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Over Usage of Over the Counter Medication

You're having a terrible migraine the whole day so the first thing you do when you come back home is to immediately reach in for your advil. You grab two pills because they seem to work better than just one pill and after a few minutes you feel the rush of relief. You finally go along with your day without pain. About four out of five American adults use over the counter medicine such as tylenol, advil, ibuprofen to get rid of pain such as raging headaches, cramps, muscle aches, fever and so on.

It's an easy way to get rid of the pain and a quick fix without having to go through the process of visiting a doctor. It's easily accessible; you see them in supermarkets, bodegas, gas stations and anywhere near you. You can even have them shipped straight to your house. What many people don't understand and are not warned about is the dangers of overusing over the counter medications and their negative impact on the body. That bears the question of how safe are over the counter medications?

First we have to understand how these drugs work and how we even feel pain. As humans we have specialized nerve cells called nociceptors. Just like other nerve cells, nociceptors are all across your body from your heart, legs, arms, stomach and so on. Now nociceptors unlike your other nerve cells don't actually work unless something is causing damage or harm to your body. For example if you touch a wall you will feel it but you won't feel any pain. Now if you slap your hand on the wall really hard you will start feeling pain because your nociceptive nerves are traveling from your hand to your brain indicating that something is

harming or hurting your hand. But nociceptors are not the only thing in charge of alerting your body of pain. When cells are damaged they release a chemical called arachidonic acid. Then two enzymes called COX_1 and COX_2 convert the arachidonic acid into prostaglandin. The prostaglandin then converts into multiple other chemicals that have specific roles such as raising your temperature, causing inflammation, and pain sensitivity.

Now how do over the counter medications such as tylenol, advil, ibuprofen and aspirin work. Well all enzymes work as a lock and key. That means for the enzyme to work it has to have a specific chemical to allow it to work. For example enzyme COX_1 can only work if arachidonic acid is attached to it because they fit like a lock and key and therefore can continue to produce prostaglandins which cause pain releasing chemicals.

Painkillers do the opposite, they obstruct the chemicals from entering the enzyme thus preventing it from converting and releasing pain causing chemicals. You may ask how do the painkillers know exactly where the pain is located? They actually don't, painkillers get dissolved by our stomach acid after being orally swallowed. It then moves into our intestine and through the walls of our intestine it moves into our bloodstream. Once in the bloodstream the painkiller moves very fast to cover areas where pain signals are being released while moving across many parts of our body. Only a fraction of the painkillers actually find their way to the spot which is emitting these pain signals. Not only do the painkillers obstruct the enzymes from releasing pain causing chemicals, they also obstruct nerve signals to the brain that alert us of pain in our body.

Now what happens to the painkiller medications after doing its job? Where does it go in the body? Well after 1-2 hours of full effectiveness of the medications the body starts eliminating the medication. Through the bloodstream again the particles of medication pass through the liver then the kidneys. Some drugs get through the process without any metabolic changes and get

passed through as excreted bile. However other drugs are converted into metabolites while in the liver and then are passed through the kidneys and excreted as bile. The amount of excreted bile caused by these medications and converted metabolites can all fluctuate based on how much medication you take, your age and health issues such as diabetes.

Knowing that the liver and the kidneys are both part of our detoxification and filtration systems there should be a direct correlation between the amount of over the counter medications you take and the effect they may have on your liver and kidneys. When you take more than the required dose of any over the counter medication that has to be converted into metabolites, there can be an over reproduction of metabolites and once the liver starts storing these metabolites instead of filtering them out they turn into toxins. These toxins start accumulating in the liver over time and start changing structures of the liver making it incapable of doing its job and eventually this causes liver damage.

Kidneys filter out bile and water from the bloodstream through many blood vessels. These blood vessels are able to filter out waste. These blood vessels can narrow and widen to change the pressure in the filters. The amount of blood filtered is based upon the amount of pressure in these blood vessels. It is always best to keep the pressure in a healthy balance. When you are sick your body is already at a low body pressure which also causes the blood vessels in your kidneys to have low blood pressure. When you take medications such as ibuprofen, aleve or motrin those medications lower your blood pressure. When taken through a proper prescription from a doctor these medications are not as harmful but once they are being used without proper advising you run the risk of making your blood pressure so low your kidneys lose function and stop working.

Many people who are in desperate situations and need a quick fix for their health problems don't particularly think about the consequences of using over the counter medications without doctor advice. They most probably weren't even aware of how these drugs affected their body and how easily someone can overdose on these medications. The CDC said that "In 2016, 115 Americans died every day from an opioid overdose – that is more than 42,000 drug overdose deaths"(blog administrator). In the journal "*Hepatology*" it has been mentioned that " U.S. researchers found that over a six-year time span, more than 40 percent of acute liver failure cases were caused by an acetaminophen overdose. High doses of acetaminophen can cause liver injury, even to a healthy liver"(Cutler).As we further read multiple other stats we see that liver damage, kidney damage and overdosing on over the counter medications is more common than we think.

So why aren't people being informed about the dangers of over the counter medications? Well simply pharmaceutical companies benefit from people buying their products. Companies like Advil make about 449.5 million dollars a year. These companies also put up ads that don't talk heavily about the side effects but rather just the positives about taking these medications. These ads started from the beginning of the 19th century encouraged people to take all these different kinds of medications for a quick fix and that these medications are totally safe for all members of the family. "Industry was quick to make sure physicians knew about the latest tools. Ads for morphine tablets ran in medical trade journals, Courtwright says, and, in a maneuver with echoes today, industry sales people distributed pamphlets to physicians"(Kelvely). These physicians would recommend to all their patients to take these new ground breaking medications for many of their health problems and people ran with it.

Physicians and pharmacists were the key drivers in increasing America's per capita consumption of drugs like morphine by threefold in the 1870s and 80s. (Kelvely). What does that

say about today's physicians and pharmacists? Many physicians to this day are being taught by big pharmaceutical companies that their products and medications can be used to a wide variety of patients. After the physicians' heard so they began telling their patients about these wonderful medications and persuading them to use it thus it began to create a direct-to-consumer advertising. In 2004 a Food and Drug survey revealed that “ physicians view direct-to-consumer (DTC) ads as one of many factors that affect their medical practices and their interactions with patients (FDA).

Many people have started to realize the dangers of these advertisements and the wide range of drug availability, people like courtwright say “that physicians can be retrained. If physicians in the late 19th century learned to be judicious with morphine, physicians today can relearn that lesson with the wide array of opioids now available”(Kelvely). The FDA also stated in an article called “*The Impact of Direct-to-Consumer Advertising*” in which they observed“For decades, prescription drug makers promoted their products exclusively to health care professionals, who were expected to interpret drug information for their patients. Beginning in the early 1990s, some drug manufacturers began targeting consumers due, in part, to the aging baby boomers and to an increase in the number of patients participating in their own health care decisions. Since then, DTC advertising has become a popular promotional tool.”.

But now many companies are using the fact that the FDA itself has approved these drugs that they are completely safe and that there is nothing wrong with advertising them. As the FDA states in one of their articles, “FDA regulations ensure that OTC drugs are safe and that the labels are easy to understand. OTC drugs can be bought and used safely without the need for a prescription”. An article written by Donald W. Light by Harvard university blog on ethics said, “The bar for “safe” is equally low, and over the past 30 years, approved drugs have caused an

epidemic of harmful side effects, even when properly prescribed. Every week, about 53,000 excess hospitalizations and about 2400 excess deaths occur in the United States among people taking properly prescribed drugs to be healthier”. These big pharma companies believe that by putting a warning on their pill bottles and boxes is enough to show the risks of consuming their products. They also believe that they are trying to just help patients by making these drugs available as much as they can so that no customer has to go through long hours of pain with no treatment nearby. Many believe that by allowing patients to get direct access to medications can actually lower the cost of healthcare as Eric P. Brass says in his article in the *New England Journal of Medicine*, “Allowing patients direct access to drugs may decrease the frequency of visits to physicians and lower the costs of healthcare”. Many middle to lower class families have to pay copays to just speak to a doctor about their pain and by allowing these families to do their own research and get their medication over the counter, that can significantly save someone lots of money especially if they cant initially pay a copay.

But the real issue at hand is how do we regulate these disasters, how do we prevent these overdoses and drug toxicity? One way that we can possibly reduce overdoses and drug toxicity that's caused by over the counter medications, is to lower the quantity in which they are sold. We see in alot of stores such as Walmart, Costco and Walgreens that drugs are being sold in huge bottles of two hundred pills and more. We should also stick to simple plain pharmaceutical designs rather than very eye-catching ones that companies such as advil and tylenol use to attract customers. By doing so people will read the actual drug facts and information rather than just glancing on what the drug has to offer.

Now as a consumer or a patient your part in trying to make over the counter medications safer is to always ready the warning labels and details about the drug you are consuming. You

should never take any medication without knowing the limits of it. You shouldn't mix multiple medications in case they might not be compatible and can cause damaging effects. You should always know that you have the right to ask your doctor about what are the side effects of the medication you are being prescribed or any medicine you're being told to buy.

In regards to this being the end of my essay I would love to see more people and pharmaceutical companies strive to create a better and much more positive and healthy relationship with medicine. After all, medicine is a beautiful thing and if taken safely it indeed can make a bunch of our lives easier. I also hope that many companies become more transparent about the medications that they are advertising to us and that physicians also are more clear about the medications we are given and are consuming. So always remember, use over the counter medications safely.

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