COCAINENE
BASE PASTE
CONSUMPTION
IN SOUTH
AMERICA:
A REVIEW OF
EPIDEMIOLOGICAL AND
MEDICAL-TOXICOLOGICAL
ASPECTS
Systematic Review Article

Use of cocaine base paste in South America: a review of epidemiological, medical and toxicological issues

Antonio Pascale¹, Marya Hynes ², Francisco Cumsille³, Cristina Bares³

¹ Medical Toxicologist. Montevideo, Uruguay. Member of the Latin American Network of Drug Researchers (REDLA)
² Inter-American Observatory on Drugs (OID) of the Inter-American Drug Abuse Control Commission (CICAD), Coordinator of REDLA, Organization of American States
³ School of Social Work. Virginia Commonwealth University, United States.

Correspondence:
Antonio Pascale
Canelones 886, Apto. 201
CP 11100
Montevideo, Uruguay
E-Mail: antopascale@gmail.com
Abstract

Over the past 10 years, the consumption of cocaine base paste (CBP), which was previously confined primarily to the countries of the Andean highlands, has gradually spread to countries such as Uruguay, Argentina and Brazil. Although crack has been the subject of many studies, little is known about the epidemiology and toxicology of CBP use in the Americas. The research team carried out a literature review of research studies on factors related to CBP use and epidemiology, composition of CBP, addictive potential, severe and chronic toxicity, psychiatric comorbidity and addiction treatment in the Americas. Large regional and international databases were used (MEDLINE, The Cochrane Library and its Spanish version Biblioteca Cochrane Plus, LILACS, SciELO), Google Scholar was consulted, and the databases of the Inter-American Observatory on Drugs and the various national observatories of Latin America and the Caribbean were consulted. The negative impact on the health of drug users is disproportionate to the low prevalence of CBP use in the Americas, as highlighted by the biopsychosocial impact in the Southern Cone countries. The composition of CBP is complex and varies in different regions and may be related to organ injury due to use. These, taken together with social problems associated with are issues of concern to public health in these countries, and should be subject to further research and interventions to reduce the negative impact of CBP consumption.

Keywords: cocaine base paste, epidemiology, composition, toxicity, treatment
1. Introduction

Cocaine, first isolated by Albert Nieman [1] over 150 years ago, became a drug for priests, aristocrats, scientists and well-known people at different times. The use of the coca plant for religious and medicinal purposes has been known since pre-Inca times and then in the Inca civilization. Cases of cocaine addiction began to be of concern early in the twentieth century, and restrictions began to be placed on the cultivation of coca leaf. Following minor variations in the use of other substances (such as heroin in Europe and the United States), the use of cocaine hydrochloride has become one of the most serious health problems in the Western world since the mid-eighties. Added to this is the growing use of other derivatives: crack and cocaine base paste (CBP), basic forms of cocaine called “smokable cocaines”, which have greater addiction potential than cocaine hydrochloride.

The first description of a clinical case of cocaine base paste was recorded in the Hermilio Valdizán Hospital in Lima, Peru in 1972: a young man presenting with particular clinical manifestations reported use of smoked cocaine, which he called “pasta base” in Spanish (cocaine base paste) [2]. Confined initially to the countries of the Andean highlands, the use of cocaine base paste has spread in the last ten years to countries such as Chile, Uruguay, Argentina and Brazil (even earlier to some of those countries), and is now a matter of public health concern because its great addiction potential and high toxicity cause severe psychological and physical disorders, with serious repercussions on the family and the social, economic and workplace environment.

In the eighties in countries such as Colombia and Peru, the use of CBP, which is an intermediate product in the preparation of cocaine hydrochloride, became widespread among the more socially and economically vulnerable sectors of the population due to its easy availability and low cost. Prohibition and control of the sale of and access to chemical precursors used in the preparation of cocaine hydrochloride is one of the reasons why consumption of CBP spread to the south of the Americas. This led to a pattern of diversification of the cocaine market in other South American countries such as Chile, Argentina, Uruguay and Brazil. In the course of a profound socio-economic crisis ten years ago, countries such as Argentina and Uruguay not only became transit countries for cocaine trafficking, but also saw emerging sales and consumption of and trafficking in CBP. The sites for the production of cocaine hydrochloride from CBP, and sales and trafficking of CBP multiplied in a very short period of time. The “mega-laboratories” used for the production of cocaine were transformed into many “family kitchens” located in city neighborhoods, which became a source for illicit sales of CBP [3].
2. Materials and Methods

An electronic search was done of publications that included the study of variables related to the epidemiology of the use of CBP in the Americas, composition, addiction potential, acute and chronic toxicity, psychiatric comorbidity and treatment of the addiction. Large regional and international databases were used (MEDLINE, The Cochrane Library and its Spanish-language version, Biblioteca Cochrane Plus, LILACS, SciELO), and Google Scholar were consulted, along with the databases of the Inter-American Observatory on Drugs and of the various National Observatories in Latin America and the Caribbean. A combination of the following terms was used for the search: *pasta base*, cocaine base paste, coca paste and smokable cocaines, epidemiology, use/consumption, toxicity, psychiatric comorbidity, addiction, dependence, treatment. A selection was then made of the abstracts of the publications found. While the abstracts and bibliographical references of some of the publications are in Spanish, English and Portuguese, the language of most of the publications found and selected is Spanish.

3. Findings and Discussion

*Use of CBP in the Americas (Inter-American Observatory on Drugs)*

At present, the use of CBP seems to be confined to certain countries of the hemisphere. The consumption of CBP was traditionally limited to cocaine-producing countries, but it has now spread to many countries in South America, particularly the Southern Cone.

Prevalence of CBP use among high school students appears to be notable in most South American countries and in some Central American countries. Lifetime prevalence ranges from less than 1% to more than 5%. Prevalence of CBP among high school students in Central America appears to be very low, while the higher rates, whether lifetime, past year or past month, are found in South America [4] (Table 1).

Last year prevalence of CPB use ranges between 0.08% and 0.70%, representing less than 1% of the general population in any of the countries that have data on the use of this drug. Past year prevalence of 0.3% or more was reported in Chile, Peru and Uruguay. The countries with lower past month use of CPB in the general population were Paraguay (0.02%), El Salvador (0.08%), Panama (0.08%) and Ecuador (0.10%) [4].
Epidemiological situation in Brazil

Unlike previous studies, the new surveys on prevalence of crack use in Brazil included “similar” substances, including CBP. A survey conducted in the 26 States and the Federal District found that prevalence of the habitual use of crack and similar is approximately 0.81% (CI95%: 0.76 – 0.86), representing nearly 370,000 users. This figure represents 35% of illicit drug users in all of Brazil [5].

User profile

Some papers that have been published on the profile of CBP users over the last ten years in the Americas have found differences among the countries studied.

In Uruguay, according to a preliminary study conducted in 2006 in the Centro de Información y Referencia Nacional de la Red Drogas “Portal Amarillo (a treatment center in Montevideo) [6], users of CBP had the following characteristics:
- largely male, average age 23 (37 % were minors).
- ninety per cent were under the age of 30.
- the majority were single and unemployed.
- most had attended secondary school (high school or technical school), but did not complete their schooling.
- no more than 20 per cent of users had stable employment or were currently studying.
- a large number of users lived with their parents.
- half had received previous treatment for problem drug use.
- two thirds of users presented with some psychiatric symptom, 18.9% with violent behavior, and 58% had had problems with the law.

According to the V National Household Survey on Drug Use (Uruguayan Observatory on Drugs, 2012) [7], the profile of users of CBP showed that eight out of ten were men, three out of four were under the age of 30, and seven out of ten lived in the capital city, thus continuing the trend of CBP use predominantly among males under the age of thirty. As to patterns of consumption, we see that practically all of them were poly substance users: most began with the use of other substances, while CBP was the drug of initiation for a very small percentage.

According to data obtained from drug treatment programs in Chile in 2010, CBP was the main substance consumed, that is, it is the substance that triggered the greatest demand for
treatment [6]. The report shows that almost 30% of these patients were women. As to the age of CBP users, only 28% of cases were 25 years old or younger, versus 72% who were over the age of 25. Thirty per cent of users were 35 or older. The average age in Chile for this patient population was approximately 32 [8].

A study of users of smokable cocaines in Brazil published in 2013 showed that the population using “crack” was largely male (78%), whose median age was thirty. Most attended school, but more than 55% did not go beyond primary school, and less than 15% completed secondary school. This population also reported that approximately 40% were street people, with a high probability of risky sexual behaviors [9].

Given the differences described above, it is difficult to establish a single profile of CBP users in the countries of South America.

**Use of CBP during pregnancy**

In Uruguay, Magri et al (2007) examined the prevalence of psychoactive substance use during pregnancy in 900 postpartum women who were surveyed during their hospitalization in the Pereira Rossell Hospital Center (CHPR) and the University Hospital (Hospital de Clínicas), where 15% of all births in the country and 33% of births in Montevideo occur. Biomarkers of fetal exposure to drugs were also examined in the meconium of the infants of these postpartum women. The survey showed CBP use during pregnancy of 0.4%. The meconium tests showed fetal exposure to cocaine hydrochloride and cocaine base paste at around 2.5% [10]. Poly substance use is frequent, which has raises concerns regarding the toxic effects of those substances and adverse consequences for mother and child. In a survey of 239 postpartum women who were surveyed during their hospitalization in the CHPR, Moraes et al (2011) found CBP use in 0.43 % of cases; meconium analysis was done in 93 cases, and metabolites for cocaine/CBP were found in 9.37 % [11]. Both studies show a discrepancy between the data obtained from the survey and the detection of cocaine metabolites in the meconium of the newborn: the percentage of pregnant women who had used CBP was higher when the latter method was used. Future studies should be conducted on a larger sample of meconium analysis, using methods that are able to distinguish between cocaine hydrochloride and CBP.

In Brazil, in a study of the profile of users of crack or similar by the Osvaldo Cruz Foundation, nearly 10% of the women surveyed reported that they were pregnant at the time of the
interview, and more than half of female users had been pregnant at least once after having initiated the use of “crack” [9].

**Toxicology – Composition and form of use**

**Cocaine base paste (CBP)** is an intermediate preparation in the production of cocaine hydrochloride (Figure 1). It is known as basuco in Colombia, pitillo in Bolivia, baserolo in Ecuador, pasta de coca in Peru, pasta base or base in Chile and Uruguay, and as pasta base or paco in Argentina. It is generally obtained by dissolving dry coca leaves in water and treating the solution with kerosene or diesel, and then mixing it with alkaline substances such as potassium permanganate and/or sulfuric acid. It is a yellowish-white powder of pasty consistency and with a strong smell; it contains varying percentages of cocaine. It is volatile at high temperatures, which means that it can be smoked. It is alkaline and liposoluble [2,12,13].

The first studies that discussed its composition date back nearly half a century: Toffoli et al. (1965) determined the concentrations of cocaine alkaloid, ecgonine and anhydroecgonine in samples of cocaine base paste. Although at that time, some studies showed a percentage of cocaine close to 70%, the authors stressed that there were variations in the concentrations of alkaloids in the different samples [14].

International reports discuss a composition of 40 to 85% cocaine alkaloid, with the addition of impurities, solvents produced during preparation, and adulterants [15]. Elsohly et al. (1984) examined the concentration of the herbicide 2,4-D in coca leaf and coca paste. In 1991, the same author studied the composition of samples of cocaine base paste from Colombia and Peru, and found cocaine alkaloid at over 60 %, contaminants (solvents such as aromatic hydrocarbons, traces of gasoline, manganese, and potassium permanganate in Colombian samples) and other coca leaf alkaloids (including, *inter alia*, tropacocaine, cis-Cinnamoylcocaine, and trans-cinnamoylcocaine). Elsohly defines cocaine base paste as “a chemically complex product that should not be regarded as having the same biological and toxicological properties as cocaine, even though cocaine alkaloid is its major component”. Differences were noted in the physical and chemical characteristics of Peruvian and Colombian CBP [16, 17].

Cocaine base paste is generally adulterated to a greater or lesser extent. There are two types of adulterants for the different forms of cocaine [2, 10, 15]:

- Those used to increase its volume: lactose, talc, and mannitol. The cocaine base paste is cut with wheat flour, clay and brown sugar for the same purpose.
Those added to offset the loss of potency caused by adulteration: they may be stimulants (amphetamines, caffeine or other sympathomimetic agents) or freezing agents (lidocaine, procaine and benzocaine), in order to mimic the local anesthetic effect of cocaine. In recent years, levamisole, an anthelminthic used in veterinary medicine, has been found as an adulterant in samples of cocaine hydrochloride seized in the United States, Canada and Europe. The adulteration generally takes place in the place where the drug is prepared (South American clandestine laboratories), and has caused agranulocytosis symptoms, with serious infectious complications [18]. Studies in animals have shown that levamisole increases the concentration of dopamine in the central nervous system. In Uruguay, recent forensic investigations have found levamisole and phenacetin (an analgesic with potential nephrotoxic effects) in seized samples of CBP and cocaine hydrochloride, as well as in biological samples [19].

Meikle et al. (2009) conducted the first pre-clinical study of the action of CBP on the central nervous system: A quantitative analysis of a sample of CBP seized in Uruguay showed that the average cocaine base content was around 68%, with 15% caffeine as an adulterant. The sample also found substances such as ecgonine, trans-cinnamoyl ecgonine, and cis-cinnamoylaecgonine. Lidocaine was not found as an adulterant in addition to caffeine. The purity of the cocaine in these samples was greater than in comparative samples in other countries [20, 21].

Clenbuterol, a sympathomimetic agonist used in Uruguay in powder form as a veterinary bronchodilator, has been found as one of the products utilized to cut CBP in clandestine laboratories. It is believed that it may increase the toxicity of cocaine and may be a causal factor in some overdose cases.

In Brazil, it is not always clear whether substances sold on the street with the name “crack” are in fact crack cocaine (free base produced from cocaine hydrochloride) or whether they are actually cocaine base paste. The fact that products are often sold in the streets with different or multiple names makes this particularly difficult to resolve. Studies show that not even the users of smokable cocaine themselves know which substance they are using. Therefore, substance sold as “crack” in Brazil may be cocaine base derived from cocaine hydrochloride, but there are or they could be CBP sold under the same name. Common adulterants found in PBC include lidocaine, benzocaine and caffeine. However, studies show that the percentage of cocaine in adulterated samples was still as high as 70% [22-24]. Bastos et al (2011) summarize the products sold as smokable cocaïnes in Brazil:
- Crack rocks, derived from hydrochloride, with the addition of sodium bicarbonate or ammonia,
- CBP smoked as free base,
- “merla”, cocaine base paste containing a high proportion of solvents and industrial products such as battery acid, and
- “oxi”, produced from the residue or waste from cocaine base paste, prepared with gasoline, kerosene and quicklime (calcium oxide) [25].

In the Southern Cone, CBP is a smokable cocaine smoked using different paraphernalia, such as plastic or metal pipes, inhalers made from soft drink caps, car antennas, light bulbs and others; it is sometimes smoked as a cigarette mixed with marijuana (“basoco”) or with tobacco (“tabasoco”). A dose, called a “chasqui”, “lágrima” or “medio” in Spanish, ranges from 0.1 to 0.5 g [2, 12,15, 26]. Basoco or tabasoco may be the initial form of use, before homemade pipes are used. Poly substance use, that is, the use of CBP and at least one other substance simultaneously or sequentially (tobacco, marijuana, ethyl alcohol) is the form of use most often reported in the Treatment Centers [27].

**Toxicology - Acute and chronic effects; neurobiology and toxicity of CBP**

The toxicity of CBP is due to the cocaine alkaloid, the presence of other alkaloids, contaminants and adulterants, and the results of thermal injury and burning (anhydroecgonine methyl-ester and the pyrolysis product of smokable cocaine, carbon monoxide and other products produced when the plastics and metals of the homemade pipes are burned) [12,26].

Cocaine is a powerful Central Nervous System (CNS) stimulant. It acts on the Nucleus Accumbens, known as the pleasure center and located in the mid-brain. It increases the build-up of dopamine in the synapse, which is responsible for the pleasurable euphoric effect (the effect sought by the user). These effects have been demonstrated in experimental studies (Meikle et al 2009, Lopez Hill et al 2011). Caffeine used as an adulterant, which is volatile when smoked, acts in synergy with cocaine to increase the stimulus effect [21]. Cocaine inhibits reuptake and stimulates the release of endogenous catecholamines (dopamine, noradrenaline, serotonin); the consequent stimulation of the Sympathetic Nervous System explains the clinical effects. Cocaine also blocks the sodium channels (membrane stabilizing effect), which also explains its neurological and cardiovascular toxicity [26].

When relatively prolonged use is stopped or significantly reduced, the mechanisms for the reuptake of the neurotransmitters involved are activated to a great degree, reducing the concentration of
dopamine in the synapses, which explains the clinical manifestations of withdrawal: anxiety or a crash followed by depression and anhedonia (absence of pleasure) [15].

Smokable forms of cocaine (CBP, crack, free base) are highly liposoluble; they pass through the blood-brain barrier very quickly to the CNS and take only five seconds to produce the euphoric effect. Its duration is very short, and the stimulating effect disappears rapidly, causing the user deep anguish. This explains the compulsive urge to continue to use, and the great addictive power of smokable cocaines [2, 12, 15, 20]. The clinical symptoms following the use of cocaine base paste were described by Nizama in 1979 as the “CBP syndrome” [28].

CBP users present symptoms of dysphoria prior to using the substance, characterized by anxiety, psychomotor agitation, sweating, trembling, abdominal pain and fecal urgency, which diminishes as soon as the user obtains the substance [2]. Jeri et al (1978,1984) categorized CBP use in four phases or clinical stages [29,30]:

1. Euphoria. It produces an intensely pleasurable flash that lasts barely five seconds, accompanied by a lessening of inhibitions, changes in attention levels, hyperexcitability, hypervigilance, accelerated thought processes. There is sensory hypersensitivity (olfactory, auditory), which even becomes unpleasant as the minutes go by. At this stage, there is a risk of cocaine overdose.

2. Dysphoria. When the euphoria crashes, psychic issues appear, such as distress, anxiety, an uncontrollable desire to continue using, instability, followed by deep depression (on occasion with suicidal ideation), apathy and sexual indifference.

3. Uninterrupted use, in order to prevent the stage of dysphoria.

4. Psychosis and hallucinations.

Almost all users of CBP experience a paranoid symptom: they become suspicious, distrustful, and feel that they are being spied on or followed. It is accompanied by delusions or actual visual, auditory and/or tactile hallucinations. The symptoms tend to disappear 60 to 90 minutes after consumption stops (even though this phase can last for two or three days). Persistence of the symptoms may indicate a paranoid psychosis in the chronic user.

While there is an initial increase in motor activity, hypertonia, particularly of the upper limbs and jaw (“being frozen”), may appear over time, accompanied by repetitive movements of arms and hands (as if playing the piano) and motor stereotypies such as mastication and sucking [2,30]. There is a stage defined by some authors as “post-effect” or the “post-critical phase”, in which the
user is fatigued, irritable, and with a desire to sleep. In the first phase of addiction, feelings of guilt over having used the drug may appear [2, 12, 29].

In Uruguay, a study conducted in the Toxicology Center showed that the clinical manifestations seen in CBP overdose are similar to those described for cocaine hydrochloride: cardiovascular manifestations (tachycardia, arterial hypertension) and neurological (psychomotor agitation and convulsions) in the clinical context of a sympathomimetic syndrome. Suicide attempts were also found to be more common among CBP shortly after using, which may correlate with the dysphoria described earlier [26]. Although the neurobiological definition of withdrawal is explained by the depletion of dopamine [31], many authors state that neurochemistry cannot in and of itself explain the complexity of the withdrawal syndrome in CBP users. The dysphoria appears to stem not only from neurobiological mechanisms, but also from psychological, social, cultural and environmental factors in the context of CBP use [32, 33].

Like cocaine hydrochloride, the use of CBP may cause arterial hypertension and ischemic cardiomyopathy, convulsions, heart attacks and cerebral hemorrhaging (both in overdose and in the chronic user) as the result of alkaloid activity. It is also associated with hepatotoxicity, rhabdomyolysis and renal failure. The association with other drugs of abuse (such as ethyl alcohol) is frequent, and may produce atypical clinical presentations and increase the severity of acute intoxication [34].

Bojórquez (1991) assessed the damage to the brain of CBP users by employing diagnostic psychometric instruments and correlating them with electroencephalographic studies. He found changes such as difficulties with abstraction, organization, analysis and synthesis, rigid, inflexible thinking, and inability to change. Forty-six per cent of the patients presented with indicators compatible with probable cerebral damage; of these, 72% had a history of CBP use for more than five years [35]. Ferrando et al (2009) showed changes in the cerebral perfusion of active CBP users by means of single-photon emission computed tomography (SPECT). Prefrontal changes may be related to predisposition to aggressive behavior, particularly during consumption or sudden abstinence [36].

CBP users have a higher prevalence of electrocardio abnormalities than in control cases, such as long PR and QT intervals, a pattern of early repolarization, and signs of myocardial ischemia [37, 38]. In a set of 18 patients, Kapitan et al showed that the use of CBP was associated
with asymptomatic ventricular dysfunction, harmful subclinical changes in arterial structure and function, and greater cardiovascular risk [39].

Users of intravenous and smoked cocaine are at risk of acquiring HIV infection and hepatitis B and C, either because they share drug paraphernalia, have sexual relations with injecting users and do not use protection during sexual activities [40, 41]. Duailib et al (2008) showed in a population of users of crack and similar in Brazil, a number of behaviors that put them at risk of acquiring HIV infection, such as a large number of sexual partners, not using protection, and having sexual relations in exchange for drugs or money to buy crack [42].

Complications related to the form of consumption include: serious burns on the face, lips and hands [43], gum and tooth changes [41, 44, 45], and respiratory disorders (sinusitis, bronchitis, lung injury, and spontaneous pneumomediastinum, among others) that are related to the contaminants and impurities (irritants and corrosive agents) and with the products of combustion [46-50]. Respiratory clinical manifestations in CBP users are frequent and do not appear to be related to any specific pulmonary illness. The radiological findings are consistent with chronic tracheobronchitis and pneumonitis, in some cases, similar to “crack lung”. In both Brazil and Uruguay, high-resolution Computed Axial Tomography lung studies showed chronic irritation of the lower respiratory tract by cocaine and products of combustion, aggravated by the use of tobacco and marijuana [51, 52].

During pregnancy, there are complications related to [CBP] use by the mother and exposure of the fetus: spontaneous abortion, intrauterine growth restriction, premature birth, and premature placental expulsion are some of the complications that put the lives of the mother and the new-born at risk [53,54]. Infants of mothers who use CBP have a higher incidence of low birth weight, temporary difficulty in suckling/feeding, and irritability; some of these symptoms are attributable to mild withdrawal symptoms that generally do not require specific pharmacological treatment [55, 56]. Children of mothers who are CBP users are at higher risk of neurodevelopment disorders, which cannot be attributed exclusively to the prenatal exposure to cocaine [53, 57].

**Comorbidity**

Physically, there are accidents, violent episodes [58] and criminal behavior related to the need to continue to use and to the psychotic symptoms mentioned above [12, 15]. A study in the Centro de Referencia de la Red Drogas in Montevideo showed that of the 150 users in treatment, 94% of users used cocaine base paste. 48.5% of users were diagnosed with some kind of comorbid psychiatric disorder, and 25% said that they had attempted suicide. Some 34% had episodes of self-
aggression and 59% of aggression against others; 65% demonstrated criminal behaviors, and 61% had conflicts with the law [59]. Santis et al (2007) show, in a set of out-of-treatment CBP users in Chile, a significant rate of risky sexual behaviors, antisocial behavior, self-aggression, suicide attempts and child neglect [60]. Studies conducted in Treatment Centers and Psychiatric Services in Uruguay show a higher prevalence of psychiatric comorbidity among CBP users compared to the general population: personality disorders (particularly Group B), mood disorders, and deficit attention disorders, among others [59-62]. The presence of a psychiatric comorbidity (substance use disorder and a psychiatric disorder not related to substance use) poses diagnostic and therapeutic challenges of greater difficulty and a poor prognosis (greater risk of relapse and of suicidal behaviors).

**Treatment – general concepts**

Treatment for CBP dependence should be part of the countries’ health policies on the treatment of problem drug use, and should rely on basic good practices. Treatment should be accessible to all those who need it; it should be timely and not restricted to addressing the use of CBP and other drugs, but should also deal with other associated problems, including comorbidity, bio-medical and psychosocial issues, and should draw on the resources of the community for support. The bases for treatment are access, and a holistic, interdisciplinary and intersectoral approach [63-65]. Coordination with other treatment and community services is essential to the proper operations of the network of care. In 1991, Napuri Jordan discussed the outcomes he obtained in the treatment of CBP users in a rehabilitation center in Peru when, in addition to the pharmacological therapy used at that time, he included group and family therapy [66].

Forms of intervention include:

- Early intervention: consists of a set of services designed to provide timely care to persons at high risk of developing a drug use problem—in this case, CBP. This group also includes some who have recently initiated CBP use, which may prefigure abuse. Early intervention includes assessment, diagnosis and brief intervention, and evaluation of the need for treatment.

- Management of acute intoxication or withdrawal: measures to treat the clinical symptoms, usually in the emergency room. Appropriate referral to other facilities once the acute episode has passed should also be included.
- Treatment for abuse and dependence: includes outpatient treatment of differing intensity, from brief early intervention and guidance, outpatient care or care in a day hospital, and in-patient hospital care, as well as aftercare and recovery support in the community. Strategies include pharmacological and individual and group psychosocial interventions, as well as work with the family and the environment. Treatment for more vulnerable groups (pregnant women, children and adolescents, prisoners) is another tool in the network of care and treatment facilities discussed above [57, 63, 67-69]. As for pharmacological therapy for dependence on smokable cocaines, no treatment thus far has demonstrated any clear efficacy. Although many drugs have been tried to treat craving, block euphoria, or lessen withdrawal symptoms or adverse effects, there are to date no specific medications that are of unquestionable use for any of these indications [70]. Many clinical trials have been conducted, particularly with users of cocaine hydrochloride, and less frequently, with crack users, using, *inter alia*, dopamine agonists and antagonists, serotonin and noradrenergic agonists, Antabuse-like drugs (flupentixol), naltrexone, antiepileptic and mood stabilizing drugs, and atypical antipsychotics [2,70]. New avenues have opened up in the last few years in the development of vaccines designed to block the physiological and behavioral effects of cocaine [71].

- Management of comorbidity: includes treating a possible psychiatric comorbidity (dual diagnosis) and/or other diseases such as HIV/AIDS infection [72].

- Social reinsertion and aftercare, designed to restore social and family functioning.

Harm reduction programs have been developed for CBP in countries such as Colombia [2]. Reducing risk and harm means taking steps to reduce morbidity and mortality related to drug use, a strategy that uses a low threshold for admitting people to care, with few requirements. It does not require mandatory abstinence from substance use as a precondition or starting point for beginning treatment [64].

5. Conclusions

The negative impact on the health of CBP users is disproportionate to the low prevalence of CBP use in the Americas, as highlighted by the biopsychosocial impact in the Southern Cone countries. There is no single profile of a CBP user, but rather, the profile varies according to region. There are many varieties of the drug called “cocaine base paste” depending on its origins and subsequent adulteration. Different forms of smokable cocaines are found in countries such as Brazil, which may lead to confusion over the terminology used to describe them. The toxic effects are determined by the concentration of cocaine, impurities, adulterants used in the preparation, and the products of
combustion when smoked. Association with other drugs increases its toxicity. Adulterants such as caffeine may play an important role in heightening the addictiveness of this smoked form of cocaine. While the Inter-American Observatory on Drugs collects information from the different National Observatories, there is still a shortage of qualitative information, such as the profile of the CBP user and consumption by vulnerable groups, such as adolescents, pregnant women and prisoners. The number of articles selected shows that information on the composition, acute and chronic toxic effects and addictive potential, comorbidity described in some patients, and specific issues related to treatment of CBP addiction is limited. We therefore think it necessary for these variables to be studied further in an effort to reduce the adverse impact of the use of CBP.
Bibliographical references


40. Osimani ML. Prácticas de riesgo y prevalencia de infecciones por Virus de Inmunodeficiencia Humana (VIH), hepatitis B (VHB), hepatitis C (VHC) y T. Pallidum (sífilis) en usuarios de cocaína no inyectable. IDES June 2003.


<table>
<thead>
<tr>
<th>Country</th>
<th>Lifetime</th>
<th>Past Year</th>
<th>Past Month</th>
<th>Past Month Males</th>
<th>Past Month Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina (2009)</td>
<td>1.80</td>
<td>0.90</td>
<td>0.52</td>
<td>0.80</td>
<td>0.30</td>
</tr>
<tr>
<td>Bolivia (2008)</td>
<td>1.89</td>
<td>1.30</td>
<td>0.80</td>
<td>1.30</td>
<td>0.40</td>
</tr>
<tr>
<td>Chile (2009)</td>
<td>5.30</td>
<td>2.60</td>
<td>1.30</td>
<td>1.70</td>
<td>0.90</td>
</tr>
<tr>
<td>Colombia (2004)</td>
<td>1.37</td>
<td>1.22</td>
<td>0.61</td>
<td>0.75</td>
<td>0.49</td>
</tr>
<tr>
<td>Ecuador (2008)</td>
<td>1.00</td>
<td>0.60</td>
<td>0.30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Guatemala (2003)</td>
<td>0.37</td>
<td>0.19</td>
<td>0.06</td>
<td>0.12</td>
<td>0.02</td>
</tr>
<tr>
<td>Honduras (2005)</td>
<td>0.32</td>
<td>0.16</td>
<td>0.06</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nicaragua (2003)</td>
<td>0.64</td>
<td>0.18</td>
<td>0.12</td>
<td>0.14</td>
<td>0.11</td>
</tr>
<tr>
<td>Paraguay (2005)</td>
<td>0.76</td>
<td>0.50</td>
<td>0.24</td>
<td>0.34</td>
<td>0.15</td>
</tr>
<tr>
<td>Peru (2007)</td>
<td>1.60</td>
<td>0.70</td>
<td>0.30</td>
<td>0.50</td>
<td>0.20</td>
</tr>
<tr>
<td>Uruguay (2009)</td>
<td>1.30</td>
<td>0.60</td>
<td>0.20</td>
<td>0.40</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>Venezuela (2009)</td>
<td>0.40</td>
<td>-</td>
<td>0.20</td>
<td>0.30</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Sources: National Drug Commissions and National Drug Observatories in the member states.

Note: This table gives data available in each country. Prevalence data come from SIDUC studies or equivalent unless otherwise indicated.

The year in which the study was conducted is given in parentheses.

Table 1

Information of the prevalence of CBP use in the general population aged 12 to 64 is available in seven South American countries (Argentina, Chile, Colombia, Ecuador, Paraguay, Peru and Uruguay) and four countries in Central America (El Salvador, Guatemala, Nicaragua and Panama).
Table 2. Lifetime prevalence of use of cocaine base paste in the general population aged 12-64

<table>
<thead>
<tr>
<th>Country</th>
<th>Lifetime</th>
<th>Past year</th>
<th>Past month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina (2008)</td>
<td>0.40</td>
<td>0.20</td>
<td>0.10</td>
</tr>
<tr>
<td>Chile (2008)</td>
<td>3.10</td>
<td>0.70</td>
<td>0.40</td>
</tr>
<tr>
<td>Colombia (2008)</td>
<td>1.09</td>
<td>0.17</td>
<td>0.10</td>
</tr>
<tr>
<td>Ecuador (2007)</td>
<td>0.72</td>
<td>0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>El Salvador (2005)</td>
<td>0.30</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Guatemala (2005)</td>
<td>0.26</td>
<td>0.08</td>
<td>-</td>
</tr>
<tr>
<td>Nicaragua (2006)</td>
<td>0.50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Panama (2003)</td>
<td>0.24</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>Paraguay (2003)</td>
<td>0.14</td>
<td>0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>Peru (2006)</td>
<td>1.30</td>
<td>0.38</td>
<td>0.16</td>
</tr>
<tr>
<td>Uruguay (2006)</td>
<td>0.80</td>
<td>0.30</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Sources: National Drug Commissions and National Drug Observatories in the member states.
Note: This table gives data available for each country. Prevalence data come from SIDUC studies or equivalent unless otherwise indicated. The year in which the study was conducted is given in parentheses.

Table 2

Lifetime prevalence of CBP in the general population (Table 2) ranges from 0.14% to 3.10%. Moderate prevalence is around 1%. The lowest lifetime prevalence is found in Paraguay, Panama and Guatemala, less than 0.3% in each case.
Figure 1. Coca leaf derivatives

- **Coca leaf derivatives**

- **Coca Leaf**
  - Kerosene and diesel
  - Alkaline substances: Sulfuric acid

- **Cocaine Base Paste**
  - Hydrochloric acid
  - Acetone

- **Cocaine Hydrochloride**
  - Sodium bicarbonate
  - Ammonia
  - Ether
  - Temp. 800°C
  - Sodium bicarbonate
  - Ammonia
  - Water
  - Temp. 98°C

- **Free Base**

- **Crack**

Figure 1. Coca leaf derivatives