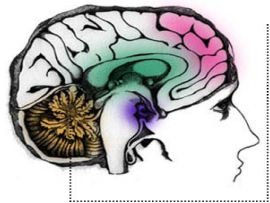


Central Nervous System Depressants

Community Mental Health Nursing Program
Kim A. Drury RN, MSN

The central nervous system (CNS) is made up of the brain, spinal cord, and cells specifically named “neurons”. The brain is made up of 4 lobes located in the cerebrum and an adjacent area, the cerebellum. These areas have their own functions as well as communicating and cooperating with each other.



Medications are classified, or put into groups, as central nervous system (CNS) depressants are used to relieve pain, anxiety, sleep disturbances and short-term detoxification for withdrawal symptoms. They also are used as part of the preparation for patients going to surgery (preoperative). People who abuse opioids do so for the euphoric feeling or “high” experienced as contentment, freedom from worry, and in larger amounts, first a “rush” then the high experience. These medications and substances are considered to be “psychoactive” (mind altering) substances because they change how we perceive pain and anxiety as well as decreasing how alert we are. They can change how well people function especially if using more at one time than prescribed and/or using more than one type of CNS. More recently we are seeing an increase in people who have needed short-term treatment with opioids, progress to abusing them and then moving on to using Heroin.

A natural source of opioids is the poppy flower found in large supply in Turkey and Afghanistan. The seed pods produce a milky substance as they ripen and this substance contains the most opium. The poppy seeds contain less opium than the milky substance (Frisch & Frisch, 2011, 424-425). Opioids are also made artificially in laboratories by pharmaceutical companies as medications and illegally by individuals in homemade laboratories. Opioids can be swallowed, injected or smoked depending on the type and form used. Anyone can see what needle tracks look like by typing “needle tracks, photos” in the search box of most search engines (ex. Google.com, Bing.com, Yahoo.com, Ask.com, etc.).

Although much is understood about the biology, chemical, and electrical parts of the CNS, exactly how the depressant effects work is not completely understood. Theories help explain some possibilities (Lehne, 2007, 182). Our brain makes substances called “endorphins” which temporarily help us by decreasing pain perception. Opioid medications and illegal drugs “fit” the in some of the same places (“mu” brain cell receptors) as our natural endorphins do. This “fit” is frequently described as a lock and key fit. When people chronically uses or abusing opioids, their brain decreases how much endorphins it produces. This is commonly explained by a negative feedback loop and is how our brain and body keep a balance (homeostasis). Negative feedback loops are triggered by having too much of a substance, chemical or even hormones in some cases.

Short-term, carefully monitored use of CNS depressants has been very helpful. However, there is a down-side because there is a risk of becoming habit-forming (addictive) and problems related to misuse or abuse. Their effects are also increased when taking more than one type of CNS depressant. It is also true that “cross-dependence”, tolerance and “cross-tolerance” can develop between different CNS depressants (Townsend, 2011, 276). They can lead to multiple problems in all areas of a person’s life and even be medically life-threatening. Even though people can experience a physical tolerance to these medications and substances, *typically there is no tolerance to the depressant effect on the respiratory system*. This causes a slower rate of breathing and lower oxygen supply. This dangerous situation can result in accidental overdose leading to respiratory arrest and death if medical help is not available. Some CNS depressants can also cause medically life-threatening situations when withdrawing from their effects. Not all CNS depressants situations respond to treatment with Narcan (Naloxone). (See other articles on our website “Addictions” and “Heroin” including use of Narcan in the community).

The following information is presented according to the groups in which specific examples of medications, as well as illegal (illicit) substances, are categorized.

CNS Depressants Groups:	Examples:	Common Medical Use:
<u>Opioids</u>	<u>Prescribed medications:</u> Morephine Demerol (Meperidine) Fentanyl (Sublimaze) Dilaudid (Hydromorphone) Hydrocodone (<i>previously marketed as Vicodin</i>) Norco Lortab	Pain management

	<p>Seconal (Secobarbital; *also known as Red birds, red devils or GBs) Nubain (Nalbuphrine) Nebutol (Pentobarbital; *also known as Yellow jackets or birds) Amytal (Amobarbital; *also known as Blue Angels or blue birds)</p> <p>Pentathal/Sodium Pentathal</p>	<p>Withdrawal from phenobarbital and other barbiturates abuse, but in smaller doses</p> <p>More often in the past used for sleep disturbances</p> <p>Used with other medications prior to medical and surgical procedures (other than phenobarbital)</p>
Sedative/Hypnotics	<p>Noctec (Chlorol hydrate; also known as Mickey, Peter*) Quaaludes (See also Benzodiazepines and Barbiturates above)</p>	<p>Sleep disturbances</p>
Alcohol	<p>Wine</p> <p>Beer, "Hard liquor", Wine</p> <p>Beer Hard liquor</p> <p>Recommended limits to stay within if you do drink alcohol and do not have any contraindications to drink:</p>	<p>Some medical use recently recommended red wine in limited amounts (<i>ex. One 4-5 ounce glass</i>) found to be "heart healthy". Can obtain the same benefit from grape juice.</p> <p>Alcohol of any kind should be avoided if:</p> <ul style="list-style-type: none"> • Taking medications that interact with alcohol (<i>includes other CNS depressants</i>) • Managing a medical condition that can be made worse by drinking • Underage • Planning to drive a vehicle or operate machinery • Pregnant or trying to become pregnant <p>No medical use.</p> <p>Generally one standard drink includes 4-6 oz of wine = 12oz beer = 1.5 oz of hard liquor.</p>

	<p><u>Men:</u> No more than four drinks per day or no more than fourteen ounce drinks per week.</p> <p><u>Women:</u> : No more than three drinks per day or no more than seven drinks per week.</p>	<p>For more specific information on what amount = a standard drink go to http://rethinkingdrinking.niaaa.nih.gov/How-much-is-too-much/What-counts-as-a-drink/Whats-A-Standard-Drink.aspx .</p>
--	---	---

(*Townsend, 2011, 276)

CNS Depressant Groups:	Use/Abuse/Dependence	Overdose:	Withdrawal:
Opioids	<p>Euphoria (rush) at first “High” (great sense of well-being) After the High, decreased mood/feels down or sad Decreased attention Memory problems Decreased/slow breathing (respirations) Decreased blood pressure Drowsiness Sedation Dizziness Nausea Pupils contract (smaller) Difficulty urinating (retain urine) Constipation Relief from pain and/or anxiety Decreased sexual functioning (desire, impotence, failed orgasm, slowed ejaculation)</p> <p><u>Abuse or Dependence</u> See above for “use”</p> <p>Change in physical appearance (look sick,</p>	<p><u>CNS Neurotoxicity syndrome:</u> Muscle twitching or jerking Agitation Dilated pupils Increased sensitivity to pain (hyperalgesia) Confusion Delirium-fluctuating levels of consciousness and alertness Coma Shock Seizures Death</p>	<p>Elevated blood pressure/heart rate/breathing and possibly fever Restlessness Muscle aches Abdominal cramping Joint pain/bone pain Sweating Nausea Diarrhea Irritability Panic Runny nose (Rhinorrhea) Runny eye/tearing up (Lacrimation) Insomnia Yawning Goosebumps/Goose flesh Chills Tremors Hallucinations</p>

	<p>pale, poor hygiene, unkempt, etc.)</p> <p>Changes in weight: Initially may see loss, but more likely see gain related to cravings for sugar</p> <p>Slurred speech</p> <p>Covering up or denying opioid use, abuse or dependence</p> <p>Stealing even from family or friends to get more opioids</p> <p>Mood swings both while using and when not using</p> <p>Changes in behavior</p> <p>Problems in close relationships; work or school relationships, performance or attendance</p> <p>Changes in priorities: Seeking, obtaining and using opioids becomes highest priority over family, friends and work responsibilities</p> <p>Decreased mental (cognitive) thought processes: Decreased alertness, confusion in a mental fog or haze, not paying attention to important matters at home, work or school</p> <p>Poor judgement</p>		
--	--	--	--

	Negligent of home/work/school/social responsibilities “living in a shambles” (http://www.opioid.com).		
Benzodiazepines	Drowsiness Poor coordination/unsteady Gait Decreased blood pressure, heart rate, and respirations Irritability Decreased concentration Memory problems Slurred speech Poor judgement Impaired work or school performance Difficulty fulfilling family roles	*Decreased blood pressure, heart rate, and respirations Shock Seizures Coma Death from cardiovascular or respiratory	* Tremors of fingers, hands and even eyelids Grand mal type seizures Confusion Disorientation Nausea Vomiting Rapid heart rate Increased blood pressure Sometimes increased respirations and temperature Sweating Anxiety Irritability Insomnia **Suddenly stopping these types of medications/drugs can result in death
Barbiturates	See “Benzodiazepines” and “Alcohol”	* Seizures Decreased blood pressure, heart rate, and respirations Shock Seizures Coma Death from cardiovascular or respiratory	Seizures See “Benzodiazepines” **Suddenly stopping these types of medications/drugs can result in death
Alcohol	Initially feel relaxed Giddy Voice volume becomes loud Slurred speech Decreased coordination Decreased physical reflexes Decreased balance Thinking processes slow down	*BAC/BAL = 300mg/dl or 0.3g/dl: Confusion Stupor Coma 400mg/dl or 0.4 g/dl and above: Coma	<u>Early Withdrawal:</u> <i>Occurs 6-8 hrs. after last drink. Peak time 24-48 hrs.</i> Lethargy or talkative Hyperactivity Sweating Elevated blood pressure Increased heart rate/pulse, breathing rate and possibly temperature

	<p>Decreased ability to make decisions or solve problems Sometimes irritability or agitation Drowsiness Lethargy Blood Alcohol Level (measured in milligram or gram per deciliter) = 80 mg/dl or 0.8 g/dl is the legal limit in most states; intoxication usually starts at 80mg/dl to 200 mg/dl *</p>	<p>Death due to respiratory depression</p>	<p>Disorientation Fine Tremors of hands and arms Blackouts (function, but don't remember anything at all of what they did during this period of time)</p> <p><i>Delayed withdrawal period may be up to 14 days</i></p> <p><u>Later Withdrawal: Peak continues from 48 – 72hrs.</u></p> <p>Increasing confusion Delirium Seizures Coarse tremors Elevated blood pressure/heart rate/breathing and possibly temperature Hallucinations – visual, tactile (ex. Feels like bugs crawling on their skin)</p> <p><i>Risk for Delirium Tremors (DTs) 48 – 72 hrs.</i></p> <p>Hallucinations Paranoid delusions Delirium Grand mal type seizures</p> <p>If withdrawal is not treated death is possible due to cardiovascular collapse, respiratory depression and arrest; or continuous seizures (Status Epilepticus)</p>
--	--	--	---

(*Townsend, 2011, 276; Varcarolis & Halter, 2010, 410, 411, 414; Fontaine, 2009, 376-386)

Resources:

Contet, C. Kieffer, B.L., & Befort, K. (2004). Mu opioid receptor: A gateway to drug addiction. *Current Opinion in Neurobiology*, Jun.; 14(3): 370-378. Retrieved January 21, 2016 from <http://www.ncbi.nlm.nih.gov/pubmed/15194118>
Drug Information: www.rxlist.com .
Food and Drug Administration (2015). www.fda.gov .

Fontaine, K.L.(2009). *Mental health nursing* (6th ed.), 376-386. Upper Saddle River, NJ: Pearson Education, Inc.

Frisch, N.C. and Frisch, L.E. (2011). *Psychiatric mental health nursing* (4th ed.), 424-427. Clifton Park, NY: Delmar Cengage Learning.

Goodman, A.J., Le Bourdonnec, B. & Dolle, R.E. (2007). Mu opioid receptor antagonists: Recent developments. *ChemMedChem*. Nov;2(11):1552-70.

Keltner, N.L., Schwecke, L.H. & Bostrom, C.E. (2007). *Psychiatric nursing* (5th ed.), 493-543. St. Louis, MO: Elsevier.

Lee, M.L., Silverman, S.M., Hansen, H., Patel, V.B., and Manchikanti, L. (2011). A comprehensive review of opioid-induced hyperalgesia. *Pain Physician*. Mar-Apr; 14(2):145-61.

Lehne, R.A. (2007). *Pharmacology for nursing care* (6th ed.), 182, 258-280. St. Louis, MO: Saunders/Elsevier.

National Institute of Neurological Disorders and Stroke (2015): Myoclonus Fact Sheet: http://www.ninds.nih.gov/disorders/myoclonus/detail_myoclonus.htm?css=print . PMID: 21412369. [PubMed - indexed for MEDLINE]. Free full text.

National Institute on Alcohol and Alcoholism (2015). Rethinking alcohol and your health. What's low risk drinking? <http://www.niaaa.nih.gov/> and <http://rethinkingdrinking.niaaa.nih.gov/How-much-is-too-much/Is-your-drinking-pattern-risky/Whats-Low-Risk-Drinking.aspx> .

Opioid Addiction (2015). 10 common signs of opioid addiction. <http://www.opioid.com> .

Townsend, M.C. (2011). *Essentials of psychiatric mental health nursing* (5th ed.), 269-315. Philadelphia, PA: FA Davis.

Varcarolis, E.M. & Halter, M.J.(2010). *Foundations of psychiatric mental health nursing: A clinical approach* (6th ed.), 402-432. St. Louis, MO: Saunders/Elsevier.