

Journal of the Health Resource Center

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Editorial Report

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As a society, we have been fortunate to have access and availability to drugs that ease our aches, pains, coughs, and other ailments. These drugs are attainable at a variety of locations, which makes the convenience of treating our maladies tremendously effortless. In other words, we have convenient access to over-the-counter (OTC) drugs and the ability to self-medicate; however, do we have the awareness to use these drugs without abusing them? It appears this is not the case, as indicated in the following articles.

Abuse and misuse of OTC drugs has become a serious problem. Reported cases of stroke, brain damage, paralysis, and fatalities abound in the literature regarding the abuse of many types of OTC drugs. In this Spring 2005 issue, identification of certain OTCs that seem to be prevalently abused and those that cause harm among college students: stimulants, diet pills, antihistamines, cough suppressants, and nicotine are highlighted in great depth.

Taking large doses of cough syrup and antihistamines to become intoxicated is probably not something new, in terms of history. But the reporting of fatalities, emergency room visits, and severe outcomes due to the abuse of these OTC drugs has created a stir. Nationwide, an increase has been observed in the incidence of these types of cases. Internet searches reveal a prevalent subculture of persons, particularly teens and college age young adults, who consume massive quantities of cough syrup, antihistamines, diet pills, and stimulants. Explicit directions are available on these websites that detail how to reach new plateaus of semi-hallucinogenic experiences.

Dextromethorphan, also known as DXM, is an effective remedy for a terrible cough, but it is also known as a method for getting "high" among teens. A town in Utah has been plagued with large numbers of their teens abusing DXM. The streets were littered with cough syrup bottles and adults could not figure out what was truly occurring.

Unintentional overdoses of OTCs described in this issue have caused severe negative health effects, such as psychosis,

brain damage, seizures, strokes, broken bones from falls, addictions, and fatalities. Young people seem to be at the highest risk for OTC drug abuse, most likely because these drugs are easier to access than alcohol or street drugs. Parents are also not alerted to any problem when they observe empty cough syrup or antihistamine packages, because they assume their children are treating themselves appropriately.

The following articles present facts about the various OTC drugs that are abused by young adults. Descriptions of ingredients, side effects, biological targets of the drug, dangerous combinations with other drugs and/or alcohol, and side effects are included in each article. These accounts highlight controversial topics; however, our goal is to prevent the dissemination of incorrect information about these drugs. It must be stressed that our intent is not to influence anyone to commit an illegal act or to experiment with harmful actions. All information is presented for educational purposes only. We do not endorse any of the risky behaviors discussed in the contents of these articles. Anyone who attempts to misuse OTC drugs described in the following pages takes full responsibility for all outcomes.

“Did you cough?”

Linda Peña

In 1958, The Food and Drug Administration (FDA) approved Dextromethorphan (DXM) as a synthetic substance to be used in a variety of over-the-counter (OTC) medicines as an antitussive (cough suppressant). When the recommended dose is taken, DXM has had a long history of safe and effective use with few adverse consequences. However, within the past few years, reports of DXM illicit use and abuse have risen among teenagers and young adults. By intentionally exceeding the suggested dose, these individuals hope to experience a sense of heightened perceptual awareness, altered time perception, and/or visual hallucinations. Frighteningly for many, instead of attaining this desired altered state, they experience a trip into toxic psychosis – a mental condition characterized by a loss of contact with reality along with a confused state- as well as other physiological and behavioral problems. The Drug Enforcement Agency (DEA) reports that DXM abuse may be related to the ease by which these nonprescription cough medicines can be purchased from drug stores and the Internet. The following article emphasizes that DXM use for cough relief to enhance one’s state of health is positive. While on the darker side, the abuse of DXM is detrimental to one’s health and can eventually destroy an individual’s hope of ever experiencing a sense of wellness.



Over 150 years ago a family medicinal secret was sold to a Poughkeepsie restaurateur and candy maker named James Smith. The purchased secret was a recipe for a licorice elixir that when taken by the spoonful could curb the worst cough. Originally this “cough candy” was brewed, spread on metal sheets to harden, cut into pieces and packaged in small brown bags. When the confectioner died, his sons decided to make an effective change in packaging their father’s cough drops. In lieu of brown bags, the brothers adeptly designed a box featuring their whiskery profiles. By registering these portraits as the product’s trademark, the brothers began production.¹ And even in today’s market, Smith Brothers Cough Drops can still be found on the shelves, between current well-known medications such as Hall’s Ice Blue®, Coricidin®, and Robitussin® cough syrup.

Antitussive-Dextromethorphan

Currently, medications are divided into two categories: “prescription only” and “over the counter” (OTC). The latter classification denotes all medications sold without restrictions to the general public. When used as instructed, OTC medications are considered safe. For instance, Smith Brothers Cough Drops are an OTC. Based upon the included ingredients, this remedy has always been considered innocuous. In early production, the

Smith Brothers used “Primary A.” This element was considered an “anti-infective Vitamin A” and was thought to assist the body in warding off colds and coughs. By today’s standards, “Primary A” would have been considered an early prototype for an antitussive used in current OTCs. An antitussive is an ingredient that functions as a suppressant for an infection-related cough. Therefore, when a person sucked or chewed a Smith Brothers lozenge, “Primary A,” as an antitussive, would lessen the throat tingle or irritation.

Dextromethorphan Paradox

There is an existence of an extraordinary paradox amongst those that promote DXM. The contradiction arises in that two diametrically opposing groups, both encourage DXM use for contrasting reasons. One group is comprised of doctors, nurses, clinicians, and health specialists who recommend OTCs with DXM as a cough suppressant. They promote DXM for its strength as an antitussive. The counterposing group of DXM users are not interested in the antitussive effects, but rather in its opiate related effects. It is critical to be aware that DXM is a derivative of opium; thus when taken in large doses, a person can endure mind-altering experiences. Members of the latter DXM users consists of elementary, middle school, high school or college age persons. While both groups strongly recommend DXM, it is the reason behind its use that poses the quandary. While the former focuses upon improving one’s state of health, the latter promotes use to attain an alternative state of mind.

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Dextromethorphan FDA-Approved Use

In 1958, after research supported its legitimacy and effectiveness as a cough suppressant, the Food and Drug Administration (FDA) approved DXM. After its approval, it was introduced as an OTC medication under the name Romilar®. It is interesting to note that as early as 1975, the popularity and extensive abuse of DXM was recognized, and Romilar® was removed from the OTC market.⁵ However, DXM was specifically excluded from the Controlled Substances Act (CSA) of 1970, thus, it was still legal to produce and use.² A few years after the removal of Romilar®, companies began introducing refined DXM products. Generally any OTC medication whose name contains the letters, “DM” or “TUSS”, and mentions “Maximum Strength”, is more than likely to contain DXM. It is most commonly found in caplet or liquid form under such trade names as: Coricidin Cough and Cold Tablets®, Robitussin®, Vicks®, Formula 44®, and Drixoral®.

Products using DXM are sold legally without a prescription because when taken in small and directed doses, the users have no intoxicating effects. Licit uses of products containing DXM are those that adhere to the manufacturer’s suggested guidelines for dosages. Users consuming DXM-containing cough syrups (such as Robitussin®) for medical reasons typically ingest 10 to 20 mg every four to six hours or 30 mg every six to eight hours. And at that level, the onset of action begins in 15-30 minutes making DXM a highly effective antitussive. For an adult, the dose becomes toxic at 10mg/kg in a similar amount of time.⁶ Manufacturers began to produce forms of DXM with “some appealing flavoring,” which led at least one researcher to suggest that the cycle of recreational abuse might begin again.² On the other hand, a single dose for recreational users can range from 240 to 1500 mg. Heavier users have been known to ingest up to 3 or 4 bottles a day.⁷

Dextromethorphan Abuse

Since DXM can appear as a seemingly enticing sugar-coated pill, as in Coricidin®, these medications have become the latest craze among teens looking for a cheap and legal high. “And because DXM comes in OTC, many view this abuse as much less intimidating than snorting a powder or injecting a strange substance,” said William Bobo, M.D., a psychiatrist who is conducting an exhaustive review of the scientific literature on DXM.³ In spite of warnings to the public and school age prevention techniques, a growing subculture has developed around the use and glorification of taking large doses of this type

of specific cough syrup. Robitussin®, NyQuil® and Coricidin® are favorite brands utilized by these youthful “high seekers.” Dr. Drew Pinsky, an addiction expert, purports that young people have discovered that by abusing these medications users hallucinate and experience psychedelic effects.⁸

There are several reasons young people are attracted to DXM abuse. First, many choose to use DXM because of their peers. Teens recommend using DXM to their friends because they derive pleasure from ingesting syrup or a pill deemed safe by both parents and society. In other words, they relish abusing a purported risk-free drug. Second, they are drawn to DXM because it is so readily accessible. Medications containing DXM can be found in any drugstore or supermarket without any consumer restrictions, such as an age stipulation. Abusers often report that parents never question the number of empty Robitussin® bottles or Coricidin® boxes found because of the perceived safety factor for these medications. And if a parent were to question, the son/daughter merely relates that they have been battling an ongoing infection or cough for weeks. For many unsuspecting parents, this response proves to be an acceptable rationale behind why they found an inordinate amount of empty bottles or boxes. Third, young people are enticed to try DXM because of contemporary musical groups such as: Nightchild, Dr. Max, and Oedipus Complex. These musical groups write and perform purportedly under the influence of DXM abuse.³ The words of their songs endorse the effects of a “DXM high” trip. Moreover, these groups promote the philosophy that DXM users are superior to others because of attaining a deeper inner knowledge about oneself through the drug’s effect. Fourth, persons using DXM gain an identity and a sense of belonging. DXM users have coined special slang and terminology for their drug of choice. They refer to DXM as rob, skittles, Vitamin D, dex, and tussin. Robotripping or robodosing are terms used for intentionally overdosing. Users are referred to as “syrup heads” and “robotards.”¹⁰ The staggering gait caused by the drug is known as the “robo-walk,” and users speak of the groggy feeling as being “drippy.”³

Furthermore, teens are solicited through websites that encourage DXM abuse. Specific websites focus on all aspects of this drug. Charles Noxicka, medical director of pediatric emergency medicine at St. Alexius Medical Center, explains that there are websites providing a resource of information for those who wish to purchase DXM. These sites list dealers, amounts to be sold and the related costs. Other websites list all OTCs containing DXM, while some provide illegal dealers that will sell the drug in its purest form, a white powder. It is crucial to

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remember when sold in this manner, there is no safe drug code enforced. This enables dealers through the Internet to detail the techniques for making DXM powder into tablets or caplets of various attractive shapes and colors, which are then handed out at raves and dance clubs.¹¹ It is alarming to realize how huge quantities of DXM can be so easily acquired. Clandestine labs producing these pills often have no quality control for regulating a specific dose measurement standard. As of yet, there is no community or government effort to track down these illegal manufacturers and prosecute them for not following FDA standards. Therefore, each time a patron ingests DXM, they run a high risk of experiencing an overdose and contamination. Dr. Noxicka adds that he began seeing DXM overdoses among teens three or four years ago. During the past few years, since the introduction of DXM websites, he has witnessed as many as four cases per week.¹⁰ In reality, signs and symptoms for DXM abuse are hard to track. Many doctors fear that since DXM abuse can go undetected; the rate of abuse might even be higher than currently estimated.

Moreover, there are DXM Internet sites suggesting cough suppressants that produce the best “highs” and guidelines as to how to achieve the desired effect. Dr. Pinsky relates sadly, “There are websites out there that tell kids exactly how to do this, how to get the pills, how to take enough pills.”⁸ As easy to follow as a child’s dot-to-dot-pattern, these websites provide a step-by-step guideline for attaining a high. Since sites are so reader-friendly, many fear teenagers are lured into thinking the drug is harmless. Influenced by extraordinary graphics depicting imaginative scenarios and distortionary colors experienced on a “high,” teens may feel compelled to experiment with DXM. Physicians, parents and other health professionals are saddened by the fact that the Internet has become such a significant factor in DXM promotion. Needless to say, this type of advertising can be very enticing to teenagers and young adults.

Users and sellers not only can obtain information about purchase production and levels of dosage amounts, but detailed accounts categorizing the levels of dosage that induce dependent intoxication or plateaus. Probably, the most threatening of these DXM websites are those detailing each plateau achieved during a trip. DXM abusers refer to website plateau explanations as “trip reports.” The effects vary with dose, and DXM users describe a set of distinct dose-dependent “plateaus” ranging from a mild stimulant effect with distorted visual perceptions at low (approximately 2-ounce) doses to a sense of complete dissociation from one’s body at doses of 10 ounces or more. The effects typically last for 6 hours.¹¹ Also, offered are the subjective

characteristics, the activities compatible and incompatible with that level (such as socializing, dancing, and swimming), the adverse effects, and even the risks involved.³ There are websites for both the more experienced as well as the experimental user, detailing ways to use such as cocktailing (mixing different drugs together with DXM). Contributors to these sites boast of taking it at a sleepover or at school. Others promote mixing large quantities with Sprite and drinking it like soda at parties.

Harmful Effects of DXM Abuse

An individual’s weight, metabolism and the DXM dosage amount all factor into determining the plateau level reached. A first plateau usually takes between 20 and 40 minutes to start (on an empty stomach), peaks about 1.5 - 2 hours later, and lasts between 4 - 6 hours. Gel capsules take an additional one hour to dissolve.¹³ At this first level, hangovers are very rare, but if they do occur, they tend to consist mainly of lethargy. Most first plateau effects relate to the senses. The best-known reason for DXM’s popularity is its effect upon hearing, specifically in reference to listening to music. Sounds become richer, deeper and more harmonious. In addition to the changes in hearing itself, music can bring a state of euphoria, often quite intense. In addition, balance and body position sense can be significantly affected, ranging from a mild disturbance; some refer to this as “sea legs,” to a near total loss of position and balance sense.¹² At this level, students can injure themselves from a fall. As a result, it is not uncommon for someone to be treated at the emergency room for a sprained ankle, a face laceration or a dislocated shoulder.

With the second plateau (around 2.5-7.5mg/kg) several new effects become evident. The most profound is that DXM begins to take on a heavier “stoning” characteristic, and senses and cognitive function are affected accordingly.¹² In particular, this is the level at which visual hallucinations begin. DXM hallucinations are only really noticeable in a dark room with eyes shut. Drug users refer to these hallucinations as “closed eye visual hallucinations” (CEVs). These visuals consist of sheets, swirls and blows of color that move rhythmically, erratically and randomly. Rarely is anything that looks “real” seen. If the user hallucinates images, they tend to be abstract and cartoon-like. There seems to be an emphasis on linear structures. To some, these hallucinations can be unpleasant.¹² Others relate they may experience a “body high” that can be positive or negative during this plateau level. More realistically, many encounter negative physical effects, such as nausea and vomiting. Furthermore, short-term memory and working memory may be severely

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disturbed. This becomes a significant impediment when students must study, write a paper, or take a final exam.

The third plateau tends to be very intense and terrifying. At this stage, the user experiences the sensory effect referred to as “flanging.” Flanging, also called phasing, stop-action or framing is the sensation of experiencing a continuous visual input that appears to be chopped up into frames, as if one were watching a badly animated cartoon. As this sensation intensifies, the abuser can perceive a loss of stereoscopic vision that becomes so powerful the brain seemingly gives up trying to process vision, leading to a type of “chaotic blindness.”¹² Users have related the disturbing effect of losing all feelings of aches, pains or any awareness of their body. Some say they could not feel the heart beating and mistakenly interpreted this dissociation from mind and body as experiencing heart failure. Furthermore, logic and causality easily break down and notions that are totally bizarre seem to make perfect sense. It is very easy to become extremely delusional and disoriented. Unfortunately, for most, at this level trips tend to go bad. Those who have used stress the importance of having a sitter in case the tripper does anything dangerous to themselves or others. It might be necessary for a sitter to call 911 if something seriously went awry.

At the fourth plateau, total mind-body dissociation occurs, often abruptly losing all contact with one’s own body. In particular, users lose the sense of their breathing and people have occasionally interpreted this as evidence that they were dead.¹² The tripper disconnects with some or all contact with external senses, and is unable to move or respond to stimuli. At this point, a person goes into an imaginary universe, while the sitter is watching to make sure the tripper doesn’t choke on his/her own vomit, go into seizures, or otherwise need medical attention. Also, there is a consequential risk for brain damage occurring as a result of this DXM dose level.

Physical and Emotional Effects

- **Impaired judgment and mental performance**
- **Blurred vision**
- **Slurred speech**
- **Loss of coordination, dizziness, confusion**
- **Rigid motor tone and involuntary muscle movement**
- **Tremors**

DXM Plateaus and Dosages

Plateau	First	Second	Third	Fourth
Dosage Range (mg/kg)	1.5-2.5 mg/kg	2.5-7.5 mg/kg	7.5-15 mg/kg	>15mg/kg
Internet Suggestions (mg/kg)	2.7 mg/kg	6.4 mg/kg	9.4 mg/kg	18mg/kg
Gelcaps (30mg) for 150lb adult	3 to 5 gelcaps	5 to 17 gelcaps	17 to 34 gelcaps	>34 gelcaps
Adjust per 25lb	1/2 to 1 gelcaps	1 to 2.5 gelcaps	2.5 to 5.5 gelcaps	5.5 gelcaps
Syrup (3mg/ml) for 75kg adult	37 to 62 ml	62 to 187 ml	187 to 375 ml	>375 ml
Syrup (3mg/ml) for 150lb adult	2 tbsp to 2 oz (1/4 cup)	2 oz to 5.5 oz (2/3 cup)	5.5 oz to 11 oz (1 1/3 cup)	>11oz
Adjust per 25lb	1 tsp to 2 tsp	2 tsp to 1 oz (1/8 cup)	2 tbsp to 2oz (1/4 cup)	2 oz

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- **Nausea, abdominal pain, vomiting, vomiting blood**
- **Dysphoria (sadness), paranoia**
- **Headaches**
- **Decreased ability to regulate body temperature**
- **Excessive sweating, reduced sweating, hot flashes**
- **Irregular heartbeat, high blood pressure**
- **Dry mouth, itchy skin**
- **Loss of consciousness**
- **Numbness of fingers or toes**
- **Redness of face**

Another major concern is the risk incurred when abusers get high and engage in activities requiring reasonable judgment and quick reactions, like driving or swimming. The effects induced by DXM abuse can make these activities deadly. The story told by one teenager illustrates the profound disconnection with reality and inability to exercise caution caused by this drug. After becoming high on DXM, he spent most of the night being half-carried, half-dragged by friends through the woods, while drifting in and out of consciousness, and woke at home the next day to discover over 100 ant bites on his body. Apparently, he had fallen into an ant bed the previous night and did not notice being bitten.³ As a result of DXM, this teenager had reached the third or fourth level plateau and no longer could feel the pain of this experience.

The real tragedy in extreme DXM abuse is a critical factor in triggering psychosis, brain damage, and seizures. Overdoses can be fatal. Fourteen people died last year and several hundred were hospitalized due to intentional overdoses of DXM cold medicines.⁸ On the morning of July 16, 2003, Misty Fetko went in to wake her 18-year old son, and found him looking relaxed, hands behind his head and legs crossed, but he wasn't moving, and he wasn't breathing. She called for help, but it was too late, Carl was dead. The police report lists his death simply as "dead on arrival." The coroner found traces of DXM in his body. His mother and other health officials believe that since DXM is an anesthetic and acts as a depressant of the central nervous system, his brain stopped telling his lungs to breathe, very similar to someone dying from a heroin overdose. Carl had also been taking other medications. This type of layered drug use is one of the biggest dangers with DXM and is referred to as "mix and

match." Young people will use other substances and then throw in a bit of DXM as an after thought. DXM alone, or mixed with other ingredients, such as ephedrine or phenylpropanolamine, has been sold as "Ecstasy." It has been identified as "filler" in confiscated samples of "bogus heroin" and "bogus ketamine" or found in herbal Ecstasy. In addition, some illegal drug manufacturers use DXM as filler.⁷ Therefore, someone might unknowingly purchase Ecstasy that has DXM. Sadly, the user is not even aware he/she might be taking a fatal combination.

Legal Action to Curb DXM Abuse

Most states have few or no legal restrictions on DXM. The history of attempts to limit the availability of it illustrates the extreme difficulty of dealing with the abuse of a drug that is legal, and completely safe when taken in the recommended dosage. During the 1980's, there was an outbreak of adolescent DXM abuse in Utah. This abuse led Utah to begin a policy of stocking medications containing DXM behind the counter so that pharmacists could exercise more discretion, especially in its sale to minors.³ Legislation has been introduced in three states – New York, New Jersey, and California – that would restrict the sale of products with DXM to minors. The California legislation emerged from a "There Oughta Be a Law" contest sponsored by Assemblyman Joe Simitian (D-Palo Alto), who asked his constituents to suggest problems that should be fixed. Detective Wayne Benitez of the Palo Alto Police Department and Lt. Ronald Lawrence, convinced Simitian the issue of DXM was important after uncovering a suicide pact by three students who had planned to overdose on cough tablets. The bill, AB 1853, would have required minors to get a prescription before purchasing items containing DXM.¹³ The bill has been stalled in the Assembly due to heavy lobbying by retailers and pharmaceutical manufactures. Drug companies oppose the Simitian bill because they feel it would keep legal products from people who need them. They would like to see drug and grocery stores voluntarily put DXM products behind the counter if they notice a problem.

Prevention for DXM Abuse

Many believe education for both young adults and parents plays a significant role in preventing further DXM abuse. Pharmaceutical firms, such as Schering-Plough, which makes Coricidin HBP®, have been working with the federal Partnership for a Drug Free America on DXM-abuse education programs for teenagers, including an Internet site that lists the dangers of DXM abuse. The Consumer Health Care Products Association (CHPA)

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has started an education campaign, sending out thousands of brochures that warn parents and educators about the dangers of having too many cold remedies stocked in the medicine cabinet. In the 2004 Annual Executive Conference Remarks, CHPA President, Lynda A. Suydam stated, “We also have been working aggressively to communicate to the right people the dangerous effects of DXM abuse. We developed a brochure and website for parents on DXM abuse, set up a research committee to look at the prevalence of DXM abuse, and instituted a targeted outreach plan to get information about DXM to communities across the country.”¹⁴ Furthermore, CHPA is working in conjunction with the Partnership for a Drug-Free America, which is now conducting its first study to gauge the prevalence of DXM abuse. Tom Hedrick is the director of Partnership for a Drug Free America and he is a little reluctant to address the problem openly. He fears bringing more attention to this drug might only be providing another abuse option to teenagers who do not know that cough suppressants can be intoxicating. Moreover, there have been individual parent groups that have called upon pharmacies to keep Robitussin® and Coricidin® behind the counter. Some local stores have complied; however, most attempts to monitor the sale of OTCs containing DXM have failed because there is a lack of data on this problem.

Conclusion

The Smith Brothers could never have envisioned 150 years later people would be using cough suppressants for motives other than gaining relief from colds and coughs. They would be amazed at the public controversy and fear over the use of cough remedies. In other words, these early manufacturers could never have foreseen or understood the “whys” behind anyone wishing to abuse a suppressant to attain an alternative “state of mind.” Moreover, all current OTC drug manufacturers stand behind the effectiveness of each of their products when used correctly. Just as the Smith Brothers wished to provide relief from the discomfort of cold-related coughs, so do the manufacturers of Robitussin® and all Coricidin® products. The foremost goal for all OTC drug manufacturers, past and present, is to offer a medication that provides relief for customers. It was never a pharmaceutical intent or goal to offer a medication that takes someone to an alternative state of mind. Instead, their primary objective has always been to improve the users current state of health in order for them to better fulfill their responsibilities for the day.

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The Use and Abuse of Diet Pills

Heidi Burkey

Misusing and abusing over-the-counter (OTC) diet pills among college students is commonly observed with eating disordered persons, athletes, and dancers. Other users/abusers are those looking for an energy boost before studying or partying from the large doses of stimulant ingredients. Non-prescription diet pills have been on the market in the U.S. for decades and ingredients have evolved over time. Past popular components were ephedrine and phenylpropanolamine; both now banned because of reported fatalities and serious negative side effects. Manufacturers of diet pills are not required to test products or ingredients for safety or effectiveness, which puts the consumer at a health risk and possibly wasting money. Most tests conducted on ingredients show no long-term weight loss benefits.

Americans spend an estimated \$33 billion each year on weight loss products and services.¹ Contrary to the money spent, more people are becoming obese. Almost 35% of persons in the United States are considered obese.² Many fail to maintain a healthy weight since behavioral changes are difficult, including reducing food consumption and adding exercise to the lifestyle routine. Thus, less “painful” methods are preferred by taking diet pills.

These so-called painless methods for weight loss abound and include herbal supplements, caffeine pills, slimming teas, diuretics, and laxatives. Products, such as these over-the-counter (OTC) drugs, are easily accessible, and can be easily abused. The misuse of weight loss OTCs is of great concern to health care professionals due to adverse health effects and even fatalities. Many weight loss medications have negative side effects and can be sold without any prior testing for effectiveness or safety because they are considered a food product. Therefore, manufacturers of dietary supplements can make any claims about their products without approval from the Food and Drug Administration (FDA).³ Herbal and dietary supplements are currently the most popular ingredients in appetite suppressants. The Dietary Supplement Health and Education Act of 1994 (DSHEA) states that “supplement manufacturers are responsible for ensuring that a dietary supplement is safe before it is marketed. Also, the FDA is responsible for taking action against any unsafe dietary supplement product only after it reaches the market. Manufacturers do not need to register with the FDA nor get FDA approval before producing or selling dietary supplements.”⁴

The following account substantiates the dangers that can be attributed to such seemingly harmless OTC diet pills. Jennifer appeared to be the epitome of an all-American, pretty college coed with an enviable lifestyle. However, her outside appearance was in direct contrast to the reality of her life because she has a devastating disability due to years of abusing diet pills. Prior to Jennifer becoming a college student, she had observed her older sister using prescription diet pills. It was Jennifer’s sister who first offered some of her pills to Jennifer. All too quickly, Jennifer began sneaking more and more of her sister’s pills. Upon realizing she was missing pills, Jennifer’s sister quit having her prescription refilled in hopes of curtailing her sister’s abuse. Unfortunately, when that supply was cut, Jennifer discovered OTC diet pills for inducing weight loss. And so she began using almost every OTC diet pill offered and as a result suffered severe side effects. In fact, the effects from her abusive pill use ended in Jennifer undergoing brain surgery to repair damage done to her cerebrovascular system. However, in spite of the harm she had suffered from these OTCs, Jennifer began taking them again shortly after she had recovered from surgery. She had become addicted. Intellectually, she realized these pills had almost killed her, but her addiction caused her to even risk death in order to continue taking them. Once she resumed using, she immediately began to suffer from severe and intense physical afflictions. It was only after she became so debilitated that she became willing to address her true problem, her addiction to OTC diet pills.

The increased usage of nonvitamin, nonmineral dietary supplements by college students has become a public health concern. One reason for this attention is the contraindications or

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adverse side effects that happen when a supplement is taken with either an existing health condition or with another medication (either prescription or nonprescription). For example, an herb such as guarana, which is a stimulant, can create high blood pressure, and thus potentiate with a person who already has this disease, possibly causing severe cardiac problems. And the second reason is when people rely on herbs and supplements to treat their symptoms they could be misdiagnosing the health problem and causing greater harm. Third, persons taking supplements or herbs to lose weight may become addicted or reliant, both physically and mentally, on the substance.

Results of the 1998 National Health Interview Survey indicated that 31% of adult respondents were currently trying to lose weight. Approximately 2.5% of the adults who responded to the survey have taken diet pills for weight loss at some point in their life. Reportedly, 2% of men and 3% of women respondents were taking diet pills.⁵ These statistics indicate that unhealthy methods for weight loss may be a reason for concern. A 2001 survey of 368 college students at a southeastern university indicated that 45% of “overweight” individuals had used diet pills to lose weight in the previous 6 months or were considering using them for losing weight. Students that considered themselves to be “about the right weight” and had taken or were planning on consuming diet pills were a reported 29.6% of the study population. Females in this study were more likely than males to consider diet pill usage.⁶



If not for weight loss, then for what?

Using diet pills, laxatives, and diuretics are considered extreme methods for weight loss.⁵ A study conducted in 1994 indicated that female college athletes, particularly those participating in dance, gymnastics, figure skating, and cross-country running were more likely to use unhealthy weight loss methods. Addiction to appetite suppressants, which usually contain stimulants, laxatives and diuretics, is a common problem among college athletes. Prevalence of persons with eating disorders using diet pills is high. Based on a study by Mitchell, Hatsukami, Eckert & Pyle in 1985, 52.2% of the study participants indicated

that they used diet pills to lose weight. OTC diet pills, laxatives, and diuretics are easily accessible and multiple studies report that they are abused most frequently among those who have eating disorders (anorexia nervosa and bulimia nervosa). Females constitute the largest abuser of these OTCs.⁷ The possibility of underreporting these socially unacceptable methods of weight loss is probably high and therefore, statistics of actual extreme dieting techniques are unreliable.⁵

Some of the active ingredients in OTC diet pills are caffeine, laxatives, chemicals that “alter fat metabolism” or absorption of fats, diuretics, and herbs that purportedly reduce anxiety and depression.⁷ OTC diet pills have changed formulations over the past several decades, but intrinsically have always contained large quantities of caffeine, and then ephedrine alkaloids, phenylpropanolamine (PPA) and diuretics. These stimulants suppressed appetite and caused weight loss. Furthermore, being jittery from the stimulants in the pills also caused the user to have excess energy that may have increased physical activity as well. Due to serious health risks and fatalities, ephedra and PPA have been removed from the market as ingredients of diet pills. One thing has remained the same, the inclusion of caffeine in the proprietary blend. Although caffeine has addictive potential, it remains in the market of weight loss as a main ingredient stimulant.⁸ Since ephedra/ephedrine and PPA were banned, diet pill manufacturers have used many herbal dietary supplements that are legal. Components such as guarana, ginseng, hoodia cactus, chromium, vanadium, L-Carnitine, and tea leaves are just a few of the ingredients used. Because a majority of diet pills contain supplements causing anxiety, some newer formulations include passion flower to produce a calming effect.

Some chemical compounds have been associated with deadly outcomes. For this reason, it is important that consumers find more information about the supplements they consume. Herbs, vitamins, and other supplements can have adverse reactions when taken with other drugs or when a person has certain health conditions, and/or depending on the amount ingested.

Ephedrine or Ma Huang

Ephedra, a botanical, used in traditional Chinese medicine for centuries, is a stimulant that is chemically similar to amphetamines and affects the central nervous system and heart. This plant is the source for ephedrine alkaloids. When the herb is processed, it is transformed into the alkaloids, which include ephedrine and pseudoephedrine. If these products are “chemically synthesized,” the Food, Drug, and Cosmetic Act regulate them

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as drugs. Supplements that contain the ephedrine alkaloids fall under the ruling of DSHEA.⁹

Diet pills containing doses of ephedrine and caffeine had been the premier, cheap and easy technique for OTC weight loss. Although long-term effectiveness is disputed and severe health problems and fatalities have occurred, they are very popular, especially among those who need a boost for studying, partying all night, working late, or even to enhance athletic performance. Brands such as Dexatrim®, Acutrim®, and “mini thins” could be bought at the local vitamin shop, convenience stores, liquor stores, gas stations, and pharmacies. Ephedrine was the main component in these diet pills/appetite suppressants. The FDA banned ephedrine alkaloids and the herb, ephedra, on April 12, 2004, after years of warnings to consumers and manufacturers about safety issues.^{10, 11}

An Internet search revealed interesting details about ephedrine use from people who write diaries of their experiences while taking drugs. Recreational users of ephedrine report the feeling of a “body buzz”, tingling of the scalp, extreme alertness, jitteriness, trembling hands, and sweaty palms. Some of the users also stated that they had feelings of anxiety and sleeplessness.

Numerous studies were conducted on ephedrine alkaloids to determine if it “posed a significant or unreasonable risk of illness or injury.” According to the studies conducted by the FDA and other organizations, there is a strong association with increased blood pressure, myocardial infarctions, seizures, psychiatric problems, and strokes. Very little correlation exists for long-term weight loss and there is no verification that ephedrine alkaloids improve athletic abilities. Although this product was banned, it can still be purchased on the Internet with only a warning and a limit on the number of orders accepted at one time. Dependency on ephedra is dangerous due to the need to increase the dosage in order to maintain the same result as the time before, thereby increasing likelihood of an overdose or of causing a serious health problem.^{7, 11, 12}

Phenylpropanolamine

Besides ephedrine, the FDA has banned another chemical utilized for diet pills, PPA. This too has amphetamine-like properties that suppress appetite, which causes short-term weight loss. However, the adverse consequences of this drug wreaked havoc with hundreds, if not thousands of individuals who consumed diet pills with PPA. Acute hypertension (high blood pressure), severe headaches, intracranial hemorrhages,

seizures, and deaths due to strokes were reported as adverse effects. PPA was used in 106 OTC products, many were in cough/cold medicines.¹³ All products containing PPA were required to be reformulated or removed entirely due to the health and safety concerns for the public.^{14, 15} An Internet search revealed no advertising for the purchase of PPA, whereas, ephedrine can still be purchased.

Stimulants and Abusive Properties

According to the U.S. Department of Health and Human Services, stimulants, analgesics, and tranquilizers are the most abused OTCs.¹⁶ Anxiety, hallucinations, severe depression, or physical and psychological dependence are some of the long-term effects of stimulant abuse. It is difficult to determine the extent of OTC stimulant abuse because clinicians do not normally screen for this information during an examination. Research regarding this problem, on a national level, has begun only recently. It appears that the abuse of OTC stimulants is much larger than originally thought.¹⁷ According to the Drug and Alcohol Services Information System Report from July of 2002, 2% of hospital admissions are due to OTC medication adverse reactions and abuse.¹⁸ Studies have shown that persons who are abusing OTC diet pills/stimulants are those attempting to lose weight, those with eating disorders, athletes, addicts, adolescents, students, and employees in jobs that require long hours and graveyard shifts.¹⁷

Laxatives and Diuretics

Laxatives cause the body to eliminate wastes through bowel movements. The different types include stimulant, bulk-forming, softening, lubricant, and osmotic. When laxatives are abused, a person may have the following outcomes: dehydration, dependence on the substance for elimination, abdominal cramping, severe diarrhea, malnutrition, electrolyte imbalance, fluid retention, rectal bleeding, permanent damage to the colon, cardiac arrhythmias, and kidney failure.¹⁹⁻²¹

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Table 1: Ingredients of Common OTC Diet Pills and Their Effects

Common Ingredients	Reported Effects	Possible Adverse Effects
Caffeine – (Including Black and Green Tea Leaves)	Stimulation of central nervous system	Insomnia, restlessness, agitation, irritability, long term use can results in anxiety, hallucinations, severe depression, or physical and psychological dependence ⁸
Chitosan	Inhibits fat absorption.	Persons with shellfish allergies should not consume. ¹² Flatulence and constipation ²³
Chromium Polynicotinate	Control blood sugar, high cholesterol, enhance athletic performance, weight loss	Hypoglycemia, kidney toxicity, cognitive and personality disorder ⁸
DHEA	Slowing aging, promote weight loss, stimulate immunity, treat lupus & multiple sclerosis, increase strength and muscle mass, energy, sexual dysfunction, improve mood ⁸	Acne, voice deepening, excessive hair growth, menstrual irregularities, insulin resistance, hypertension, liver problems, etc. There are numerous drug interactions and negative side effects. <u>The consumer should research this product in greater depth.</u> ⁸
Garcinia Camboga	(AKA Hydroxycitric acid) Interfere with fat generation or deposition, suppress appetite ⁸	Headache, upper respiratory tract symptoms, gastrointestinal symptoms ¹²
Ginseng	Stimulates body during times of fatigue and stress	Not to be taken with other stimulants or antidepressant/ antipsychotic drugs, during pregnancy, and for individuals with diabetes, heart disease ⁸
Guarana	High powered stimulant	Disturbs sleep and causes agitation. ³ Serious negative interactions with at least 22 drugs and supplements, including oral contraceptives. ⁸
Gymnema Sylvestre Leaf Extract	Metabolic control, laxative, stimulant, diuretic	Lowers insulin and hypoglycemic drug levels, affects diabetics and hypoglycemics. Decrease iron absorption. ⁸
Hoodia Gordonii Cactus	Reduces hunger pains and feelings of hunger, appetite suppressant	No human studies have been released stating effectiveness or safety. ²⁴
L-Carnitine	Treat metabolism disorders, congestive heart failure, chronic fatigue syndrome, etc.	Gastrointestinal problems, tingling/numbness, headache, anemia, weakness, possible seizures, and serious side effects when taken with some supplements and many prescription drugs ⁸
Magnolia bark	Anti-stress, anti-anxiety, stimulant, induce sweating, digestive problems	Can cause drowsiness at high doses ^{8, 25}
Passion Flower	Reduces anxiety, aids in sleep	Liver and pancreatic toxicity. Increase bleeding when taken with other anticoagulant herbs or drug, interaction with MAO inhibitors, and sedatives. ⁸
Piper Nigum (pepper)	Antiflatulent, diuretic, induce sweating, increase gastric secretions, possible lipolysis	Increases absorption of drugs and other substances ⁸
Yerba Maté	Stimulant and diuretic properties via excretion	Psychological dependence, withdrawal symptoms, insomnia, increased blood pressure, numerous interactions with multiple medications ⁸

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Diuretics cause the elimination of water from the body through increased urination. OTC diet pills appear to contain mild diuretics, which are usually botanical in nature. When taking a diuretic, not only is body water lost, but also important minerals like potassium. Diuretics cause some of the same adverse effects as laxatives. For those who take a stronger diuretic for weight loss, an opposite of the desired outcome will occur. A “reduction in plasma volume negatively affects thermoregulation and cardiovascular function.”²² When a person stops using diuretics “significant fluid retention and reflex edema” occurs. There are also no studies that prove diuretics are effective for weight loss.⁷

Diet Pill Ingredients

A review of ten OTC diet pills currently on the market includes ingredients listed as “proprietary blends.” Table One summarizes the reported effects and possible adverse outcomes of several major ingredients in common OTC diet pills. Many of these have contraindications and possible side effects. Contraindications means that taking a specific supplement with another or with certain medications or pre-existing conditions can have serious health outcomes.

How Do I Know if I am Hooked on Diet Pills?

As in the prior written account of Jennifer, at what point did her consumption of diet pills turn into abuse? Taking diet pills for something other than weight loss is unhealthy and is considered an extreme method for dieting. Reducing caloric intake together with increasing physical activity should be sufficient for most people to lose weight. Long-term use of weight loss products can also cause dependence and many can interfere with normal body functions.

For instance, taking laxatives on a frequent basis can cause the body to become physically dependent upon them for elimination of waste products. The more laxatives taken, the more laxatives are needed to take a bowel movement. A normal amount of bowel movements varies from three per day to several times per week. Anywhere in that range is normal. Partial paralysis of the intestine can be a direct result of laxatives being over used or abused. For those who must take a laxative, a bulk-forming laxative is a better option. Drinking plenty of water, eating a low-fat, high fiber diet, and regular exercise can help stimulate normal bowel function.²⁶

Diuretic abuse will actually create a rebound effect and the consumer will become more bloated and swollen. There is no guarantee that OTC diet pills are safe for human consumption or even effective because the Food and Drug Administration does not regulate their safety or efficacy.

Taking the OTC diet pill for an extended period of time can cause psychological dependence as well as negative health effects. Diet pills should only be taken while weight loss continues without any side effects or the need for increased dosages. A period longer than 4 to 6 weeks indicates possible addiction to the substance.²⁶

How to Help Yourself If You Think You Might Have a Problem

- Limit use to the dosage and amount of time specified on the label, unless a physician specifies a different treatment.
- Because it is an OTC does not make it safe to take more than the recommended amount or with other drugs and/or alcohol.
- Always read the label of the bottle or package even if you have taken it before. Manufacturers may change ingredients and add warnings.
- Ask a pharmacist for information if you don't understand the directions or are concerned about contraindications (mixing it with other drugs or alcohol).
- Think you are taking too much or have a problem with an OTC? Get it out of your home and don't keep it in your purse, backpack, pocket, or glove compartment. Make it less available so you won't use it.
- If you have a problem or think you have a problem with an OTC, talk to your doctor about getting help.
- Persons who are predisposed to alcoholism or drug abuse should not take diet pills.
- There are 12-step programs to assist in quitting these drugs.²⁶

The new OTC diet pills, although reformulated to contain less deadly components like ephedrine or PPA, may contain supplements and herbs that can have serious health effects. Some of these ingredients have not been tested for safety or efficacy with animals or humans. One such drug is hoodia gordonii, a cactus from South Africa, used by hunters to stave off hunger and thirst for a period of time while on a hunting trip (a day or two). Already this product is being sold on the market

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in the United States, but no testing has been done to ensure that it can be taken for extended periods of time. Hoodia has already received publicity by the American media regarding the possibility of it being a “miracle weight loss drug” from CNN and the Los Angeles Times. Bear in mind that PPA was also considered a great diet pill ingredient, but sadly, many families have lost loved ones from the use of this OTC product.

Being a smart consumer means appropriately taking any drug, including OTCs. Follow all of the manufacturer’s directions and be aware of warnings. Taking OTC diet pills is a gamble because they fall under the FDA’s supplement rulings and the manufacturer does not need to provide proof that all ingredients are safe or effective. Researching the ingredients of OTC diet pills to discover if there are side effects or contraindications (reactions with other medications or health problems) is also a component of being a conscientious consumer. Knowing what effect the ingredients will cause is important for protecting your own health. If the goal is weight loss, then confirming that there is scientific data to support the purchasing and consumption of this OTC diet pill is crucial. Misuse of diet pills can have serious consequences, as this article has depicted. Abuse of OTC diet pills can be deadly, or leave someone with serious brain damage or paralysis. Medical personnel should be aware of the possible side effects and outcomes of OTC diet pill use. Screening patients who may be typical users would be the first recommendation for possible abuse problems and being alert for atypical persons who may be having medical issues related to OTC diet pills.

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Medicine Cabinet -Select What You Need-

Yumiko Lee

Over-the-counter (OTC) drugs are self-prescribed and self-administered for the relief of symptoms of self-diagnosed illnesses. An antihistamine is widely available and can relieve the symptoms of allergies such as sneezing, itching, nasal discharge, and other allergic reactions such as hives. According to the FDA standards, antihistamine OTC products containing diphenhydramine (DIP) are considered to be safe and available without a prescription. Consuming large quantities of any antihistamine products can lead to very dangerous consequences. Serious side effects are observed from ingesting a large amount of DIP such as hallucinations, heart problems, blocked intestines, inhibited sweat and salivary glands, disorientation, psychosis, and impaired memory. Moreover, the side effects and withdrawal symptom from an overdose are not only unpleasant, but can be lethal. Some people abuse DIP to get a “buzz,” get “high” and even to induce hallucinations. Unfortunately, teenagers appear to be the main offenders because of having easy access to these OTCs.

Drugs are widely used, legally and illegally. Over-the-counter (OTC) drugs are self-prescribed and self-administered for the relief of symptoms of self-diagnosed illnesses. OTC drugs are considered safe to use by individuals; however, abuse can occur if taken in greater amounts than recommended or for purposes other than those indicated.

In order to maintain the quality of drugs, the Food and Drug Administration (FDA) oversees all the legal drugs in the United States. Since there are so many products on the market, the FDA made the decision not to study individual products, but rather review their ingredients. Many drugs were removed from the market because their ingredients increase the chance for diseases. An example of such a drug removal was when clinical studies revealed that ephedrine was directly related to an increased risk of stroke. Therefore, products containing ephedrine were removed from the market in 2004.

The FDA uses the acronym, GRAS (Generally Recognized as Safe), as a stamp of approval for products containing ingredients deemed safe. Safe means “... a low incidence of adverse reactions or significant side effects under adequate directions for use and warnings against unsafe use as well as low potential for harm which may result from abuse...”¹ Histamine H1 is a histamine antagonist (antihistamine) which is a drug that opposes the action of histamine. It is the largest class of medications used in the treatment of allergic disorders.² The main ingredient, which the FDA approved as GRAS for the antihistamine, is diphenhydramine (DIP), which can be found in Benadryl®.

Many cold remedies and sleeping aids such as Sleep-Exe 3®, Unisom®, and Nytol® contain DIP as well. ¹ It is considered to be safe if used as directed. The problem of OTC misuse occurs when individuals start to ingest these products without proper care and accurate knowledge. Increasing numbers of people are purchasing OTC medications in grocery and convenience stores, rather than in pharmacies with no extra warnings or suggestions about how to take the drug by pharmacists. Many people assume these drugs are “safe” and may use them carelessly. This carelessness and misuse of readily available medications can prove as dangerous as using illegal street drugs.

The following article will present the facts about various antihistamine products’ general use, side effects, abuse and dangerous combinations with other drugs. In addition, the article highlights some controversial topics. However, the goal of this article is to prevent the dissemination of wrong information about drugs. The intention is not to influence anyone to commit an illegal act or to experiment with harmful actions. All information is presented for educational purposes only. This article does not endorse any of the risky behaviors discussed in the contents. Anyone who attempts to misuse OTC drugs described in the article takes full responsibility for any outcomes.

General Use of Antihistamine Drugs

Americans are spending more than \$10 billion a year on OTC products. Antihistamines are one of the more popular categories of this type of medicine. These can be used for a variety of symptoms with or without a prescription. Histamine

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is stored in mast cells, which can be found throughout the entire body. They play an important role in inflammatory and immediate allergic reactions. Mast cells release antihistamine to the nervous system following various physical disruptions including direct contact with a substance (e.g., a scratch on the skin), contact with cold (e.g., ice on the skin) or chemical initiation such as in “allergic responses” where contact with an allergen like pollen causes the body to release IgE antibodies, which in turn bind to mast cells. The binding action will cause the mast cells to release their histamines. IgE antibodies are a principal type of immunoglobulin made by the body implicated in allergic reactions. When chemical initiation of histamine release occurs, the classic response follows: vasodilatation (blood vessels expand), increased capillary permeability (capillaries leak fluid and some cells into the spaces between cells), and erythematic effect (the area becomes red), glandular hypersecretion (nose and bronchioles release mucous), and smooth muscle spasm (muscle twitching and tightness).³ Histamine also acts as a neurotransmitter. In the central nervous system (CNS), including the spine and brain, it influences many important regulations such as hormonal functions, thermal regulation, cardiovascular regulation, and arousal.

True antihistamine inhibits release of histamine. Unlike true antihistamine, DIP is a histamine receptor antagonist, which interferes with triggered receptor activities. There are two kinds of histamine receptors. The H1 and H2 receptors both receive histamine as a messenger, but the message received by the different receptors is different. H1 receptors tend to produce the symptoms and activate allergic reactions. H2 receptors are primary regulators of gastric acid secretion. This results in reduction of smooth muscle contraction. DIP has a high affinity for both H1 and H2 receptors.⁴

Antihistamine drugs are widely used to relieve, prevent, or manage allergic conditions (e.g., hay fever). However, they should not be used for an acute emergency situation such as anaphylaxis and asthma attack. DIP is generally considered to be a first generation H1 receptor antihistamine. It acts as an anticholinergic agent in the body, which reduces acetylcholine activities. Since acetylcholine stimulates various nervous activities, antihistamine reduces motor excitation, serotonin up-take, norepinephrine up-take, and increase dopamine.⁵ Hence, it is the reason why a main side effect of antihistamine consumption is drowsiness.

Antihistamine products are readily available over the counter. These drugs are easy to obtain and reasonably effective to treat minor symptoms, as indicated below.

- 1) Due to their local anesthetic and mild sedative actions, antihistamines are often helpful in eczema to lessen itchiness and reduce scratching.
- 2) Antihistamine drugs can be used to *prevent* asthma attacks by taking it prior to exposure to a known allergen.
- 3) Various antihistamine drugs have been extensively used in the prevention of motion sickness, including nausea and vomiting induced by motion (car, sea, or air). These drugs have some therapeutic value for the relief of vertigo (dizziness) and for Meniere’s disease. Patients suffering from these illnesses complain of dizziness and feel as though they were spinning or the world is revolving around them. Antihistamine drugs can be used for prevention of post-anesthetic vomiting, nausea and vomiting due to pregnancy, and radiation sickness.
- 4) Antihistamine drugs can be taken for the treatment of insomnia.
- 5) Some antihistamines are used in the treatment of nervous and emotional conditions to help control anxiety.⁶

It must be emphasized that antihistamine drugs, due to their sedative actions can lead to varying degrees of impairment in mental function. Antihistamines have similar effects to other types of CNS depressants, such as alcohol, barbiturates, analgesics and general anesthetics.⁷ Despite the positive attributes of antihistamine drugs, as previously stated, there is a dark side to this OTC and its use. Some people abuse it for getting a “buzz”, getting “high” and even to induce hallucinations. Unfortunately, teenagers appear to be the main offenders because they have easier access to them since they are OTCs.

Side Effects

Negative effects associated with consuming antihistamine drugs are observed when people use them without considering possible adverse consequences. In order to reduce harmful effects, do not take more than the recommended dose on the label, unless otherwise directed by the doctor. For DIP, which is the most common ingredient found in the antihistamine OTC drugs, the recommended effective dose for adults and teenagers is 25 to 50 milligrams (mg) every four to six hours as needed.⁶

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Antihistamine drugs enhance the effects of alcohol and other CNS depressants. Some examples of CNS depressants are sedatives, tranquilizers, and sleeping pills. Prescription pain medicine or narcotics are barbiturates, medicines for seizures, muscle relaxants, or anesthetics, including some dental anesthetics. This medicine may cause drowsiness or being less alert than normal. Even if taken at bedtime, it can cause a person to feel drowsy or less alert upon waking. Also, an antihistamine can cause dryness of the mouth, nose, and throat. For temporary relief of mouth dryness, use sugarless candy or gum, melt bits of ice in your mouth, or use a saliva substitute. However, if mouth dryness persists for more than 2 weeks, one should consult a doctor because it may increase the chance of dental diseases, including tooth decay, gum disease, and fungus infections.⁶

One must see a doctor immediately if any unusual symptoms occur such as:

- a) Fast or irregular heartbeat
- b) Fever
- c) Abnormal pain
- d) Burning sensation
- e) Chills
- f) Clay-colored stool or dark urine
- g) Severe cough
- h) Diarrhea
- i) Difficulty swallowing
- j) Puffiness or swelling of the eyelids
- k) Redness of skin
- l) Tightness in the chest

Due to these negative side effects, the FDA established standardized content requirements for labeling OTC drugs containing DIP in 1999. A warning label is put on every container with bulleted items that list side effects along with other information important for the consumer. Oral antiemetics (stops vomiting), antihistamines, antitussives/cough suppressants, and sleeping-aids have these warnings on them.⁸

Warnings
Do not use
<ul style="list-style-type: none">• With any other product containing diphenhydramine, even one used on skin

Table 1. – Warning for products containing diphenhydramine ingredients.⁸

This warning in Table 1 advises consumers not to take oral OTC DIP products with any other product containing any

type of DIP, including products used topically. Based upon consumer responses, this cautionary statement was studied and formulated by the FDA and required for all the products containing antihistamines.⁸

A lethal dose of DIP for humans is 855 mg/kg according to the National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods. The LD50 is the dose at which 50% of all subjects will die. For a person who weighs 60 kg (~135lb), a lethal dose of DIP is about 50,000 mg. However, there are many reports and studies indicating that overdoses resulted from amounts far less than 50,000 mg.⁹

Acute Intoxication

Antihistamine intoxication occurs when an individual ingests between 750 mg to 1250 mg on a single occasion. At doses close to 800 mg, an individual experiences hallucinations, pleasant and euphoric tactile and visual sensations and excitement. However, at larger doses, one can become confused and violent.⁵ Moreover, an individual may suffer from anticholinergic syndrome if he/she induces a large amount of antihistamine drugs very quickly. A description of anticholinergic syndrome is stated below.^{10,11}

- Vasodilation (expansion of blood vessels) especially of the face and skin surfaces. Skin may appear flushed and warm without sweat.
- Dry mucous membranes and hot, dry, flushed skin can occur from inhibition of secretions from salivary glands, bronchioles, and sweat glands.
- The body temperature rises due to both an inability to sweat and altered CNS thermoregulation.
- Pupils are markedly dilated and vision is blurred.
- Intestinal block may decrease drug absorption.
- Early stage of heart attack might occur.
- Urinary retention may contribute to the agitation.
- Disorientation, agitation, impairment of short-term memory, nonsensical or incoherent speech, and meaningless motor activity that includes repetitive picking or grabbing may be seen.
- Visual hallucinations may be a common symptom and it is often accompanied by paranoia, and auditory and sensory hallucinations.¹⁰

The American Association of Poison Control Centers Toxic Exposure Surveillance System (AAPCC-TESS) annual report for 1999 ascribes 52,118 exposures to antihistamine

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products. A total of 17,632 of patients exposed to either H1 or H2 blockers were treated in a health care facility. DIP was the most common antihistamine exposure among those reports being made to poison centers. Of all antihistamine exposures reported to U.S. poison control centers in 1999 (AAPCC-TESS data), 3884 (7.4%) resulted in moderate-to-major toxicity and 28 (0.05%) resulted in fatality. The vast majority of fatalities (71%) were associated with DIP.^{3, 12 13}

Antihistamine Drug Abuse

With considerable stress during their college life, students may feel they need extra help to continue their most challenging everyday routines. Drug use might be the 'help' some college students think will solve their problems. Since they are inquisitive, they are eager to attempt new experiences. Peer pressure may also play a role in the experimentation of drugs, like antihistamines and others. Prevention remains the best solution to avoid drug abuse because once drugs are used inappropriately, a distorted perception of the world becomes the main pursuit of a person rather than getting through the normal day-to-day activities.

According to the Canadian Psychiatric Association, a case study shows that DIP can cause inappropriate effects, such as agitation, disorganized behaviors, paranoid delusions, and auditory hallucinations. In the study, calm and pleasant feelings were found when 3000 mg (60 gel capsule of 50 mg) per day were consumed.¹⁴ An Internet search revealed that 8-12 tablets of Benadryl® usually leads to a hallucinatory effect. However, others who are very sensitive to the drug can have severe reactions with one or two tablets.

Also, the hallucinations are rarely a positive experience, and can be frightening and/or threatening. A very common reported experience is having contact and conversations with entities that are not there, including supernatural beings, friends, relatives or even someone who was dead. Sometimes the user will converse for over 10 minutes with an imaginary being, without ever realizing the irrationality of the situation.

Dimenhydramine (DMH), which is virtually the same as DIP, is another main component of products for motion sickness. Example of drugs with DMH are Dramamine® or Calm-X®. This drug is known to cause euphoria, induce pleasant visual and tactile hallucinations when taken in excessive amounts.^{5, 15} Due to the euphoric feelings, visual and/or auditory sensations, LSD or marijuana users have reported taking large doses of antihistamine drugs for experimentation or as a replacement

when they cannot get their drugs of preference.⁵ The FDA recommends only 50-100 milligrams (mg) be consumed every four to six hours as needed.⁶

Research indicates societal, community, and family factors play an important role in determining whether an individual will first try a drug. Since OTC drugs are legal, and easy to access, there is a high probability of them being misused.

Continuing misuse could become an important factor leading to addiction. For a person who becomes seriously addicted, the drugs and its effects on that individual become the central focus. Social influences, availability, cost, and penalties play a less important role. When antihistamine drugs are abused chronically, tolerance to the effects of the drug develops. There are severe withdrawal symptoms including depression, lethargy, irritability, loss of appetite, agitation, nausea, and amnesia.⁵

Intentional overdoses of antihistamines for a suicide attempt or hallucination seeking may cause rhabdomyolysis, the breakdown of muscle fibers resulting in leakage of potentially toxic cellular contents into the circulation system.¹⁶ Antihistamine may exert a direct toxic effect on muscles, which can induce possible injury to the sarcolemma, (muscle fibers). Injury to the sarcolemma would lead to leakage of intercellular contents, as well as to an increase of sodium into the cells.¹⁷ Sodium is the primary positive ion found in the blood and body fluids; it is also found in every cell, working closely with potassium, the primary intracellular mineral. Along with potassium, sodium helps to regulate the fluid balance of the body, both within and outside the cells. These two minerals help control the acid-base balance, provide buffering, and balance the positive and negative ions in the blood.⁵

In an effort to monitor the toxicity of drugs, other than alcohol, the federal government created the Drug Abuse Warning Network (DAWN). This system collects data on drug related crises from several hundred hospitals emergency rooms in metropolitan areas around the country. In 2002, patients who had incidences due to antihistamines were 3,314. This may be either suicide attempts or accidental overdoses. MDMA (Ecstasy) related incidences were reported to be 4,026.¹⁸

Green Hornet

The FDA is warning consumers not to purchase or ingest a liquid product called Green Hornet. It is a combination of DIP and dextromethorphan (DXM). Recently, there were four adverse

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events reported with the following symptoms: seizures, excessive heart rates, severe body rashes, and high blood pressure.¹⁹ Current reports to the Drug Enforcement Administration (DEA) and Internet sites have identified a pattern of misuse commonly referred to as ‘pancake and syrup.’ Adolescents and young adults are reported to take a series of cold tablets with cough syrup. These drug mixtures have produced episodic abuse in some Midwestern U.S. cities, resulting in an increase for emergency room visits from complications of overdose. These drug combinations have been described as producing a sense of well-being, euphoria, and a “wired” or speedy feeling.⁴ One study using a high dosage mixture of DIP and DMX on rats indicated significant enhanced effects on animals’ physical activities and mortality rate.²⁰

Conclusion

Itchy skin, watery eyes, and a runny nose are all signs that histamine, one of the chemicals released when antibodies overreact to allergens, is functioning. Antihistamines have been very effective at reducing those symptoms. An antihistamine can relieve the symptoms of allergies such as sneezing, itching, nasal discharge, and other allergic reactions such as hives. According to the FDA standards, OTC products containing DIP are considered to be safe and effective.

Recent reports have revealed some young adults and teens misusing antihistamine drugs for recreational reasons. College students are curious and there is a strong temptation to try something new. Consuming large quantities of any antihistamine products can lead to very dangerous consequences. Hallucinations, heart problems, blocked intestines, inhibited sweat and salivary glands, disorientation, psychosis, impaired memory and many more negative outcomes are possible. Moreover, the side effects and withdrawal of an overdose are not only unpleasant, but can also be lethal. Experimentation, misuse and abuse of OTC antihistamines are serious because of the health problems that may ensue. Hopefully through education, any individual that may have been curious about experiencing the possible “positive” effects will be dissuaded from ever misusing antihistamines.

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Preventable Harm: The Effects of Nicotine

Linda Peña

Of the many destructive carcinogens found in tobacco, nicotine is considered one of the most harmful. Nicotine is an alkaloid poison and research clearly indicates its damaging effects upon the body. Interference with the body's natural process of allowing cancerous cells to self-destruct, prohibiting wounds from healing properly, and assisting in acceleration of the skin's aging process are just some of the harmful effects of nicotine. And as if these were not sufficient enough reasons to never ingest nicotine, there is a far more sinister fact. Nicotine is a highly addictive stimulant, and when used in tobacco, it is rapidly absorbed into the blood, affecting the brain within 7 seconds. This stimulant increases the dopamine output, causing the user to experience a more intensified sense of pleasure. Sadly for some, they can become addicted to the nicotine. Those suffering from tobacco-related cancer, because of their addiction to nicotine, might find it impossible to stop using the very poison that is killing them.

During the past few decades, there has been significant action taken in order to protect individuals from the "health dangers" caused by the tars in tobacco. However, more and more people are becoming equally aware of the villainous effects nicotine can have on the human body. By definition, nicotine is an alkaloid poison that occurs in tobacco; also used in medicine and as an insecticide. In tobacco smoke, nicotine, as a carcinogen, "rides" on small particles of tar. When the smoke arrives at the lungs, the nicotine is absorbed quickly. When smoked or chewed, the nicotine in tobacco is rapidly absorbed into the blood and starts affecting the brain within 7 seconds.¹ Nicotine affects the central nervous system (CNS) through the action of nicotinic acetylcholine receptors that are widely distributed through the brain.² Acetylcholine is a chemical in the brain important for learning and memory. This chemical rapidly binds with nicotinic acetylcholine receptors where nicotine is in the body. This binding consequence causes the CNS to be exasperated into accelerated action.³ In addition, nicotine acts on the central and peripheral nervous system. The rapid effects of nicotine include:

- Increasing blood pressure and heart rate
- Faster respiration
- Constriction of arteries
- Stimulation of the CNS⁴

Nicotine shifts the body into high gear. By acting on the acetylcholine receptors, nicotine may goad many tissues into hyperactivity -- a possibility that raises scientists' suspicions about its role in disease. "It's an eye opener. Nicotine isn't just

a drug that stimulates neurons. It does the exact same thing to cells outside of the nervous system," says dermatologist Sergei A. Grando of the University of California, Davis, who studies nicotine's effects on skin.⁵ The following article will detail recent studies linking nicotine to various diseases and body processes such as: cancer, premature aging of the skin, and the prohibition of wounds healing properly.

Cancer

Even though nicotine alone has not been proven to cause cancer, new research suggests it might keep diseased cells alive. Evidence shows that nicotine is an immunomodulator and that one of its possible mechanisms is regulation of apoptosis, or programmed cell death in immune cells.⁶ This type of "cell death" is one of the most effective defense mechanisms a body has against cancer. Cells are constantly checking their "normal status," and are poised to commit suicide at the first sign of irregularities, thus protecting the host from propagation of abnormal cells that can, over time, form tumors. This is a process through which the body can begin to heal itself from cancer by eliminating cells damaged from cancer. In many cancers, including those of the breast, ovaries, prostate, and brain, a protein kinase B and a molecule called Akt are partially responsible for keeping this apoptosis process under control. Research has proven that when cells are treated with nicotine, Akt and kinase B cease functioning normally and simply shut down, thus discontinuing a diseased cell's ability to complete the suicide sequence.⁷

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Furthermore, nicotine has a second malicious talent for enhancing tumor growth. This drug causes tumor-nurturing blood vessels to sprout. Tumors can only grow to a certain point before they must be fed. In fact, John P. Cooke, a Stanford University researcher, claims that cells cannot continue to survive and grow to become malignant unless they can encourage blood vessels into themselves.⁵ It appears that nicotine may enable blood vessel formation by stimulating the production of vascular endothelial growth factor, or VEGF. Researchers from Baylor College of Medicine have been conducting tests that seem to indicate nicotine plays a role in plaque formation along blood vessel walls.⁵ Since vascular disease and cancer are both linked to smoking, it has been hypothesized that nicotine might ramp up blood concentrations of this growth factor.

Premature Skin Aging and Wound Healing

Just as nicotine sparks activity in nerve and tumor cells, it speeds up normal cellular activity in the skin. For example, some cells exposed to nicotine might go through the same life stages in 10 days that would normally take 10 weeks. Such hyperactivity occurs in cells called dermal fibroblasts that control the skin's texture by regulating the production of support proteins including collagen and elastin. The latter is a protein that coils and recoils like a spring within the elastic fibers of connective tissue and accounts for the elasticity of the skin. Whereas elastin provides elasticity, collagen provides rigidity to connective tissue. Since the body doesn't produce elastin after puberty, research indicates this is the point at which a person's skin can begin to age. If elastin can no longer be produced, it is understandable why individuals should not use any products containing nicotine that promotes skin deterioration such as sagging and wrinkles. Furthermore, these fibroblasts send out proteins that clean up wounded skin. Dermatologist, Sergei Grando states that fibroblasts can send out proteins that clean the site. This cleanup crew acts like "biological scissors," clearing the way for healing to begin. When these fibroblasts are treated with nicotine they lose the ability to heal. In other words, the healing process becomes inactive.⁸

Nicotine Poisoning

As research now clearly indicates, nicotine does cause damage to one's body. However, even in spite of knowing these facts, it still remains an adult's right of choice as to whether to use it. Regrettably, this choice is not always available for the very young. It must be taken into consideration that nicotine can cause

severe harm to children who unknowingly ingest this substance and suffer from nicotine poisoning. Little ones, who are known to eat almost anything, are most often poisoned after consumption of tobacco used for smoking or chewing. Without thought, parents and adults foolishly leave nicotine products strewn about the house within easy reach of babies, toddlers and young children. In addition, parents attempting to stop smoking might leave boxes of Nicorette® out and accessible to children. When these Nicorette® boxes are left out, children view them as candy or gum and will pop far too many into their mouth and can then suffer symptoms of a nicotine overdose. Therefore, pediatricians are warning parents to keep all nicotine products away from young children. Fortunately, tobacco tastes terrible and most children would immediately spit it out.

Nevertheless, there are incidences of nicotine poisoning reported every year. For an adult, symptoms of nicotine toxicity can result from ingesting one to four milligrams of nicotine. Adults should be cautious when using a nicotine supplement; they must also stop smoking. Like a child, sometimes an adult might treat Nicorette® as a gum or candy and lose count of how many they have chewed or consumed in a relatively short length of time. A toxic dose for nicotine in adults can be from 60-100 mg. A cigarette contains 9-30 mg of nicotine depending on the type of cigarette; while a cigarette butt contains about 25% of the nicotine of the original cigarette despite its deceptively small amount of tobacco. Death from nicotine poisoning usually results in a few minutes from respiratory failure caused by paralysis.¹

The fact that nicotine alone is an extremely toxic poison often goes unmentioned. If an adult or child were to ingest a toxic amount of nicotine, poisoning symptoms usually would begin to appear within 30 to 90 minutes. If the nicotine were in liquid form or gum form, symptoms could result as soon as 15 to 30 minutes.⁹ Nicotine poisoning causes vomiting and nausea, headaches, difficulty breathing, abdominal pain, rapid pulse, decreased respiration, sleepiness, confusion, lethargy, coma, blurred vision, pains, increased drooling and seizures. Children can suffer abnormal blood pressure, slowed or interrupted breathing, general sluggishness, seizures and coma. Each of these symptoms can be traced back to excessive stimulation of the cholinergic neurons.¹⁰ These neurons relate to nerve cells or fibers that employ acetylcholine as their neurotransmitter. Nicotine over-activates these receptors, thus causing the before-mentioned symptoms. If nicotine poisoning is suspected, do the following:

- Do not wait for symptoms to appear.
- Do not make the person throw up or vomit.

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- Do not give the person anything to eat or drink.
- Call the Poison Control Center immediately ⁹.

Brain Damage

One of the organs most negatively affected by nicotine is the brain. Nicotine acts upon a part of the brain called the fasciculus retroflexus. Neuroscientist, Gaylord Ellison, at the University of California, Los Angeles (UCLA), has reported that nicotine causes the most selective degeneration in the brain that he had ever seen.¹¹ In previous research, Ellison and scientists had shown that amphetamines, cocaine, Ecstasy and other addictive drugs damage one half of the fasciculus retroflexus. The fasciculus retroflexus is a bundle of nerve fibers emerging from a region of the brain just above the thalamus. These fibers dictate the levels of dopamine in an organism. Dopamine controls movement, emotional response, and the ability to experience pleasure and pain. When nicotine binds with nicotinic acetylcholine receptors, the resulting release of dopamine increases its concentration from what would normally be found in the brain, thus producing a pleasurable effect on the user. The researchers administered nicotine to rats for five days through a mini-pump inserted under their skin. “We initially gave relatively high doses of nicotine, and then reduced it to a dose that induces plasma levels of nicotine in rats comparable to those of two-pack-a-day smokers,” Ellison said. “Even at this much lower dose, we still found degeneration in the tract. We measured the degeneration and found that the larger the dose, the more damage.”¹² Thus nicotine begins to adversely affect the average dopamine level for an individual.

TABLE 1: SUMMARY OF MAJOR BEHAVIORAL EFFECTS OF NICOTINE

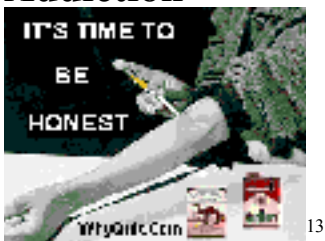
Effect of nicotine	Notes
Increases in rates of conditioned behavior such as working for reward or to avoid aversive stimuli	Less marked than effects of amphetamine
Decreases in rates of conditioned behavior	Subject to tolerance
Increases in rates of unconditioned behavior, notable locomotor activity	Increase with repeated exposure to nicotine
Decreases in rates of unconditioned behavior such as locomotor activity, eating and drinking	Rapid persistent tolerance. Probably a motor deficit rather than a sedative/hypnotic effect
Serves as positive reinforcer in self-administration and, controversially, in place preference procedures	Believed to be a main addiction
Serves as aversive stimulus in negative reinforcement, punishment, place and taste avoidance conditioning	May oppose or weaken tendency

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A direct result of nicotine influencing dopamine levels are changes of behavioral effects. Surprisingly, nicotine is shown to have an even more marked effect on increases in the rates of conditioned behavior than another stimulant, amphetamine. Table One summarizes some of the behavioral effects caused by nicotine use.

One marked change noted in Table One is “decreases in rates of unconditioned behavior such as locomotor activity, eating and drinking.” It is common for some recently ‘quit smokers’ to lament about weight gain. A smoker may want to stop, but is emotionally and psychologically anxious about gaining extra pounds. Studies have proved nicotine can decrease food consumption, particularly of sweet substances of high caloric value, and there is evidence for rebound increases in intake during withdrawal.³ Therefore there is a probability an individual may gain weight during their initial break from nicotine. However, knowing the nicotine facts about food intake, allows one to carefully plan for a healthy diet during this crucial and critical time of withdrawal. It becomes clear why some may choose to resume nicotine intake if weight becomes an overriding factor. To some, nicotine may seem relatively harmless, but to the contrary, these truths highlight the dangers. Not only is this drug destructive to the brain, but also harms one’s basic and instinctive conditioned behaviors towards maintaining good health.

Addiction



Nicotine is classified as a psychoactive drug and as previously mentioned, has similar actions as heroin and cocaine upon the brain. Nicotine is absorbed through the skin and mucosal lining of the mouth and nose or by inhalation in the lungs. Depending on how tobacco is taken, nicotine can reach peak levels in the bloodstream and brain rapidly. Cigarette smoking, for example, results in rapid distribution of nicotine throughout the body, reaching the brain within 7-10 seconds of inhalation.¹ Cigar and pipe smokers, on the other hand, typically do not inhale the smoke, so nicotine is absorbed more slowly through the mucosal membranes of their mouths. Nicotine

from smokeless tobacco is also absorbed through the mucosal membranes.

As a stimulant, nicotine rapidly invades our own “natural reward system” by increasing the activity in the dopamine neurotransmitters. Nicotine reinforces smoking behavior by activating nicotinic acetylcholine receptors in the midbrain dopaminergic reward centers. Nicotine induces long-term potentiation and increases the excitatory input to dopamine cells in the ventral tegmental area, and depresses inhibitory inputs.¹⁴ In other words, an individual can become dependent upon the dopamine effect caused as a direct result of tobacco. This action upon the reward system is believed to be responsible for drug-induced feelings of pleasure. However, the acute effects of nicotine dissipates in a few minutes, causing the smoker to continue dosing frequently throughout the day to maintain the drug’s pleasurable effects and prevent withdrawal.¹

Dr. John A. Dani and his colleagues at Baylor College of Medicine have shown that this activation of dopamine neurons by nicotine begins the response that leads to feelings of pleasure and reward, and then addiction.¹⁰ These same researchers examined dopamine nerve cells from the brains of rats that had been exposed to nicotine for prolonged periods. Their tests indicated that nicotine, at levels comparable to those found in human smokers, first activates or sensitizes these neurons but then quickly desensitizes them. This nicotine-induced desensitization of dopamine cells may explain why smokers report that they rapidly become tolerant to the effects of smoking during the day. The tolerance fades overnight so that by the next morning the dopamine cells are desensitized to nicotine.¹⁵ Thus explaining why many smokers’ report that the first cigarette of the day is the most pleasurable.

Nicotine has a half-life of 1.5 to 2 hours.¹⁶ Half-life is defined as the time required for half the quantity of a drug in a living organism to be metabolized or eliminated by normal biological processes. This relatively short half-life time span explains why the drug may be repeated throughout the day to maintain the blood nicotine level within the user’s comfort range. An astounding study published in the September 2000 issue of the British Medical Association journal, *Tobacco Control*, clearly reveals that full blown tobacco addiction can occur in just a few weeks.¹¹

If an individual has become addicted to nicotine they will suffer from withdrawal symptoms in their effort to stop using. The most common withdrawal symptoms are:

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- Anxiety
- Restlessness
- Inability to concentrate
- Irritability
- Severe urges to use tobacco
- Reduced pulse rate
- Headaches
- Problems with sleeping¹

The pattern and severity of these symptoms vary from person to person. Nicotine replacement therapy such as the patch or gum can alleviate withdrawal symptoms without providing the positive reinforcements associated with tobacco use. It is significant to remember the medical consequences of nicotine exposure through tobacco are critical. The most injurious effects of nicotine addiction are the result of tobacco use, which accounts for one-third of all cancers. Foremost among the cancers caused by tobacco is lung cancer – the number one cancer killer of both men and women.¹

For the past quarter of a century, focus has been upon eradicating tobacco use because of its causal effects to cancer. However, nicotine as a carcinogen is finally being more intensely scrutinized for its true insidious nature. Cunning by nature, nicotine has escaped being directly linked with cancer until only recently. Due to newer and more current research, nicotine has been implicated in assisting cancer to continue to exist and spread throughout the body by preventing diseased cancerous cells to self destruct. Furthermore, nicotine is the stimulant that keeps an individual addicted to using tobacco, possibly the cause of the cancer. And in addition, nicotine research has revealed this carcinogen accelerates the skin's aging process and interferes with the body's ability to heal its wounds. Therefore, truly the time has come to protect oneself from this poison and "just say NO to NICOTINE."

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Is This Abuse of Over-the-Counter Stimulants?

Ralph Davis

College students have always pulled all night study sessions to cram for tests and write papers. Commonly, they use some type of stimulant to help fight fatigue. These substances; however, may pose health risks if abused or combined with certain medications, alcohol, or drugs. Research has indicated that there are physical dangers resulting from the misuse of Over the Counter (OTC) stimulants including changes in the cardiovascular and central nervous systems. Withdrawal symptoms can occur when someone ceases to consume stimulants, such as headaches, lethargy, and irritability. The safety of some OTC stimulants, particularly energy drinks, has not been verified by long-term studies due to their relatively recent public availability. When using OTC stimulants, all provided directions should be followed and the body's need for rest should be respected.

For many college students cramming for tests and all-night study sessions are accepted routine activities. Students are under tremendous pressures from their families, peers, professors, and themselves to succeed at the collegiate level. For some, the transition to university coursework can be overwhelming. College students are forced to balance many activities such as: schoolwork, employment, family, and social affairs, while working toward their goals. In order to work through fatigue, some students use over-the-counter (OTC) stimulants to provide a boost in their energy level. Some students may use OTC stimulants with alcohol in an attempt to nullify the sedation caused by alcohol consumption. Although these stimulants are available at most pharmacies, drug stores, convenient stores, and supermarkets, researchers have now documented their potential risk for abuse and physical harm. The following article provides descriptions of OTC stimulants and the dangers of their abuse and interactions, such as: caffeine (including sleep inhibitor pills), Ephedra, and energy drinks. Although ephedra was banned for OTC sale in April 2004, it still is accessible illegally.

Unfortunately, OTC stimulants are marketed to the general population on a widespread level through appealing advertisements. Colorful ads and catchy slogans offer the illusion that these OTC stimulants are miracle tonics that will allow you to work beyond the body's limits. As with most medications there are some harmful side effects that may result from the abuse of OTC stimulants and their interactions with alcohol or other medications.

What are stimulants?

Typically when one thinks of stimulants, drugs such as cocaine, methamphetamine, or Ritalin may come to mind. These specific drugs are powerful stimulants. However, there are other substances including some OTC that have similar effects to those before mentioned high-risk drugs. Many popular diet pills, and energy boosting products are stimulants. Stimulants such as caffeine, can cause a user to experience an increase in alertness, but feel more anxiety. Also, stimulant use increases activity in the cardiovascular system and the central nervous system, while causing a decrease in appetite and weight loss.¹

College students may view the alertness, increased vigilance, and energy boost as benefits for using stimulants. They use these substances as a key ally for aiding them in their goal of achieving academic success. While seeking this increase in alertness and energy, students often ignore the negative effects stimulants can have on the human body, such as increased heart rates, blood pressure and dehydration. Stimulants can cause similar hazardous effects when combined with other medications, controlled substances or alcohol. It is important that students be aware of all the risks and not use stimulants carelessly.

Types of Over-the-Counter Stimulants Caffeine

Caffeine is consumed by billions of people worldwide on a daily basis. It is found in coffee, teas, colas, chocolate, many herbal remedies and energy drinks. Many people start their day

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by ingesting some form of caffeine. Humans absorb caffeine into the bloodstream within 30 minutes and it is eliminated from the body in three to six hours. Some researchers say this rapid cycle of absorption and elimination make caffeine an ideal substance for abuse. Caffeine causes an increase in heart rate and blood pressure, and may contribute to dehydration due to its diuretic effects. Moreover, caffeine consumption is considered a socially acceptable vice.²

Mild caffeine stimulation of the central nervous system can be beneficial, allowing clearer thinking and more energy.³ However, it is the consumption of large amounts of caffeine that may lead to negative effects. For example, 150-250 mg of caffeine can produce negative side effects in some users. This amount, the equivalent of 2-3 large cups of coffee can lead to hyperesthesia or increased unpleasant sensory sensations. In addition to this effect, large doses of caffeine can also cause insomnia, restlessness, excitement, muscle tremors and rapid heartbeat.³

Caffeine is also the main ingredient in sleep inhibitor pills. These pills are marketed to the population as energy suppliers that will allow the body to function with a decreased need for sleep. Having the same effect as caffeine, these sleep inhibitors also share the same potential for side effects and harm. These pills are often used by students to pull “all nighters”, or prolonged study sessions. Anecdotal reports indicate students may crush these pills and snort them for an intensified effect. Snorting of any substance may cause damage to nasal membranes and sinuses, which carries the risk of transmission of diseases like Hepatitis C and HIV. This risk comes from nasal damage caused by instruments like straws and dollar bills.

Ephedra (Ma Huang)

Ephedra is a naturally occurring plant, known in traditional Chinese herbal medicine as “ma huang.” This substance contains an active ingredient called ephedrine. Ephedrine is similar to an amphetamine and is a powerful stimulant to the nervous system and heart.⁴ In the past, ephedra products were marketed as dietary supplements to promote weight loss, increase energy and enhance athletic performance. Although banned for dietary use in the United States in 2004, people may still use ephedra or its derivatives unknowingly or illicitly.

After careful review of the available evidence about the risks and benefits of ephedra in supplements, the Food and Drug Administration (FDA) found that these supplements present an

unreasonable risk of illness or injury to consumers.⁴ Research has shown that ephedra has questionable effectiveness and confirms that the substance raises blood pressure and stresses the heart. In fact, ephedra may be more beneficial in people that are already thin and less effective for overweight people.⁴ The risk of illness, and lack of proven effectiveness should be a leading concern for people considering the use of any product containing ephedra.

Energy Drinks

In recent years, energy drinks have flooded the market. Their producers market them as a safe, and harmless way to enable people to work or party harder for longer periods of time. Energy drinks may contain as much as 80mg of caffeine and herbal stimulants such as ginseng and taurine. These drinks are marketed largely to people under the age of 30, with college students being a targeted population. Students report product giveaways and promotions at venues near their campuses.⁵ This is an area of concern for health care professionals that say young people already consume an unhealthy amount of caffeine.⁵

An individual’s response to these drinks may vary, and consumption should be treated carefully because of their caffeine concentrations. Energy drinks can increase the heart rate and blood pressure, cause possible palpitations, dehydrate the body, and prevent sleep. They may also induce insomnia and anxiety in sensitive people.⁶ Energy drinks should not be used while exercising, as the fluid loss from exertion coupled with the diuretic quality of caffeine can leave the user severely dehydrated.

Another cause for concern with energy drinks is they contain many ingredients that are not really understood, and may have potential to cause harm. According to Dr. Michael Hirt, medical director of the Center for Integrative Medicine, energy drinks can become a “witches brew” with ingredients that are not understood, and the long-term effects may not be known.⁵

Energy drinks have not been proven to be bad for you when consumed alone, but they should not be utilized as a natural alternative. Caffeine however, has been proven to have withdrawal symptoms including headaches.² The claims made for improved performance and concentration can be misleading. Findings have shown that energy drinks may improve performance some, but too much (the equivalent of 4 cups of coffee in an hour) can be a hindrance.⁷ Students must think of them as highly caffeinated beverages, and by doing so will use them knowing the possible risky effects.

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Harmful Interactions

All of the above mentioned OTC stimulants have the potential for a harmful interaction with other substances such as: medications, illicit drugs and alcohol. For college students, a primary concern is the interaction of stimulants with alcohol. Many college students use stimulants in an attempt to counter the depressive quality of alcoholic beverages. The danger here, lies in the attempt to fool the body into thinking an individual is not as drunk as they really are. According to researchers, mixing energy drinks and alcohol could be a “disaster waiting to happen.”⁵ The energy drink maker Piranha, and the Swedish National Food Administration advise people not to mix these beverages with alcohol. They may consume larger amounts of alcohol, and when combined with energy drink stimulants, harmful side effects like alcohol poisoning or cardiac arrhythmia may result.⁵

Dehydration is another danger from combining alcohol and stimulants. Alcohol alone causes dehydration, and when stimulants are added containing large amounts of caffeine (a diuretic), the dehydrating effects are increased. Many doctors and nutritionists are concerned about young people’s increased consumption of energy drinks. They say that users of energy drinks must stay hydrated and water intake is important, since caffeine promotes fluid loss.⁵

A further risk is the possibility of cardiac-related problems developing from the combination of stimulants and alcohol. Energy drinks containing caffeine combined with alcohol send dangerous, mixed messages to the body. These communications can affect the central nervous system and lead to problems like increased heart rate or cardiac rhythm.⁸ The danger of cardiac problems is even more of a threat if caffeine and ephedrine are combined. Although ephedrine is a banned substance, it may be consumed unknowingly or illicitly. According to Dr. Hirt, the combination of caffeine and ephedrine has been proven to cause deadly heart problems.⁵

Other products capable of causing harmful interactions with stimulants include oral contraceptives, laxatives, and diuretics. These products increase the half-lives (the amount of time present in the body) of caffeine and ephedra, raising the possibility of negative side effects.⁴

Conclusion

Since OTC stimulants are available for anyone to purchase, they should be used cautiously. While these substances may provide a boost in energy necessary to complete a certain

task, the user must be warned that these products contain ingredients not tested for long-term effects. Caffeine may also be habit forming, and as previously mentioned, may cause withdrawal symptoms.

It is critically important to be aware of all potential dangers resulting from the interaction between stimulants and other substances, primarily alcohol. This combination not only causes bodily harm from changes in heart rhythm, but may also allow students to drink more than usual due to the stimulant’s masking of the depressive effects of alcohol.

Millions of people worldwide start the day with a hot cup of caffeinated coffee or tea, and others rely on some stimulant to give them an energy boost throughout the day. Knowing this, it is extremely important to be informed of the contents of the food, beverages, or supplements being used to supply this energy, in case there may be dangerous interactions. Everybody may need the occasional pick-me-up, but it must be remembered the body has mental and physical limitations that must be respected when using all types of stimulants.

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