Medical Uses of Lysergic Acid Diethylamide

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Abstract

Lysergic acid diethylamide is a drug known for its distortions of colours, patterns, and other hallucinations. LSD also has medical applications. Due to its tendency to create life-altering experiences or open the mind, LSD has been used traditionally (in the 1960s and 70s) in psychedelic therapy in order to treat alcoholism and psychological disorders. More recently, LSD has been used for its mind-opening effects to ease the anxiety of those with terminal illness. LSD is also recently being found to be able to aid people with extremely painful isolated headaches (cluster headaches) even when the hallucinogenic effects of the drug are removed. LSD, despite its illegality, is a relatively safe drug that seems worth its risks in order to be used as medicine for cluster headache patients and terminal illness patients. More research in general is required in the treatments of alcoholism, cluster headaches, and terminal illness with LSD.

LSD is a drug that is usually only recognized for its hallucinogenic properties. However, there are other interesting aspects of LSD, such as its medical uses. As expected, there are not very many uses of LSD in this way, considering it is so often used solely for its hallucinations. In the 1960's, when LSD was gaining popularity, psychiatrists began to experiment with it in an attempt to open their patient's minds. More recent uses of the drug are still in their infancy, but new applications such as the treatment of cluster headaches and terminal illness care are promising.

After LSD was discovered, it became extremely popular and wasn't outlawed until 1966 in America (Smith, Raswyck & Leigh, 2014). As it gained popularity, therapists noticed some of its properties, which they believed could be useful to treat their patients. LSD was reported to open or reduce conflict in the mind and often elicited life-changing experiences. These factors seemed like they would beneficial in a therapeutic setting in order to treat mental disorders. One of the most common treatments was for alcoholism. Psychiatrists of the time theorized that LSD would initiate a life changing experience or perhaps open patients' minds to a path that led away from drinking with the help and guidance of the psychiatrist (Krebs & Johansen, 2012). Ross (1961) described an example of this type of therapy, where psychedelic therapy was conducted in both alcoholics and non-alcoholics. The non-alcoholics consisted of sociopaths, people with personality disorders, anxiety, OCD, depression, manic-depressive disorder and schizophrenia. In this specific case the therapists did not take LSD with the patients. Surprisingly enough, this was a common occurrence as it was reasoned that it allowed the therapists and the patients to feel equal and un-scrutinized. The patients were given high doses of LSD

in a controlled and comfortable setting, which ranged from 400 to 1500 micrograms (as decided by the psychiatrist). Ross mentioned that a person closer to what he believed self-acceptance was would receive a lower dosage. A dosage of 400 micrograms would be given to start and as the sessions went on, it would be decided when/if more was necessary. If a patient was acting anxiously after one or two hours, the dosage would also be increased. The authors rationalized that more was needed to increase the psychedelic experience. This is a very high dose of LSD, as 20 micrograms is the threshold dose. The procedure consisted of the patient being administered the LSD, and 4 professionals (one psychiatrist, one psychologist, a music therapist and a psychiatric nurse) being present to guide the patient through the experience, focusing on individual awareness and self-acceptance. The psychiatrist made his own measures as to how improved each patient was in their work habits, interpersonal relationships, symptoms of psychosis and drinking patterns (for the alcoholics). Ross concluded that the therapy was effective for alcoholics, anxiety and personality disturbances. There were clearly limitations in the research, such as a lack of control over administration level, how long the treatment lasted, measurements of the patient's improvement and a lack of comparison/placebo group.

Considering psychedelic therapy was so common in the 1960s for its aid of alcoholism and other disorders, it seems surprising that there is no recent research in this area. However it should be remembered that LSD became illegal in the 1970s and so it is difficult to conduct research with the drug. However, Krebs and Johansen (2012) conducted a meta-analysis of data from 1966-1970 on the treatment of

alcoholism with LSD. LSD was found to reduce alcohol misuse significantly after the first reported follow up of assessment (ranging from 1-3 months after the treatment had ended). Krebs and Johansen mentioned that despite the positive results of their statistical analyses, the articles that they used for their data had many methodological issues. The studies were often very vague and left out important details, they usually used extremely high doses of LSD, and lacked the use of blind procedures and other controls such as placebo groups. These issues are consisted with Ross's (1961) research mentioned above, which was not included in this meta-analysis. This was probably common with this type of research at this time. It would be beneficial to investigate this phenomenon more with more controlled and advanced procedures considering the amount of positive and healthy results.

In 1970 when LSD was legislated as a schedule I drug, research died out because of its illegality (Smith *et al*., 2014). Recently research has emerged with its use again. Sewell, Halpern and Pope (2006), cluster headache researchers, were approached online with people reporting that when they recreationally took LSD, their cluster headaches disappeared. Cluster headaches are extremely painful headaches behind the eye isolated in one hemisphere. Only approximately 0.1% of the population experiences cluster headaches. They can be either chronic (headaches occur constantly with no remission longer than one month) or episodic (occurring for weeklong to year long periods with longer remission periods). Episodic headaches can evolve into chronic conditions for 10 percent of those with episodic headaches. These painful headaches are usually treated with pure oxygen, but no treatment so far has been able to eliminate these painful headaches. After

being approached about medicating with LSD, Sewell *et al.* decided to conduct survey research in order to see how many people use LSD and psilocybin (magic mushrooms, similar chemically to LSD) to treat their cluster headaches. There were a total of 53 participants, however not all the participants had used LSD or psilocybin to treat their headaches. The researchers found positive results: 4 out of 5 users reported remission period extension (period between cluster headaches) and 7 of 8 users reported cluster period termination (a period of time where cluster headaches are common). This research was self-reported and conducted over the internet, so these results should be taken carefully. The participants were also not blind to their treatment, as they used the psychedelics themselves, yet placebo effects seem to have no or little effect on aiding cluster headaches. Despite these issues with the research, it still seems like a considerable enough effect to perform more research in the area.

Karst, Halpern, Bertaneck, & Passie (2010) administered LSD to patients with cluster headaches in order to investigate if it could aid them in their pain. In order to eliminate LSD's hallucinogenic effects, the researchers altered (brominated) the D ring in the chemical, creating BOL-148. This generally did work, as none of the subjects hallucinated or had changes in their vital signs, but did feel a bit strange (reported as feeling flabby, funny or tipsy). This research only consisted of 5 subjects, probably due to the low occurrence of cluster headache patients who do not mind taking a substance derived from LSD. Most of the subjects were chronic patients, while subject 2 had episodic headaches. Each subject was given 30 μg/kg, which seems like a very high dose, but keep in mind the hallucinogenic effects have

been eliminated. The subjects were given this dose once every 5 days for a total of 3 doses. The number of attacks per week was recorded over 16 weeks. Administration began on week two and ended midway through week three (total of 3 doses every 5 days). The number of attacks per week on the first week ranged for each subject, but during and after treatment, their attacks per week had significantly decreased. These results may not be so conclusive for subjects 1 and 2, but 3, 4 and 5 all showed considerable improvement. This decrease in number of attacks had also lasted up to the 16 weeks the researchers recorded. This was an un-blinded and uncontrolled study, but it still creates the framework for what seems to be a considerable effect.

There has also been extremely recent research in the usage of LSD for palliative care. Gasser *et al.* (2014) administered LSD to 12 patients with anxiety relating to threatening diseases. These diseases consisted of Parkinson's, lymphoma, and several cancers. Because of these illnesses, patients experienced major depression, panic disorder, social phobia or PTSD. It may not seem like it at first glance, but this treatment is actually psychedelic therapy (the first of its kind in 40 years). There were two groups with different administrations of the drug. One was an active dose (200 μg) and the other was administered as a placebo (20 μg). A dose of LSD as the placebo was used because the effects of the drug are so widely known that the researchers felt the patients would know if they were in a placebo group lacking active LSD. After all necessary administrations and measures were completed, the patients in the placebo group were allowed to switch to the experimental treatment. In total there would be 2 experimental sessions (two

administrations of LSD). These administrations had drug-free therapy mixed in between and before the administrations. Measurements of trait anxiety (general anxiety level) and measurements of state anxiety (anxiety due to the patient's conditions) were measured for each patient before treatment, post session one, post session 2, and at a 12-month follow up. The patients in the experimental condition showed significant reductions in anxiety after each treatment, and this level of lowered anxiety remained at the 12-month follow up. The placebo group did not show such results, but those who switched to the experimental condition did show reductions in anxiety identically to the initial experimental group. This is extremely promising research, as reducing the anxiety of those who face imminent death is a positive outcome for society.

Something to consider when using LSD is the safety of the drug, considering it is indeed, illegal. LSD is actually nearly impossible to overdose on, and does not produce withdrawal or dependence. The most dangerous aspect of LSD is probably its strong hallucinogenic and potentially anxiety inducing effects. In an uncontrolled or negative setting, it is possible for people to experience panic or anxiety while using the drug. However, in the case of cluster headaches, as mentioned in the study above, the hallucinogenic effects do not seem necessary to treat the headaches. In the interest of potentially curing alcoholism or for palliative care, the hallucinogenic experiences are important. Those taking LSD for terminal illness would often be in a medically controlled setting due to their illness, so the risk of panic or anxiety could easily be regulated. Even if the patients were residing in their homes, it seems that the benefit of coming to terms with one's death is worth potential situational

heightened anxiety or panic. More current research to see if LSD can aid those in overcoming alcoholism needs to be conducted, however if it is indeed effective situational panic or anxiety would seem worth ending a drinking problem. Basically, it seems that LSD is worth using as treatment for all these problems. Considering the most negative side effect of LSD is uncomfortable experiences, the good seems to outweigh the bad, especially considering many medications have much worse side effects (Passie, Halpern, Sticgtebitg, Emrich & Hintzen, 2008; Smith *et al*., 2014).

Perhaps surprisingly enough, there do seem to be some effective medical uses of LSD. In all of these areas however, there is very little research that all generally show positive results. Old psychedelic therapy in the aid of alcoholism seems strange, but seemed to produce effective results, more current research (with less limitations) would aid in understanding this potential effect. The treatment of cluster headaches and palliative care with LSD seem to also produce desirable effects, but once again there is limited research in both these areas. If LSD is as effective and harmless as the research seems to point to, it seems more criminal to keep it illegal and out of the hands of these select people who may need it.

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