable outbursts of rage.[3,13]

Research done on MA-related psychiatric disorders were mainly conducted in the U.S.A.[2,14,15], Japan[16], Australia[5,11], and Germany[12], whilst there is scant literature describing the psychiatric sequelae of MA use in South Africa.[6,7,17,18] Although the drug has only recently been introduced in South Africa, and specifically the Western Cape, a MA-epidemic has beset adolescent youths (i.e. < 20 years) during recent years. Plüddemann et al.[7] established that treatment demand trends for MA as a primary or secondary drug of abuse in the Western Cape were less than 1% in 2002 and rose to 51% by 2006. An increase in admissions for MA-related psychiatric disorders to acute psychiatric admission wards in the Western Cape is also expected, especially amongst young patients, which poses a major challenge to psychiatric inpatient services.

The objectives of this study were firstly to determine the recent trend for MA-related admissions to a psychiatric admission ward at Tygerberg Hospital in the Western Cape. Tygerberg Hospital is one of the two major general state-funded teaching hospitals in the Western Cape, providing tertiary care for psychiatric patients. Secondly, this study also aimed to elucidate the demand placed on psychiatric inpatient services by MA users in Tygerberg Hospital. The demographic profile, psychopathology, length of stay (l.o.s.), medication requirements, Mental Health Care Act (MHCA) admission status and referral pattern to other disciplines were therefore compared between MA-related and non-MA related admissions.

Methods

A retrospective review of clinical records of all patients admitted to Ward G Lower Ground, an acute psychiatric admission ward (22 beds) at Tygerberg Hospital, was undertaken for the periods 1 January 2002 to 30 June 2002 and 1 January 2006 to 30 June 2006. Inclusion criteria included MA use within the past six months, as determined by patient history, history from collateral sources, toxicology screening or clinician impression using discharge summaries and clinical notes. Ethical approval for the study was obtained from The Committee for Human Research of the University of Stellenbosch, whereas consent for access to clinical folders was obtained from the Medical Superintendent of Tygerberg Hospital.

For both study periods, the numbers of MA-related admissions were expressed as percentages of the total number of admissions and of individual numbers of adult and adolescent admissions respectively. In addition, all available clinical notes, discharge summaries, certification papers and nursing notes were reviewed from 30 randomly selected patient folders for the period 1 January 2006 to 30 June 2006 using a randomiser program. These clinical records were reviewed to assess patient demographic profile, MHCA admission status, length of stay (l.o.s.), use of seclusion, psychopathology, inpatient and outpatient medication usage, as well as referral patterns to other disciplines. These variables for the MA and non-MA-related admissions were subsequently compared by the primary investigator.

Statistical analyses were performed using Statistica software. Associations between categorical variables were tested using cross tabulation and the Chi-square test. In cases where the numbers were small, Fisher's exact test was used. Average age and l.o.s. were compared between the groups using Kruskal-Wallis ANOVA. Significant differences were determined at a 5% significance level ($p < 0.05$).

Results

Descriptive trends and findings over both study periods

Admission data for both study periods are summarized in Table I. The total number of admissions for the 6-month study periods in 2002 and 2006 were n=73 and n=75 respectively. In 2002, admission data from two adults and one adolescent were missing, whereas in 2006, only data from one adult admission was unavailable. The available data showed that significantly ($p = 0.02$) more adolescents (age range, 14 – 18 years) were admitted during 2006, compared to 2002. In contrast, significantly ($p = 0.02$) more adults were admitted for treatment during 2002, than in 2006. Although there were no statistical difference in the number of patients who reported substance use in 2002 than in 2006, there was a significant ($p < 0.01$) increase in the admission of adolescent substance users in 2006. In comparison, there was a significant ($p < 0.01$) decrease in adult substance user admissions in 2006, compared to 2002. Although no MA use was reported in 2002, 37% (n=28) of all patients reported the use of MA in 2006, of which 67% (n=19) were adolescents. There was also a significant ($p < 0.01$) increase in the number of adult MA cases reported in 2006, compared to 2002.

Table I: Admission data of all patients over the study periods 2002 and 2006

	2002 Group		*2006 Group*		*p-value*
	n	*%*	*n*	*%*	
Total number of admissions	73	75			
Number of eligible patients included in study	70	74			
Number of substance users	33/70	47	44/74	59	0.14
Number of MA users	0/70	0	28/74	37	<0.01
Number of adolescent admissions (age 14-18 yrs)	17/73	23	31/75	41	0.02
Number of adolescent substance users	5/33	15	25/44	56	<0.01
Number of adolescent MA users	0/17	0	19/31	61	<0.01
Number of adult admissions (>18 yrs)	56/73	76	44/75	58	0.02
Number of adult substance users	28/33	84	19/44	43	<0.01
Number of adult MA users	0/56	0	9/44	20	<0.01

Findings from the study samples of MA users and non-users in 2006 study period

Demographic variables of the randomized study sample (n=14 MA users and n=16 non-MA users) in 2006 are summarized in Table II. There was a significant (p = 0.04) difference between the ages of MA users (22 years) and non-MA users (31 years). All MA users were single, whilst only 71% (n=10) of non-MA users were single. Although there were no significant differences noted between groups in terms of employment, the majority of MA users were unemployed (93%, n=13). In addition, there were no significant differences between the two groups in terms of gender, level of education, MHCA admission status, l.o.s., and use of seclusion. However, all MA users in the study sample required involuntary (MHCA) admission and l.o.s. in hospital was relatively high (56 days).

Psychopathology data are summarized in Table III. All MA users were diagnosed with at least one of four MA-related disorders, i.e. MA abuse, MA dependence, MA induced mood disorder and MA-induced psychotic disorder. There was a trend (p = 0.07) for MA users (86%, n=12) to more likely have paranoid delusions than non-MA users (56%, n=9). A similar trend (p = 0.09) was observed for aggression [93%, (n=13) vs 69%, (n=11)]. In addition, there was a slight trend (p = 0.14) for MA users (100%, n=14) to more often have hallucinations than non-MA users (81%, n=13). However, cognitive impairment among non-MA users (50%, n=7) was more frequent than among MA users (23%, n=3), but this trend was not significant (p=0.14). No significant differences between the two groups could be demonstrated with regard to grandiosity, thought disorder, emotional blunting, social withdrawal, suicidality, euphoria, or depression (all p-values > 0.26).

Data on inpatient and outpatient medication usage are summarized in Table IV. The majority of patients (MA users and non-MA users) were treated with antipsychotic medication both as inpatients and out-patients. All MA users (100%, n=14) required significantly (p <0.01) more benzodiazepines, compared to the 69% (n=11) of non-MA users. No significant differences were noted for all other medications prescribed for MA and non-MA users as inpatients. As outpatients, no MA users were prescribed benzodiazepines, whereas there was a tendency (p = 0.06) for non-MA users to be prescribed benzodiazepines more often. No other significant differences in outpatient treatment were noted, whilst there was also no significant difference between the two groups in terms of referral to other disciplines (Table V). The majority of MA users (62%, n=8) however required referral to a social worker.

Discussion

Our findings indicate that MA-related psychiatric hospital admissions reflect the increasing trend reported for treatment demand for MA abuse at community drug treatment centres in Cape Town from 2004 to 2006.[7] In our study, MA accounted almost

Table II: Demographic characteristics of the study sample during 2006

	MA[a] users		*Non-MA users*		*p-value*
	n	*%*	*n*	*%*	
Age	22 years	-	31 years	-	0.04
Gender (% males)	9/14	64	9/16	56	0.65
Single	14/14	100	10/14	71	0.05
Unemployed	13/14	93	11/16	69	0.09
Secondary Education	10/13	77	11/15	73	0.83
Involuntary Admission (MHCA)[b]	14/14	100	12/14	86	0.87
Length of stay	56 days	-	39 days	-	0.12
Seclusion required	4/14	29	3/15	20	0.59

[a]MA: Methamphetamine
[b]MHCA: Mental Health Care Act

Table III: Psychopathology of the study sample during 2006

	MA users		*Non-MA users*		*p-value*
	n	*%*	*n*	*%*	
Delusions (paranoid)	12	86	9	56	0.07
Aggression	13	93	11	69	0.09
Hallucinations	14	100	13	81	0.14
Cognitive Impairment	3	23	7	50	0.14
Grandiosity	7	50	7	47	0.86
Thought disorder	11	79	11	69	0.54
Emotional blunting	5	36	6	38	0.92
Social withdrawal	4	29	2	13	0.27
Suicidality	2	14	4	25	0.46
Euphoria	8	57	9	60	0.88
Depression	2	14	2	13	0.89

Table IV: Medication requirements of the study sample during 2006

	MA users		*Non-MA users*		*p-value*
	n	*%*	*n*	*%*	
Inpatients					
Benzodiazepine	14	100	11	69	0.007
Mood stabilizer	6	43	10	63	0.28
Antipsychotic	13	93	14	88	0.62
Anticholinergic	6	43	4	25	0.58
Outpatients					
Benzodiazepine	0	0	4	25	0.06
Mood stabilizer	6	43	9	56	0.46
Antipsychotic	12	86	13	81	0.74
Anticholinergic	1	7	3	19	0.35

Table V: Patient referrals to Allied Health Services during 2006

	MA users		*Non-MA users*		*p-value*
	n	*%*	*n*	*%*	
Clinical Psychology	4	31	4	25	0.73
Social Services	8	62	7	44	0.34
Psychiatric Community Services	2	18	5	31	0.44
Other medical disciplines	4	31	6	40	0.61

entirely for the increase in adolescent substance user admissions and seems to have replaced other substances in the adult group. Although there were no MA users admitted to this psychiatric ward during the 2002 study period, MA-related psychiatric admissions accounted for 76% and 47% of substance-use reported amongst adolescent and adult psychiatric admissions respectively, during the 2006 study period. MA-related psychiatric admissions mostly affected the adolescent (14 – 18 yr) age group, and reflect the increasing trend of MA abuse as a primary substance among South African adolescents from 2003 to 2006.[17]

The above findings are similar to those reported by Degenhardt et al.[11], who reported that amphetamines accounted for the largest proportion of all drug-induced psychosis admissions in Australia, which increased from 41% in 1999-2000 to 55% in 2003-2004. In Germany, similar results were also reported by Härtel-Petri et al.[12], who found that both the number of patients with chronic dependence on MA as well as acute admissions of patients with amphetamine-induced psychosis increased. In his comprehensive review, Meredith et al.[3] concluded that the MA epidemic continues to spread, particularly amongst young cohorts in the United States.

Our data also indicated that MA users tended to be single and unemployed, reflecting the observed younger age of the MA-group. These results correspond to a study by Baberg and co-workers[19], who also found that users were generally younger and unemployed. No significant differences were noted between the MA and non-MA users in terms of education, admission status and l.o.s.

We found no significant psychopathological differences between MA users and non-MA users. This is most likely because patients under investigation represented an acutely disturbed inpatient population. A trend suggesting more paranoid delusions and aggression in the MA-users was however noted. All the MA users in our study sample presented with hallucinations, whereas other psychotic features such as paranoid delusions, aggression, thought disorder and euphoria were also prominent (>50%). Lewis also found more aggression, restlessness, and paranoia in patients with MA psychosis in his study at Groote Schuur Hospital, Cape Town.[18] The above symptoms, along with depression and cognitive impairment, are also consistent with previous reports.[3,20,21,22] The relatively low rate of depression in our study sample is however surprising, considering a report by Zweben et al.[15] who found depression to be one of the most common symptoms in MA users. Then again, their study was conducted on outpatients, while our study focussed on an acute psychiatric inpatient population

The lower rate of cognitive impairment in MA users (23%), compared to the non-MA users (50%), may reflect the severity and chronicity of the psychiatric disorders of the non-MA users, the young age of the MA users and the fact that MA-users may not have had prolonged exposure to MA. MA abuse is overwhelmingly implicated in the development of characteristic neurocognitive impairment that is both dose- and duration-dependent in severity.[3,21,22] However, this study was a retrospective review and neurocognitive data was mostly obtained from the Mini Mental State Examination.[23] Patients therefore did not receive formal neuropsychological evaluation, which may have detected more subtle cognitive impairment. Nevertheless, the incidence of cognitive impairment in our study sample is of concern, especially given the young age of MA users and warrants further research as it holds implications for treatment, including rehabilitation and health service resources.

MA users required significantly more benzodiazepines compared to non-MA users, which suggest a greater degree of aggression and agitation. Yegiyants et al.[24] also reported an increased incidence of assaults and increased l.o.s. in the MA

group in their study on trauma patients. In addition, a study at Groote Schuur Hospital, Cape Town, found that patients with MA psychosis were prescribed higher doses of benzodiazepines.[12] Behavioural disturbance poses an increased demand on nursing and security personnel. Our sample of MA users did not require benzodiazepines on an outpatient basis but the majority of MA users required antipsychotics on discharge. This suggests that although agitation in MA users diminished after discharge, the persistence of psychotic symptoms and need for anti-psychotic treatment persisted.

Although referral of MA users to social workers and for rehabilitation did not differ significantly from the non-MA users, the rate of referral to social services amongst MA users was high. It is alarming that it reflects a similar or even increased demand on health resources compared to other psychiatric disorders in this regard. However, referral for rehabilitation appeared to be comparatively low. The reason for this is unclear but may include the presence of ongoing psychotic features, lack of motivation on behalf of the majority of patients or a lack of appropriate services. This underscores Myers and co-workers' assessment of the challenge MA poses to the health sector in the Western Cape.[13]

Limitations

This was a retrospective study and the quality of data was dependent on the quality of medical recordkeeping and patient self-reports. Few cases of MA use were confirmed by toxicology and the relation of psychopathology to MA use depended on the treating clinicians' judgement (e.g. with regard to toxicology screening), which was not standardised. The sample size was small and assessment of the total number of MA-related admissions might have been more accurate. The study population also represented only those patients with MA-related psychopathology who required admission to an acute psychiatric ward and is therefore not representative of all MA-related psychopathology. Moreover, MA users included patients with co-morbid psychiatric disorders and do not reflect a pure sample of MA-induced psychopathology. The impact on the health sector is therefore likely to be underestimated.

Conclusion

To summarize, although MA use is relatively recent to the Western Cape, its psychiatric complications have reached significant proportions. This places an increased demand on the psychiatric in-patient (but most likely also out-patient) services in the Western Cape in terms of psychiatric inpatient l.o.s., seclusion, management of aggression, medication use, referral to other disciplines, which is at least equal to and in some respects greater than that of other psychiatric inpatients. Moreover, almost all of the MA users were young and unemployed.The cost to society of them having a substance use disorder that requires resources to be sustained and which often leads to violence and aggression is likely to be substantial. Further studies are required to determine the long-term psychiatric effects of MA use in this population and its impact on other psychiatric services in South Africa. Meanwhile, the health and social impact associated with its current effects demand urgent intervention.

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