

Component Analysis of the Illegal Handmade Pills and Capsules for Self-Medicating Substance Dependence in Tehran, Iran

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Original Article

Abstract

Background: To self-medicate substance dependence, many substance users consume herbal medicines delivered in herbal medicine shops which are prepared through non-standard methods using a variety of different materials. Hence, the present study was carried out aiming to investigate and analyze the content of such herbal medicines.

Methods: Four herbal medicine shops were selected from each of the 22 zones of Tehran City, Iran, and a total of 95 samples were purchased. A package containing 6 types of medication that was advertised by a satellite TV channel, was also purchased. Using high-performance liquid chromatography (HPLC) method, the samples were analyzed in the laboratory to detect different types of materials.

Findings: Among the samples, 23 and 72 samples were uncovered compressed pills (Dragon pills) and capsules filled with colored powders (handmade self-medicating substance dependence capsules), respectively. The package advertised in the satellite TV was prepared in 6 various forms. The most common substances present in all the samples were as follows: diphenoxylate, tramadol, opioids, acetaminophen, and codeine with values of 90%, 86%, 78%, 69%, and 68%, respectively. On average, 5 of the above mentioned substances were present in each sample; moreover, 63% of the samples contained 5 or more substances. In addition, 42 (41%) of the samples contained all the 5 main substances including opioids, codeine, tramadol, diphenoxylate, and acetaminophen.

Conclusion: The findings of this study showed that handmade capsules and pills used for self-medicating substance dependence and also medicines advertised in the satellite TV channels contain different amounts of opioids, amphetamine, benzodiazepines, tramadol, codeine, and other substances that cause problems for substance users who are going to abandon substance abuse.

Keywords: Substance withdrawal; Herbal medicine; Dragon; Component analysis; High-performance liquid chromatography

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Introduction

It is estimated that about 250 million or nearly 5% of individuals aged between 15 and 64 years old worldwide abused substances for at least once in 2015.¹ Iran is one of the countries in which substance abuse is common and the available statistical data indicate the rising number of substance users over the past 73 years.^{2,3} With the increase in the number of substance users, there has also been an increase in the number of consumers of soothing and self-medicating substance drugs that are mostly handmade.² Generally, in recent years, Iranian individuals have become more interested in using herbal remedies for self-medicating substance dependence,^{4,5} which is similar to trend observed in other parts of the world.^{6,7} Based on unofficial statistics, there are over 6000 herbal medicine shops in Iran; despite the fact that many of them are not licensed, however, individuals refer to them and accept them as the distributors of herbal medicines. Previous studies have shown that 85% of the herbal medicine shops in Tehran, Iran, provide substance dependence treatment herbs and products and more than 80% of their consumers refer for drugs to self-medicating their own substance dependence.⁸

Drug addiction remedies are often provided and prescribed rudimentarily and unsafely by unprofessional individuals without observance of health issues and without any supervision on them. In some cases, herbalists are not aware of the ingredients and consider them to be safe, while it has been found that at least one chemical substance is used for the preparation of these medicines.^{8,9} Handmade self-medicating substance dependence medicines often cause problems, discontent, and dependence in the consumer.⁸ The study of drugs obtained from the herbal medicine shops and unauthorized centers have shown that they contain chemical substances including morphine and codeine, diphenoxylate, tramadol, and other chemicals and drug agents.^{2,8} Furthermore, in addition to herbal medicine shops, some satellite TV channels advertise non-standard medicines for treating substance dependence whose content is not known. Given the increasing use of non-standard herbal medicines provided by herbal medicine shops and advertised by satellite TV channels, this study was conducted with the aim to

investigate and analyze the content of handmade pills and capsules used for self-medicating substance dependence.

Methods

This study was conducted in 2015 in Tehran, the capital of Iran. Four herbal medicine shops were selected from each of the zones of Tehran and several pills or capsules were purchased from each shop. As the shop keepers did not provide all individuals with self-medicating substance dependence capsules or pills, the researchers asked several motorcycle rider ex-addicts who were treated to purchase the medicines. The treated ex-addicts were equipped with a voice recorder and all conversations were recorded all the time they were in the herbal medicine shop. Moreover, pills and capsules were chosen in a variety of colors and sizes. A total of 95 self-medicating substance dependence capsules or pills were bought from 88 herbal medicine stores and were delivered to Bahar laboratory (Tehran, Iran). Furthermore, a package containing 6 types of medication that was advertised by a satellite TV channel was also purchased and sent to the laboratory.

In the laboratory, the samples were analyzed using high-performance liquid chromatography (HPLC) to detect different types of opioids (opium, opium extract, Sokhteh, Sokhteh extract, heroin, compressed heroin, and morphine powder), amphetamines, benzodiazepines, tramadol, codeine, and other substances. The amount of each drug was determined based on a scale of one microgram with a Trace up to +++ . All cases with a trace up to +++ were considered as positive. Then, the overall amount of each substance was expressed by rate and percentage.

Results

Characteristics of the samples: Of the 95 self-medicating substance dependence capsules and pills purchased from the herbal medicine shops in Tehran, 23 samples were uncovered compressed pills known as Dragon pills which were colored dark and light green, dark and light brown, white, and milky, each weighing 1.75-2.5 mg (Figure 1). The other 72 (76%) samples were capsules filled with white, yellow, orange, brown, light green, and crimson powder, each weighing 1.5-2.5 mg which were known as handmade self-medicating substance dependence capsules

(Figure 2). The self-medicating substance dependence package advertised by satellite TV channel, known as REXON, contained 6 types of medicine with a brochure written in Persian including instructions for their use.



Figure 1. Back and front sides of Dragon pills

The package included a capsule (green-yellow), a pill for depression or insomnia (light blue), a jelly capsule for analgesia and hangover (blue), a supplementary solution for hangover (pink), an anti-temptation drops, and a detoxification solution or syrup (Figure 3).



Figure 2. Shapes of some handmade self-medicating substance dependence capsules and pills

Analysis of the samples: Table 1 shows the

results of sample analysis. The most common substances present in all of the samples respectively were diphenoxylate, tramadol, opioids, acetaminophen, and codeine. In addition, the most common ingredients present in Dragon pills included tramadol, diphenoxylate, opioids, codeine, and acetaminophen, respectively; however, no trace of methadone was found.



Figure 3. Package of self-medicating substance dependence medicines advertised by the satellite TV channel

Moreover, the most common ingredients available in handmade capsules were diphenoxylate, tramadol, opioids, codeine, and acetaminophen, respectively. The analysis of the package advertised by the satellite TV channel showed that its most common ingredients respectively included tramadol, acetaminophen, anti-depressants/anti-psychotics (tricyclic agents, phenothiazine), and methadone.

On average, 5 of the above-mentioned substances were included in each sample; moreover, 63% of the samples contained 5 or more substances. In addition, 42 (41%) samples contained all the 5 main substances including morphine, codeine, tramadol, diphenoxylate, and acetaminophen (Table 2).

Table 1. Findings of component analysis of the illegal drugs for self-medicating substance dependence

| Substance | Illegal drugs | Total samples | Dragon pills | Handmade capsules | Satellite package |
|----------------------------------|---------------|---------------|--------------|-------------------|-------------------|
| | (n = 101) | (n = 101) | (n = 23) | (n = 72) | (n = 6) |
| | [n (%)] | [n (%)] | [n (%)] | [n (%)] | [n (%)] |
| Opioids | 79 (78) | 79 (78) | 17 (74) | 62 (86) | - |
| Codeine | 69 (68) | 69 (68) | 15 (65) | 52 (74) | 1 (17) |
| Amphetamine | 10 (10) | 10 (10) | 4 (17) | 6 (8) | - |
| Methamphetamine | 18 (18) | 18 (18) | 7 (30) | 11 (15) | - |
| Cannabis | 16 (16) | 16 (16) | 3 (13) | 13 (18) | - |
| Methadone | 8 (8) | 8 (8) | - | 6 (8) | 2 (33) |
| Benzodiazepines | 23 (23) | 23 (23) | 4 (17) | 18 (25) | 1 (17) |
| Tricyclic agents/anti-psychotics | 13 (13) | 13 (13) | 9 (39) | 2 (3) | 2 (33) |
| Tramadol | 87 (86) | 87 (86) | 21 (91) | 62 (86) | 4 (67) |
| Diphenoxylate | 91 (90) | 91 (90) | 20 (87) | 70 (97) | 1 (17) |
| Phenobarbital | 21 (21) | 21 (21) | 8 (35) | 13 (18) | - |
| Acetaminophen | 70 (69) | 70 (69) | 13 (57) | 54 (75) | 3 (50) |

Table 2. Rate of main substances including opioids, codeine, tramadol, diphenoxylate, and acetaminophen present in the illegal drugs for self-medicating substance dependence

| Substance number | n (%) |
|------------------|---------|
| 0 | 1 (1) |
| 1 | 4 (4) |
| 2 | 8 (8) |
| 3 | 18 (18) |
| 4 | 28 (28) |
| 5 | 42 (42) |

Discussion

The results of this study showed that diphenoxylate, tramadol, morphine, acetaminophen, and codeine with values of 90%, 86%, 78%, 69%, and 68%, respectively, were the most common substances present in all the samples including Dragon pills, handmade capsules, and the package advertised by satellite TV channel. The most common ingredients present in Dragon pills included tramadol, diphenoxylate, opioids, codeine, and acetaminophen, respectively. In addition, the most common ingredients present in handmade capsules respectively were diphenoxylate, tramadol, morphine, codeine, and acetaminophen. A comparison between the ingredients of handmade capsules and Dragon pills showed that the latter ones did not contain methadone and a majority of them contained anti-depressants/anti-psychotics (tricyclic agents, phenothiazine), phenobarbital, methamphetamine, and amphetamine. Furthermore, diphenoxylate, morphine, codeine, acetaminophen, benzodiazepine, and methadone were found in a large number of handmade capsules. The analysis of the package advertised by the satellite TV channel showed that its most common ingredients included tramadol, acetaminophen, anti-depressants/anti-psychotics (tricyclic agents, phenothiazine), and methadone, respectively.

Rahimi Movaghar et al. conducted a study in Tehran and investigated the treatment of substance abuse by herbalists.⁸ In the present study, self-medicating substance dependence medicines were analyzed and the results showed that diphenoxylate was the most common substance, followed by tramadol, morphine, acetaminophen, and codeine, respectively. However, as reported by Rahimi Movaghar et al., the most common opioids among 58% of cases included morphine, codeine, methadone, or a combination of them.⁸ According

to the study by Abasi and Nazeri, morphine and codeine were the most common substances present in self-medicating substance dependence pills.² Differences in the type of ingredients can be due to non-standard process of production in each region and also the differences in measuring methods. For example, in the study conducted by Abasi and Nazeri,² the investigation was performed only on the samples that consumers were complaining about, while in the present study and the study by Rahimi Movaghar et al.,⁸ the samples were collected from different parts of the city.

In the present study, a comparison between the ingredients of handmade capsules and Dragon pills showed that in a large number of Dragon pills, anti-depressants/anti-psychotics (tricyclic agents, phenothiazine) were used instead of methadone. In the study by Rahimi Movaghar et al., the type of analyzed medicines were not mentioned, however as it was reported, tricyclic anti-depressants were the third most common ingredient.⁸

As stated by the producers of handmade drugs, herbalists use a variety of chemical compounds, most of which are addictive and psychoactive substances like diphenoxylate, acetaminophen codeine, amitriptyline, methadone, diclofenac, diazepam, clonidine, boosting capsules, and even 3,4-methylenedioxy-methamphetamine or ecstasy powder.⁸ Nevertheless, it is illegal for herbalists to use chemical drugs together with or without herbal medicines within herbal formulation for the treatment of patients. In addition, many of these substances are controlled and are considered as abusive drugs. In addition, the prescription of any anonymous drug by anyone, even if a physician, is a violation of law. As substance abuse is different from other illnesses and is considered as a crime in Iran, substance users are less likely to refer to judicial centers and make a complaint; thus, those who provide this type of service, especially herbalists, are more prone to fraud and abuse.

Considering the number of chemical substances present in each sample in this study, on average, there were 5 of the mentioned substances in each sample and 63% of the samples contained 5 or more substances. In addition, 42 (41%) samples contained all the 5 main substances. In the study by Rahimi Movaghar et al., the researchers used thin-layer chromatography (TLC) and all the samples contained at least one chemical ingredient and

54.5% of the samples showed more than one chemical substance.⁸ The high percentage of samples containing 5 or more substances in this study may be due to the difference in the method of measuring, as the HPLC method was used in this study for measurements, which was more sensitive than the method used in the study by Rahimi Movaghar et al.⁸

Finally, it can be stated that none of the handmade self-medicating substance dependence medicines and those advertised by the satellite TV channels were not usable for the treatment of substance dependency, and even a drug was not found to be eligible. Furthermore, because of the false belief that medicine treatment is the only possible method for self-medicating substance dependence, a culture of self-medication has emerged. Substance dependence capsules and pills supplied in herbal medicine shops and those advertised by satellite TV channels contain different amounts of opioids, amphetamine, benzodiazepines, tramadol, codeine, and other substances with the potential for causing complications among individuals who want to stop substance dependence through using such medications. None of the drugs present in the capsules and pills were capable of treating substance abuse and some of them could cause very severe complications. In addition, the herbalist that mixed the mentioned substances was not aware of drug interactions. Furthermore, mixing more than 5 drugs in a capsule can be a risk. Moreover, the use of high amounts of tramadol is associated with the risk of convulsion; therefore, a substance abuser who does not receive any instruction for taking these medications may also be at risk of convulsion. Hence, health policymakers and authorities not only must prevent the supply of such drugs, but also must have more supervision over herbal medicine shops and enhance the public awareness on the use of self-medicating substance dependence medicines advertised by satellite

TV channels.

As one of the weaknesses of this study, a self-reported questionnaire was not used to investigate the effect of the self-medicating substance dependence medicines on substance abusers who used such medications. Moreover, it was not possible to investigate handmade medicines supplied in other cities of the country. However, as one of the strengths of this study, medicines advertised by satellite TV channels were analyzed and compared with handmade herbal medicines prepared by herbalists. The results of field studies have shown that the sale of medicines advertised by satellite TV channels is significant. In addition, in this study, 4 samples were obtained from each of the municipality zones which were more than the number of samples obtained and analyzed in the study performed by Rahimi Movaghar et al.⁸

Conclusion

The results of this study showed that none of the handmade self-medicating substance dependence medicines and those advertised by satellite TV channels were usable for the treatment of substance dependency, and even a drug was not found to be eligible. self-medicating substance dependence capsules and pills supplied in herbal medicine shops and those advertised by satellite TV channels contain different amounts of opioids, amphetamine, benzodiazepines, tramadol, codeine, and other substances with the risk of causing complications among individuals who want to stop substance dependency through using such medications.

Conflict of Interests

The Authors have no conflict of interest.

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بررسی آزمایشگاهی محتوای قرص‌ها و کپسول‌های دست‌ساز غیر قانونی ترک اعتیاد در شهر تهران

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مقاله پژوهشی

چکیده

مقدمه: بسیاری از معتادان جهت ترک اعتیاد از داروهای گیاهی عرضه شده در عطاری‌ها استفاده می‌کنند. این داروها به شیوه غیر استاندارد و با استفاده از مواد گوناگون تهیه می‌گردد و برخی از آن‌ها حاوی مواد مخدر می‌باشد. مطالعه حاضر با هدف بررسی و آنالیز ترکیبات مرتبط با مواد مخدر موجود در داروهای دست‌ساز و همچنین، داروهای تبلیغ شده توسط ماهواره انجام شد.

روش‌ها: به کمک چند معتاد بهبود یافته، چهار عطاری از هر یک از مناطق ۲۲ گانه تهران انتخاب شد و در مجموع، ۹۵ نمونه خریداری گردید. یک عدد پکیج تبلیغ شده توسط ماهواره نیز که شامل شش نوع دارو بود، تهیه شد. نمونه‌ها در آزمایشگاه از نظر وجود مواد خانواده اپیوئیدها، آمفتامین، بنزودیازپین‌ها، ترامادول، کدئین و سایر مواد، با استفاده از روش کروماتوگرافی مایع با کارایی بالا (High-performance liquid chromatography یا HPLC) مورد تجزیه و تحلیل قرار گرفت.

یافته‌ها: ۲۳ نمونه به صورت قرص‌های بدون پوشش پرس شده معروف به قرص دراگون و ۷۲ نمونه دیگر به صورت کپسول‌های پر شده از پودرهای رنگی معروف به کپسول‌های دست‌ساز ترک اعتیاد بود. پکیج ماهواره‌ای نیز از یک نوع کپسول، دو نوع محلول، دو نوع قرص و یک قطره تشکیل شد. شایع‌ترین مواد موجود در کل نمونه‌ها به ترتیب شیوع شامل دیفنوکسیلات (۹۰ درصد)، ترامادول (۸۶ درصد)، اپیوئیدها (۷۸ درصد)، استامینوفن (۶۹ درصد) و کدئین (۶۸ درصد) بود. بنزودیازپین‌ها (۲۳ درصد)، فنوباریتال (۲۱ درصد)، مت‌آمفتامین (۱۸ درصد)، حشیش (۱۶ درصد)، ضد افسردگی‌ها/ آنتی سایکوتیک‌ها (سه حلقه‌ای‌ها، فنوتیازین) (۱۳ درصد)، آمفتامین (۱۰ درصد) و متادون (۸ درصد) نیز از جمله مواد ترکیبی بود. به طور میانگین، در هر نمونه پنج نوع ماده از مواد مذکور وجود داشت و ۶۳ درصد نمونه‌ها حاوی پنج ماده یا بیشتر بودند. از نظر وجود پنج ماده اصلی (شامل اپیوئیدها، کدئین، ترامادول، دیفنوکسیلات و استامینوفن) نیز ۴۲ نمونه (۴۱ درصد) هر پنج ماده را داشت.

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واژگان کلیدی: ترک اعتیاد، داروی گیاهی، قرص‌های دراگون، آنالیز آزمایشگاهی، کروماتوگرافی مایع با کارایی بالا

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نویسنده مسؤول: دکتر هومان نارنجی‌ها