

The Problem of Acute Deliberate Poisoning in Adolescents in Modern Society

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Abstract

One of the urgent medical and social problems of modern society is the steady growth of auto-aggressive behavior and deliberate medication poisoning among adolescents and young adults. This investigation was held to optimize the provision of specialized medical care for acute deliberate self-poisoning in teenagers. We examined 498 patients admitted to the Toxicology Department of N.F. Filatov Children City Clinical Hospital No. 13 with a diagnosis of acute deliberate medication poisoning. The diagnosis was confirmed by chemical and toxicological urine test using thin-layer chromatography. From 2016 to 2019 the number of patients with deliberate medication poisoning increased by more than 2.5 times and amounted to 236 cases. Female patients were prevalent and accounted for up to 85% of cases. The leading position among medication self-poisoning is held by psychopharmacological drugs at 56%, in second place are non-steroidal anti-inflammatory drugs at 18.5%. The main causes of self-poisoning were social or family conflicts (47%), problems at school (35%) and Internet-related complaints (18%). The clinical manifestations of the disease in the acute period of chemical poisoning depended on the toxic agent and the dose taken. Psychological testing revealed a high level of neuroticism in 71% of adolescents, severe anxiety was observed in 57% of patients, and depression was diagnosed in 28% of cases. All patients were provided specialized medical care, including resuscitation, detoxification, and psychiatrist examination. Based on the accumulated clinical experience, an algorithm for managing adolescents with deliberate medication poisoning has been developed, which has reduced the number of repeated suicides by 1.8 times.

Keywords: Deliberate Poisoning; Medication; Adolescents

Introduction

Autoaggressive behavior and suicides among adolescents are one of the most pressing medical and social problems of modern society. The suicide rate among the population of Russia and other economically developed countries is steadily increasing [1]. Russia is in third place in the number of completed registered suicides, including suicides among young people [1,2].

Adolescence is a difficult period of crisis caused by the transition of a child from childhood to adulthood. This period is characterized not only by internal conflicts of the child, but also by the appearance of a huge number of conflicts with the surrounding world. As a rule, the main causes of suicide in adolescence are unrequited love, conflicts with parents and peers, fear of the future, and loneliness. The problem of teenage suicides is particularly acute in megacities and large localities [3].

Materials and Methods

We observed 798 patients aged 12 to 18 years who were treated in the toxicology Department for acute intentional drug poisoning in the period from 2016 and 2019. The diagnosis was confirmed by chemical and Toxicological examination of urine by thin-layer chromatography. Upon admission, a clinical assessment of the patients’ condition, analysis of anamnestic data, laboratory studies and pathopsychological testing were performed. Psychological testing was performed using rapid diagnosis of neurosis [4], assessment of asthenia - using a subjective scale of assessment of asthenia (MFI-20, TheMultidimensionalFatigueInventory-20) [5]. Statistical data processing was performed using the STATISTICA 7.0 software package (StatSoft.Inc.). Quantitative indicators are presented as a median (25th and 75th percentile).

Inclusion criteria

- Age 12 - 18 years old.
- Deliberate poisoning.

Results and Discussion

In recent years, Moscow has seen a significant increase in the number of intentional self-poisoning among adolescents (Figure 1). The number of hospitalized patients in a Toxicological bed with auto-aggressive actions increased by more than 2.5 times.

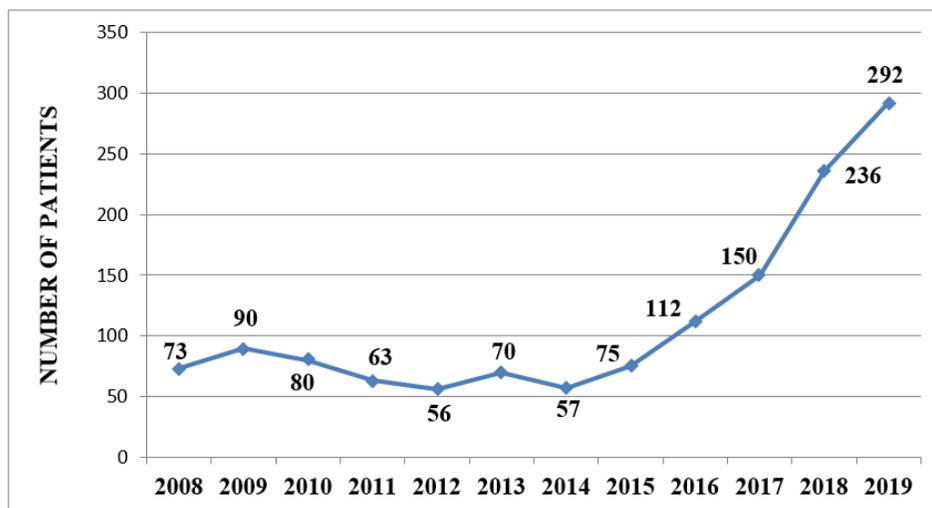


Figure 1: Dynamics of acute intentional self-poisoning in Moscow teenagers from 2008 to 2019.

In most cases, for the purpose of self-poisoning, teenagers used medications. The leading position (up to 56% of cases) among drug-induced self-harms is occupied by psychopharmacological agents: neuroleptics, antidepressants, tranquilizers). In second place (18.5%) are poisoning with antipyretic and non-steroidal anti-inflammatory drugs (aspirin, paracetamol, etc.).

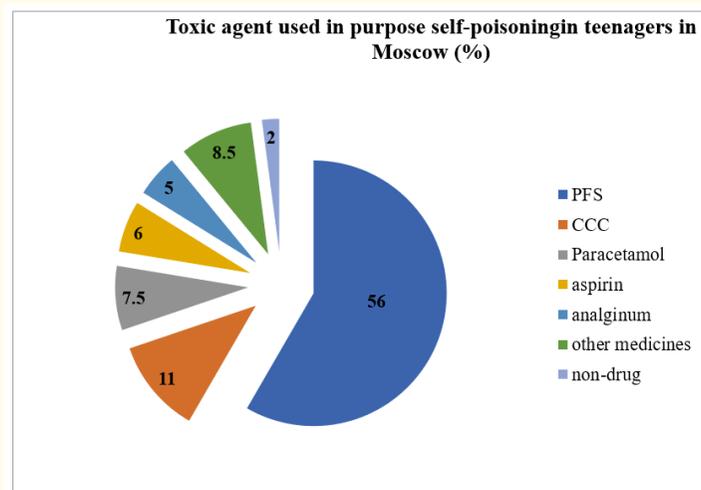


Figure 2: Toxic agent used in purpose self-poisoning in teenagers in Moscow.
 Note: PFS: Psychopharmacological Agents; CCC: Cardiovascular Agents.

At the same time, 30 - 40% of the victims had other autoaggressive actions (traumatic skin injuries).

Analysis of the cause of self-poisoning showed that in 35% of cases, adolescents had problems in school (school adaptation, failure in school and fear of failure in exams, lack of understanding with classmates) and intra-school conflicts (Figure 3). In 47% of cases, social or family conflicts were the trigger for suicidal actions.

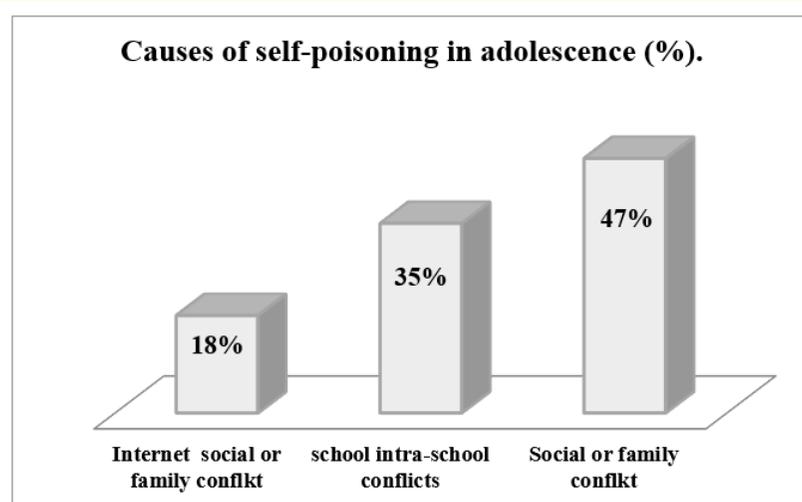


Figure 3: Causes of self-poisoning in adolescence (%).

One of the factors that influence the formation of suicidal behavior in adolescence is various Internet resources (forums, sites that cultivate the topic of death and suicide). When studying the family history of teenagers who committed suicide, we received the following data: more than 57% of children were raised in incomplete or dysfunctional families.

Clinical manifestations of the disease were caused by the interaction of a toxic agent with the target organ. When poisoning with psychopharmacological drugs, there were violations on the part of the Central nervous system, when poisoning with cardiovascular drugs-various forms of cardiac conduction disorders and instability of cardiovascular regulation; in the case of taking antipyretics and NSAIDs, there was a violation of liver and kidney function. The severity of the patients' condition is determined by the degree of severity of functional disorders of various organs and systems.

After 48 - 72 hours from the moment of deliberate poisoning, somatogenic effects of the disease were detected in 120 (50.8%) patients in the form of pathological changes in the liver and kidneys (Table 1).

Indicator	Result		Reference values
	Me [25 th ; 75 th percentile]	min/max	
Total protein, g/l	59,7 [57,5; 68,6]	51,2/71,7	56 - 80
ALT, ed/l	91,3 [29,9; 231]	26,8/597,1	0 - 55
AST, ed/l	88,4 [30,5; 118]	39,1/334,7	0 - 50
Total bilirubin, mmol/l	16,9 [7,2; 20]	3,8/32,8	1,7 - 20,7
Glucose, mmol /l	7,3 [4,3; 9,6]	3,7/13	3,3 - 6,1
Cholesterol, mmol/l	3,2 [2,9; 4,2]	2,24/4,23	3,7 - 5,2
Urea, mmol/l	3,3 [2,8; 3,8]	2/5,6	2,8 - 7,2
Creatinine, mmol/l	77,3 [58,1; 83]	51/115	31 - 52

Table 1: Biochemical parameters of blood in acute intentional poisoning (n = 120).

As can be seen from the table, 50% of patients had an increase in ALT and AST levels from 2 to 10 norms. In 28% of cases, there was an increase in serum glucose and a decrease in cholesterol. These changes indicated toxic liver damage with the development of hepatocellular disorders.

In patients with severe forms of the disease, acute kidney damage of the 1st or 2nd stage was registered (assessed according to RIFLE criteria) as a result of direct nephrotoxic action of a toxicant or violation of renal blood flow with hypoxia of the renal tissue [6]. This was manifested by an increase in serum creatinine levels (Table 1) and violation of glomerular filtration rate. Violation of glomerular filtration indicated proteinuria and erythrocyturia in General, the analysis of urine. In 10% of the observations, there were tubular disorders in the form of glucosuria. Metabolic disorders in the form of crystalluria (phosphate or oxaluria) were also recorded (Figure 4).

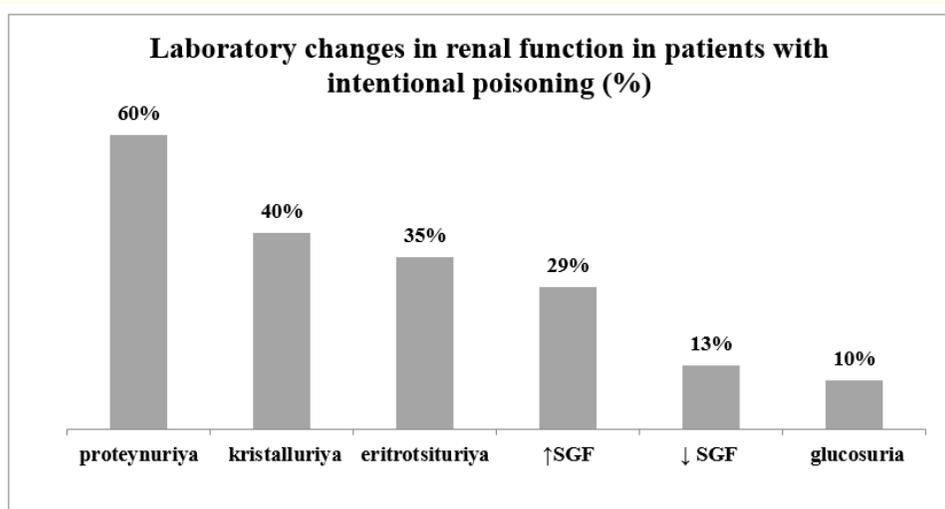


Figure 4: Laboratory changes in renal function in patients with intentional poisoning (%).

An unfavorable combination of acute chemical and psychoemotional stress in adolescence leads to a vegetative imbalance with a violation of Central regulatory mechanisms with the development of asthenic syndrome (Table 2).

Indicator	Value average	Min/max	25/75 Percentile
Total number of points*	47,7 ± 3,8	24/78	38/65
General asthenia	9,5 ± 0,9	4/17	6,5/14
Reduced activity	10,5 ± 0,9	5/17	7/15
Reduced motivation	14,9 ± 4,4	5/18	7/14
Physical asthenia	8,8 ± 0,7	4/14	6/11
Mental asthenia	8,9 ± 0,9	4/17	5,5/12

Table 2: Data on subjective assessment of asthenia in adolescents with drug-induced self-poisoning (MFI-20 questionnaire).

*: Normally, the total number of points should not exceed 30.

Psychological examination of 120 teenagers revealed signs of psychological adaptation and changes in the emotional background.

Analysis of the data of the MFI-20 questionnaire showed the presence of astenic syndrome in patients (47.7 points with a norm of not more than 30) with an emphasis on the reduction of motivation (Table 2).

Psychological testing using rapid diagnosis of neurosis revealed a high level of neuroticism in 71% of adolescents, which was clinically manifested by a pronounced emotional excitability with elements of negativity and irritability. 57% of patients had severe anxiety, and depression in 28% of cases (Figure 5).

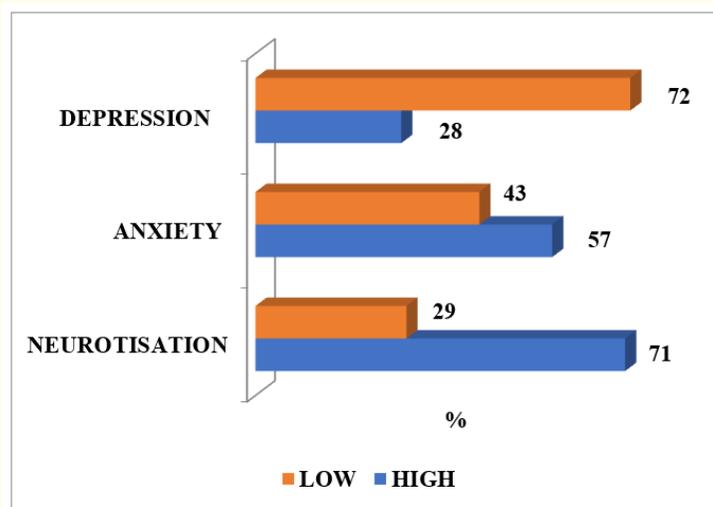


Figure 5: The results of the rapid diagnosis of neurosis (%).

All victims received specialized medical care in three stages. The first stage was carried out in the ICU of the toxicology Department and included assessment of the somatic status, collection of anamnesis, laboratory examinations and verification of acute drug poisoning, provision of specialized medical care, including resuscitation, detoxification and post-syndrome therapy.

After stabilization of the condition and achieving the necessary clinical effect from intensive care, patients moved to the second stage of treatment in the toxicology Department. Rehabilitation of impaired functions on the part of the cardiovascular and hepatobiliary systems and kidneys was carried out in other structural units of the hospital (Nephrology center, hepatobiliary center, pediatric Department) with the involvement of specialized specialists.

The deliberate nature of poisoning (a suicidal attempt) dictates the need to consult a psychiatrist directly in the hospital. The procedure of psychiatric examination is regulated by articles 23, 24, 25 of the law of the Russian Federation of 02.07.1992 N 3185-1 (ed. of 19.07.2018) "on psychiatric care and guarantees of the rights of citizens in its provision". The examination is performed with the consent of the patient, and in the case of minors under 15 years of age-their legal representatives (parents/guardians).

In 2016, in 67% of cases, teenagers or their legal representatives refused to consult a psychiatrist. In 33%, adolescents were consulted in the toxicology Department, and 18% of them were transferred to a psychiatric hospital for further treatment. In 2018-2019, the number of patients who refused to consult a psychiatrist decreased by more than 2 times compared to previous years. 67 - 71% of the victims applied for specialized help in the hospital, and the proportion of hospitalized children in a psychiatric hospital increased (Figure 6).

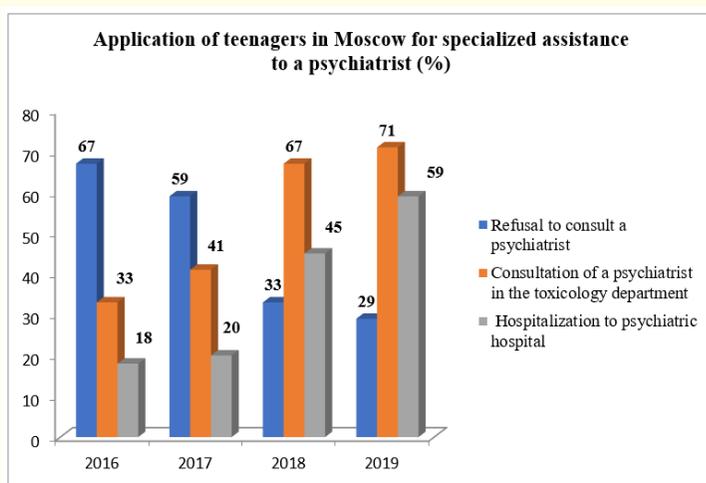


Figure 6: The number of Moscow teenagers seeking specialized medical care from a psychiatrist (%).

In table 3 presents data on mental disorders registered in adolescents.

Diagnosis	2016 year	2017 year	2018 year
	Absolute number (%)	Absolute number (%)	Absolute number (%)
Affective disorders	20 (54)	29 (46,8)	76 (48,4)
Violation of emotions and behavior (deviant behavior)	14 (37,8)	19 (30,6)	47 (29,9)
Acute reaction to stress, adaptation disorders	1 (2,7)	4 (6,5)	11 (7)
Organic personality disorder	0	3 (4,8)	8 (5)
Schizophrenic spectrum disorders	2 (5,4)	7 (11,3)	15 (9,6)
Total psychiatric consultations conducted	37 (100)	62 (100)	157 (100)

Table 3: Mental disorders registered in Moscow teenagers with deliberate self-poisoning.

In the vast majority of cases, affective disorders (psychogenic, endogenous, and endoreactive depressions) were diagnosed. Special mention should be made of the typical adolescent “mask” of depressive experiences in the form of deviant behavior (leaving home, alcoholism, taking psychoactive substances, aggression), which is regarded by society as a difficult transitional age. Accordingly, instead of adequate assistance, such adolescents face even greater rejection, which, in turn, only increases the risk of committing suicidal acts.

Conclusion

From 2014 to 2018, there has been a steady increase in deliberate drug poisoning among adolescent children. This growth is due to both social and interpersonal problems in the family and in society, as well as a high psycho-emotional load of high school students, as evidenced by the age of patients (children aged 15 to 17 years prevail).

Attention is drawn to the fact that in 18% of cases, the induction of suicidal behavior was due to Internet resources due to their high availability and the difficulty of parental control.

All children with suicidal attempts need to consult a psychiatrist to develop individual tactics for managing such patients.

The dynamics of the increase in the number of deliberate drug poisoning among children and adolescents that has emerged in recent years dictates the need to improve the system of psychoprophylaxis, psychological and psychiatric care provided even at the stage of being in a somatic hospital.

The developed comprehensive approach to providing specialized medical care to children with deliberate self-poisoning with medications in the conditions of a children’s toxicology center based on a multi-specialty hospital has improved the quality of medical care by early detection of somatic and psychiatric diseases and prevention of repeated suicide attempts. Based on the accumulated clinical experience, an algorithm for managing adolescents with deliberate medication poisoning has been developed, which has reduced the number of repeated suicides by 1.8 times.

Conflicts of Interest

The authors confirm the absence of conflicts of interest.

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