

Addiction, Infant Mortality, and their Correlation

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American drug usage, both by illicit and illegal drugs and by prescription medical pharmaceuticals, is on the rise with the advancement of chemical manufacturing technologies and the growth of the economic network in the country. What comes with this is a higher usage of drugs and medications entering the human body, causing ever increasing trends in addictions to drugs. Addictions play an unapparent yet increasingly crucial role in another medical topic, infant mortality. When parental figures or supporting guardians become addicted to drugs, biopsychosocial behaviors from them become imprinted or transferred to young children in their care, especially infants, who take on addictive behaviors and therefore undergo withdrawal symptoms. This is seen in diseases such as Neo-Natal Abstinence Syndrome, for example. Infant mortality is lowering in many countries, but its connection with drug addictions is rising, especially in countries with growing economies and pharmaceutical industries, such as America.

The purpose of this paper is to demonstrate the vast unobvious yet existent linkages between drug addictions and mortality rates in young infants, and to suggest treatment mechanisms to remove or decrease the impact of these linkages.

These topics will be addressed by briefly scoping over the two concerned topics separately, delving into their connections in medical problems such as Neo-Natal Abstinence Syndrome, and addressing new options to target these linkages by exploring viable solutions.

Addictions and their Consequences

The basic medical definition of an addiction is a primary neurological disease concerned with cognitive motivation and reward pathways associated with certain drugs, causing a dependency on these drugs for proper functioning of the body (Kosten & George, 2002). In other words, by inducing one to become exposed to certain drugs that produce certain effects, like

pleasure or immense relaxation, the acclimation the body performs when taking these drugs, in order to maintain equilibrium in the body, causes the effects of these drugs to only be observable when dosages are increased (Caplan, Thomas, & Banks, 1982).

For example, say an individual is in pain and is prescribed morphine, an opiate painkiller, to manage this pain. Because of being exposed to this drug that reduces the sensation of pain, and the need to maintain homeostasis or bodily equilibrium, the painkilling sensations of that drug become reduced over time (Leshner, 1999). The only way to reestablish these effects is to increase the dosage. The body becomes dependent on these drugs in order to function as needed, since the body maintains equilibrium by accounting for exposure to these drugs (Leshner, 1999).

The Creation of an Addiction

The actual science behind how this works is beyond the scope of this analysis, but the basic mechanism of addictions is critical to understand. The basic functional units of the nervous system are neurons, or brain cells (Leshner, 1999). These cells contain receptors for certain endogenous chemicals, like endorphins or dopamine, which are naturally produced in the human body as neurotransmitters. These are produced in regulated supply (Kosten & George, 2002). However, when similar drugs, like opiates, morphine, and such, are exposed to the body, they activate the same receptors. The amount of times these receptors are activated, though, is increased, since both endogenous chemicals and externally-induced chemicals become exposed. In order to habituate towards these chemical tendencies, and to achieve equilibrium in the body, these neurons lose sensitivity to these specific receptors over time (Caplan, Thomas, & Banks, 1982). As a result, to achieve the same response or effect, with reduced sensitivity of the receptors, the receptors must be activated more frequently. This means more drugs have to be put into the body. Thus, an addiction is created (O'Brien, 1997).

The science behind addictions is key to understand, because it explains why addictions become so dangerous. In the media and in common knowledge, drugs impair cognitive ability and general health, as seen with alcohol consumption and taking illegal drugs (O'Brien, 1997). However, what can be even more dangerous is addictions themselves. When it reaches a certain level, people will do whatever it takes to reach their desired effects, no matter how high of a dosage is required. Extremely high dosages can cause organ failure, unconsciousness, irreparable damage, and death (O'Brien, 1997). Moreover, if one cannot reach such dosages, their neural systems unintentionally backfire, causing individuals to be unable to care for their own bodies because of cognitive impairment. This is what occurs during withdrawal, where the inability to attain one's desired dosage causes bodily backlash mentally and physically (O'Brien, 1997).

Famous studies have reported the effects of addictions. One such study showed that a laboratory-tested monkey would push on a lever over twelve thousand times in order to receive a meager amount of cocaine, after becoming addicted to cocaine (Kosten & George, 2002). This only serves to prove the dangerous cognitive impairment addictions can have on people, and show the consequences of drug addictions in general.

Infant Mortality and its Occurrence

Considering governmental funding for healthcare and the general wealth per capita of nations, the United States has the largest infant mortality rate in developed countries, measuring approximately 6.1 deaths per 1000 live births (Lester, Andreozzi, & Appiah, 2004). This is an astoundingly and alarmingly high rate. The largest reason for these statistics, as reported by numerous scientific studies, is the increasing occurrence of premature births (Chen, Oster, & Williams, 2014). This can occur due to many reasons, such as parental sicknesses, high blood pressure, and, importantly, addictions to certain drugs.

Human Development and Premature Births

The human fetus goes through a grueling developmental process in the approximately 9 months it grows in a mother's womb. Starting out as a zygote, or the first cell of a human being, duplicating its cells to form the billions of cells in the human body, differentiating to produce different organs, and establishing basic cognitive functions, the developmental morphology of the human being is an intricate and complex sequence of steps that if gone awry, can lead to devastating consequences (Lester, Andreozzi, & Appiah, 2004).

In premature births, the size and proportionality of the body could be impaired, which leads to faulty organ systems such as the circulatory, pulmonary, or nervous systems. Respiratory distress, lacking of reflexes, and other symptoms exist in premature births, which significantly damage the development of an infant after being born (Capaldi, 2008). One important defect that is widely known is cerebral palsy, a group of permanent movement disorders that cause the impairment of sensory pathways and the inability to move or coordinate motion in key muscles.

Premature births occur due to many reasons, but many of them have to do with the health risks associated with the parental womb. Hypertension, cognitive disorders, or other symptoms in the mother contribute to premature births, but these can be genetically induced and are unavoidable as of now (Chen, Oster, & Williams, 2014). However, induced diseases such as alcoholism or addictions can be prevented, but if they occur, they can damage the development of a fetus and permanently scar the infant for life (Chen, Oster, & Williams, 2014).

Correlating the Problems and Addressing Solutions

As above, when addictions arise in an individual carrying a fetus, their neurological system becomes dependent on being continuously exposed to drugs. However, what is hard to realize is that since the fetus in the womb is exposed to the circulatory system of the mother and

depends on the mother for functional development, the fetus is also exposed to the drug addictions, and generally gains an addictive disease (Capaldi, 2008). Combined with the premature births caused by parental addictions, infants that are developmentally immature are born with drug addictions that immediately turn into withdrawal phases since the infants are not exposed to drugs following the exit from the womb. With a lack of development and neurological withdrawal occurring, the infants cannot cognitively function even at the simplest of levels, and the body deteriorates to the point of self-inflicted death (Capaldi, 2008). This is the brutal reality of Neo-Natal Abstinence Syndrome.

Conclusion

As shown here, there are many linkages between drug addictions and mortality rates in young infants, that only become apparent when linking the prevalence of addictions in mothers with the premature births and associated infant deaths caused by drug addictions in parental figures. However, solutions are in sight. Premature deaths cannot be prevented without stopping alcohol intake and drug usage in mothers, which cannot be enforceable legally or socially. Nevertheless, the incidence of withdrawal in prematurely-born infants can be reduced, by reducing the effects of withdrawal when these infants exit the womb. Pharmaceutical technologies and projects are expanding worldwide to make robotic devices that artificially represent the womb to continue cognitive development and provide a maternal environment that facilitates an infant having a physical familial connection despite having exited the womb. With solutions in sight, these problems are sure to be addressed in the near future.

References

- Capaldi, L. (2008, May). The Relationship Between Parental Substance Abuse and the Effects on Young Children. *Social Work Theses*, 14, 1-57.
- Caplan, L. R., Thomas, C., & Banks, G. (1982, June 1). Central nervous system complications of addiction to "T's and Blues". *American Academy of Neurology*, 32(6), 623.
- Chen, A., Oster, E., & Williams, H. (2014, September 29). *Why is infant mortality higher in the US than in Europe?* Retrieved February 19, 2018, from University of Chicago Booth School of Business: <http://faculty.chicagobooth.edu/emily.oster/papers/imr.pdf>
- Kosten, T. R., & George, T. P. (2002, July). The Neurobiology of Opioid Dependence: Implications for Treatment. *Science and Practice Perspectives*, 1(1), 13-20.
- Kurinczuk, J. J., Hollowell, J., Brocklehurst, P., & Gray, R. (2009). Infant mortality: overview and context. *National Perinatal Epidemiology Unit*, 1-13.
- Leshner, A. I. (1999). Science-Based Views of Drug Addiction and Its Treatment. *JAMA*, 282(14), 1314-1316.
- Lester, B. M., Andreozzi, L., & Appiah, L. (2004, April 20). Substance use during pregnancy: time for policy to catch up with research. *Harm Reduction Journal*, 1(5), 1-44.
- O'Brien, C. P. (1997, October 3). A Range of Research-Based Pharmacotherapies for Addiction. *Science*, 278(5335), 66-70.

