

Bioethics and Andragogy in Rehabilitation Centre Practice: Neuroethical Factors

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Abstract: *The article discusses whether sensory deprivation is suitable for clients undergoing anti-drug rehabilitation in a specialized centre, prompting discussion on the ethical considerations of partially violating natural rights. Its significance stems from the alarming increase in drug addiction, its widespread availability and the conflicting perspectives in terms of andragogy, bioethics and neuroethics. The latter is at the core of human identity. The article aims to analyze scientific views on the problem in question, reveal the neuro- and bioethical realities within individual rehabilitation centres, contrast them with the multi-faceted ethical considerations and evaluate the usefulness of limiting certain natural rights of the client (restricting sensory pleasure) for therapeutic reasons. Owing to the lengthy and isolated nature of rehabilitation, along with ethical concerns, the authors faced challenges in accessing information. Consequently, data collection relied primarily on andragogical observation and monitoring of clients' neurophysiological responses. Additionally, access was granted to centre staff journals, interviews and occasional client surveys. The analysis involved interpreting neurophysiological data without the use of equipment, consolidating survey data and assessing ethically significant matters concerning suitability and permissibility. The findings highlighted the relevance of ethical considerations surrounding intervention in both the human body and psyche, emphasizing that decisions are typically dictated by the specific therapeutic context. Consequently, the primary objective of the article is to bring awareness to rehabilitation specialists, medical practitioners and legal professionals about the importance of reaching a consensus between respecting human natural rights and the imperative to provide rescue, even during stages III-IV of addiction.*

Keywords: *bioethical and neuroethical factors; inviolability of boundaries; rehabilitative treatment; neurophysiological response; stress therapy.*

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Introduction

In today's globalized and hedonistic consumerist society driven by high technology, the frequency of comorbid multi-addictions has skyrocketed. This phenomenon has reached pandemic levels and has become a focal point of discussions, initiatives and legal measures across many countries. The decreasing age of onset for psychoactive substance abuse, affecting children as young as 14 years old, and the widening array of dependencies encompassing alcohol, drugs, toxins, pornography, gambling and even digital addiction, are particularly troubling trends. Presently, both in Ukraine and worldwide, rehabilitation emerges as the foremost and most effective approach for addressing drug addiction. In Ukraine, there is also a focus on "non-medication treatments", emphasizing character rebuilding, recovery, adoption of new ways of thinking and self-awareness.

Educators, social workers, medical professionals, law enforcement and civil organizations are involved in addressing the challenges of combating and preventing addictions, resulting in extensive research on general principles and methods employed in these efforts. However, recent trends towards liberalization have led to many forms of dependency no longer being solely viewed through a medical prism but rather assessed in terms of personal privacy rights, recreational use and other factors (Ajayi & Somefun, 2020). Consequently, the predominant approach to treating drug addiction today involves rehabilitation and social reintegration, with emerging methods focusing on andragogical and group psychotherapeutic approaches for adult dependency elimination (Varga et al., 2017). These approaches leverage the limited integration, socialization and realization experiences already present in individuals struggling with addiction. However, the closed and sometimes regimented nature of many rehabilitation centres raises questions about the methods employed, particularly regarding andragogical and psychological interventions. In contrast, programmes for social rehabilitation outside institutional settings offer greater opportunities for study (Sermek, 2013), highlighting an epistemological gap in the examination of private and pseudo-scientific methods that underscores the relevance of this article.

As previously mentioned, rehabilitation in these centres involves a closed and lengthy process that includes restrictions on freedom, and client feedback varies. This suggests that inappropriate legal methods may be used, such as aversion therapy or punitive measures. However, considering the potentially devastating consequences of addictive behaviour, addressing this contradiction calls for a fresh perspective in research and its application

within the ethical framework, particularly focusing on pedagogical, bioethical and neuroethical considerations.

Research relevance

The importance of bioethical research into drug addiction is demonstrated by statistical, social and moral evidence. According to Scholl et al. (2018), figures demonstrate that substance misuse has caused more fatalities in the US recently than car crashes and violent attacks. Howell-Miller (2019) examined the bioethical and underlying factors contributing to drug addiction. In her dissertation, she proved that drug abuse arises from injustices, including policies surrounding narcotics, biased health standards in biopolitics, as well as societal acceptance and moralizing towards various deviations. Additionally, Dos Anjos (1996) highlights the most agonizing bioethical issue: the most severe aspect is not merely death, but rather the enduring suffering and premature loss of life.

In this regard, this research aims to analyze relevant scientific and ideological sources and, based on summarized positions, determine the appropriateness, degree and types of violations of bio- and neuroethics using a specific example of a closed-type rehabilitation centre (hereinafter referred to as “the centre”). For self-evident reasons, the authors will not mention the centre’s name or its location. They should only point out that it is situated in one of the former USSR republics.

Methods and data collection

In this particular case, the unique nature of data collection presented significant limitations when it came to employing research methods. The collection of data for this study was notably constrained by legal regulations, established customs and the andragogical principles governing the rehabilitation of addicts. To conduct the survey, the authors had one chance to distribute an anonymous questionnaire to clients with no direct supervision and communicate with volunteers who had frequent contact with addicts. The primary source of data stemmed from observing the centre’s clients. The authors were not allowed to perform neurophysiological measurements or diagnostics, but rather, they documented neuro- and psychophysiological responses of clients in domestic and educationally relevant scenarios, including conflicts. Using appropriate research methods, the authors employed a neurophysiological analysis of responses and evaluated outcomes and changes in clients’ psycho-emotional states. They also analyzed and synthesized the data collected through questionnaires and

provided an objective explanation of ethically significant positive and negative phenomena, with regards to bioethics, neuroethics and andragogy. Moreover, the authors aimed to correlate the observed phenomena with current scientific and philosophical viewpoints.

The study involved 21 clients aged between 19 and 45, all of whom were male and experienced various forms of addiction, primarily drug addiction.

Research ethics

The clients of the centre verbally agreed to allow observation of the rehabilitation and educational process. They were motivated by the anticipation that the presence of a new staff member (one of the authors of this article) would bring diversity to their emotional, cognitive and geographically limited experiences. However, due to ethical concerns, the centre's administration permitted only passive observation and prohibited interviews or verbal interactions with clients. The authors accepted these terms for data collection as they were already familiar with the strict discipline and ethical standards of similar establishments.

Scientific views on pedagogical, neurobiological and neuroethical aspects of addiction treatment

It is important to note that bioethics was introduced in the 1920s by the German researcher Fritz Jahr (1927), who was questioning the moral authority of humans to employ animals and plants for scientific experiments and laboratory tests. In the 1970s, Potter (1971) guided the field of bioethics towards exploring the impact of social, behavioural and medical factors on human spiritual and mental well-being. The next few decades witnessed the merging of biology and medicine with the philosophical and moral aspects of human existence. In its current sense, the term neuroethics took on its full meaning only in the 21st century, when society became aware of the great prospects and dangers of the impact of neurotechnology on the human brain (including the preservation of its health and the multiplication of possibilities in new circumstances). The field of study is now rapidly incorporating issues concerning behavioural conditioning, neurotechnological interventions, external manipulation of consciousness, as well as manipulation of lower-level brain functions (Cometa et al., 2022).

Currently, bioethical and neuroethical concerns regarding the impact of deliberately formulated substances or situations that undermine one's mental health, rationality and self-regulation abilities are crucial. These

factors can lead to mental and physical deterioration as one voluntarily or involuntarily accepts external agents that alter consciousness.

Physicians and rehabilitation therapists are striving to resolve this neuroethical issue by determining the source, diagnosis and ethical and moral implications of compulsive and addictive disorders. However, the current neoliberal environment does not allow for a straightforward examination of these issues.

Berridge's article, "Is Addiction a Brain Disease?" (2017), is especially relevant to this discussion. A definitive answer to this particular question could significantly influence the ethical considerations surrounding rehabilitation and the conceptual understanding of addiction within the medical community. The article argues that the craving for drugs arises from the same mechanisms as other ordinary desires, specifically, the mechanism of stimulating sensitization of major mesolimbic systems. The challenge lies in the fact that this mechanism is not inherently pathological. According to Berridge (2017), one should not characterize it as a disease but rather as alterations in neural sensitization, which can manifest in both normal and pathological contexts, even in extreme situations. At the same time, the researcher emphasizes that it is far more crucial to comprehend the mechanisms of addiction and develop effective interventions within the framework of conventional medical ethics than to seek extra-medical ethical considerations.

Lately, researchers have accumulated a substantial amount of evidence supporting the recognition of addiction as a form of disability. As the non-medical model of disability gains global acceptance, this perspective on addiction, along with other forms of addiction, broadens social and therapeutic possibilities while introducing new ethical dimensions. For instance, in a recent publication by Maier (2021), addiction was viewed as a type of disability, extending the discussion beyond the medical context. The challenge of addiction does not just stem from the person with the dependency, but also from the societal setting in which they live. When it comes to addiction, the key ethical concern lies not in how to interact with or impact those struggling with dependency, but in how a fair society can effectively engage with and accommodate such individuals (Maier, 2021).

When considering the broader scope of the problem in question, neuroethics should place more emphasis on the political, pragmatic and legal aspects of advanced neurostimulants and their potential impact on enhancing human cognitive abilities. Dubljević (2019) argues that when it comes to neuroethics, autonomy and freedom require the establishment of

precise regulations and legislation in each country. This approach can address the overarching concern surrounding neurostimulation.

This research underlines this expansive neuroethical dilemma owing to its profound social implications. Nevertheless, in cases involving addiction and the rehabilitation of addicts, the focus remains on the individual, whether it be a single person or a group (e.g., clients of a rehabilitation centre), where interventions, consent and accountability imply a distinct and personalized character.

Thus, for a long time, the moral, axiological and legal aspects of medical intervention have fallen within the framework of bioethics. However, as technology, biomedicine and particularly neuroscience progress, there has emerged a demand for a more specialized interdisciplinary field, i.e., neuroethics. In the authors' opinion, this is an area of special responsibility since the brain is a unique organ that provides and defines consciousness as the highest and most holistic characteristic of the human psyche. Bioethics emerged earlier and is associated with the rapid development of civilization, which needed to maintain a balance between the natural integrity, the value of the human body and the new possibilities of biomedical intervention. Scientists of the time referred to bioethics as civilized medicine or medicine of spirituality. Neuroethics today is not fundamentally different from bioethics. Even though its scope may be narrower, it demands greater responsibility, as any intrusion into the brain or consciousness can impact one's ability to uphold fundamental humanistic rights such as freedom, free choice, personal self-identity and, crucially, the preservation and cultivation of one's uniqueness and mental well-being.

Examining rehabilitation within a closed centre: reflections and generalizations

Consequently, this research does not seek to inherently separate the bioethical and neuroethical aspects of rehabilitating individuals with addiction since they are considered interconnected under specific circumstances (Maksymchuk et al., 2022; Sarancha et al., 2021; Sarancha et al., 2022). There is a distinction between these fields primarily to differentiate the degree of influence (more on the somatic, physical, neurophysiological, or cognitive-behavioural level). The authors of this article acknowledge the arbitrary nature of such categorization, recognizing that any aspect of rehabilitation ethics can have implications in terms of health, legal, medical or social consequences.

The authors of this article soon observed that the distinctions between adherence to or violation of bioethics and neuroethics at the centre

are quite unclear. Given that this research aimed to evaluate the extent to which bio- and neuro-ethics were upheld within a closed rehabilitation centre and determine the legitimacy and therapeutic necessity for any deliberate violation of the neuro- and bio-ethical rights of clients (which are agreed upon with the clients themselves at the beginning of therapy), the authors of this article adopted a principled approach. Their approach was based on the assumption that the most widely accepted system of bioethical principles was outlined by Beauchamp & Childress (2001). However, these principles primarily apply to medical services in general. Closer to the focus of this study are the fundamental bioethical and legal guidelines of today's narcology, which are open to interpretation. Consequently, it was decided to generalize and frame them as questions to provoke ethical reflection before ethically significant actions. The questions are as follows: 1. Can the client give informed consent for substance abuse treatment? 2. Can the client receive treatment at the drug rehabilitation centre anonymously through a paid arrangement (paid anonymity)? 3. Is it ethical to use opioid substitution therapy in the treatment of drug addicts? 4. Is it acceptable to employ scientifically unverified or non-scientific methods in the treatment of addicts? 5. Should clients be required to abruptly stop using psychoactive substances at the beginning of treatment? 6. Should the status and attitude towards drug addicts be changed according to neo-morality?

The authors of this article have also considered the neuroethical principles of intervention and devised comprehensive neuro- and bioethical principles for practical application:

- *Individual Autonomy*: Every individual possesses the right not only to manage their health and determine their neuropsychological state but also to give or withhold consent for interventions involving their mind, brain and body. This principle is employed within the closed rehabilitation centre as a component of legal authorization (informed consent).

- *Minimization of Negative or Unforeseen Consequences*: This principle is derived from the fundamental medical guideline of "Do no harm".

- *Equal Treatment and Fairness*: This principle forms a fundamental therapeutic guideline within the closed rehabilitation centre.

- *Emphasis on Progress*: All participants in the rehabilitation process should ideally prioritize each other's improvement.

- *Dignity Preservation*: Clients of the centre are entitled to be treated with dignity and respect, even when they are temporarily in a state of pain or emotional instability. However, in certain situations, the centre's experts or the client's guardians may make decisions on the client's behalf.

- *Respect for Personal Boundaries*: Within the centre, as well as in society, individuals should not be subjected to influences that jeopardize personal comfort, self-identity, and physical and mental well-being.

- *Special Consideration*: Professionals working with individuals in rehabilitation not only approach their roles from a societal and medical perspective but also consistently bear in mind that they are working with individuals who may have specific limitations, vulnerabilities and sensitivities.

Particular attention should be focused on the debatable and critical aspects regarding the violation of natural ethics (bioethics) at the centre. As is known, one distinct challenge lies in studying the various or selective neuro-mechanisms that trigger drug use or relapse. Neuroscientists have extensively explored key factors such as euphoric memories, the impact of triggers and the function of signalling mechanisms. In light of this, the centre frequently engages in extensive discussions, descriptions and definitions of its own “disruption symptoms”. However, the effectiveness of these measures remains questionable.

Recent neurobiological research has revealed that one of the foremost contributors to relapse is the presence of stress and the generally low stress tolerance seen in individuals with addictive tendencies (Weiss, 2005). These findings pose a challenge to the neuroethical considerations in handling and interacting with addicts, as the principle of avoiding any individual's suffering is paramount. Nevertheless, the centre places a significant emphasis on fostering stress resilience.

Given that the problem of easy access to drugs is currently relevant, volunteers, staff members and psychologists at the centre are sometimes forced to deviate from certain neuroethical positions. They must address not only issues of attitude and humane rehabilitation but also physical deprivation, external control and even restrictive measures on behavioural, affective and occasionally borderline (at the level of psychosis) reactions due to attempts to obtain drugs or disrupt rehabilitation.

According to Selamoglu et al. (2020), the most significant neuroethical issue is conflict. On the one hand, the consumption of “mild drugs” by adolescents can bring about cognitive behavioural and even psychiatric alterations. On the other hand, cannabis use affects one's lifestyle and well-being. Often such use is driven by a need for satisfaction, anxiety reduction and other relatively positive motivations (Selamoglu et al., 2020). In this regard, the neuroethics of cannabis use is becoming a global phenomenon. Political and educational strategies are needed to foster a culture of cannabis use and impose reasonable age limits on social circumstances.

Generally, drug culture serves as a highly negative form of motivation. Within the studied centre, considerable emphasis is placed on shaping and even psychotherapeutic reprogramming of deeply rooted reactions and behavioural patterns to alter thinking and lifestyle. However, this approach proves to be ineffective. A majority of addicts strongly defend their subculture and its traditions, presenting a significant ideological and value-based obstacle to recovery.

The primary method for preventing relapse at the centre under study is group stress therapy. This approach aims to foster moral resilience in the face of stress and responses to stimuli, whether positive or negative. Given that character building within this centre mainly relies on labour, organizational techniques and disciplinary methods, it can also be associated with andragogy (adult education). This alignment corresponds with the cultivation of maturity and resilience in dealing with temporary distress. Unfortunately, the use of drugs as a means to alleviate suffering can be partially justified from a medical and bioethical standpoint. Nevertheless, in the authors' view, this fact should not contribute to excessive loyalty to the clients.

Nowadays, many countries are reconsidering the neuroethical implications associated with criminal penalties for drug use. Discourse revolves around legal resources, pedagogical approaches, social factors, and more, all within the environment of correctional facilities for individuals struggling with drug dependency (Pugh & Douglas, 2016). Undoubtedly, the determining factor in this context is the legal aspect. However, the authors of this article often communicated with the staff of the rehabilitation centre regarding the consequences of various types of combating addiction as a social phenomenon. The centre's administration refused to provide any statistical data but relied on their experience and claimed that many of their clients had a history of traumatic experiences with criminal punishment or forced detoxification, which only worsened their excessive sensitivity and stress resistance. Typically, they ended up back in the rehabilitation centre repeatedly. In contrast, drug addicts who only received help at the rehabilitation centre and avoided the experience of psychiatric, narcological, or isolation influence demonstrate a higher percentage of recovery or stable remission. Furthermore, 3 out of 21 clients of the centre are hiding there to evade criminal responsibility.

The observation of natural neurological responses to changing situations in the majority of the clients under study has revealed an ongoing background tension. The authors of this article analyzed the existing literature on various approaches to handling drug addiction, such as incarceration, compulsory treatment or isolation. Surprisingly, this pressing issue, with significant implications for humanity, remains unresolved even in

some of the world's most advanced nations. For instance, the UK frequently employs compulsory treatment, despite a lack of substantial clinical evidence supporting its efficacy (Seddon, 2007).

Through numerous discussions with the administration of the centre under study and the regional department's head (part of a network of similar facilities), the authors learned that the country is currently engaged in political and legal deliberations. The central topic under consideration is the potential replacement of criminal punishment with rehabilitation within specialized centres. It might appear that such a shift would serve two primary purposes: a) enhancing therapeutic outcomes and b) upholding individuals' moral right to choose their path to recovery.

As drug addiction encompasses both suffering and pleasure, the challenge of enhancing motivation for addict treatment or rehabilitation has become increasingly pressing. Recent research analysis has revealed a range of personal motivations to address this issue, namely, from self-preservation to fulfilling a social duty and grappling with the guilt associated with addicted family members (Hong et al., 2022).

However, based on the authors' observations, a majority of the centre's clients are demotivated about staying at the centre for an extended period, wishing for a faster departure, and experiencing deprivation of simple life joys (constantly seeking immediate gratification such as sweets, the chance to talk with someone new, relaxation, play, etc.).

For their part, the centre's administration stated that clients (if they were sober at the time of coming to the centre) or their relatives signed a consent to the limitation of some personal rights (which ones - the contract did not specify). It was also explained that all basic human rights are fully respected.

An anonymous survey of 21 clients of the centre, however, shows various bio- and neuroethical violations. Five clients, whose identities were concealed, confessed to having been tricked into enrolling in long-term rehabilitation (they were promised a visit to a psychologist and a single session of counselling). Three clients confessed that their family members (with the aid of strangers sometimes) forced them to go to rehabilitation. Two clients mentioned intensifications of chronic diseases or persistent ill-health. The administration replied to the latter point that they only call a doctor in case of an emergency (except a narcologist).

Concerning the above-stated clients, the authors of the article have noticed that they either suffer from emotional instability or have sustained background stress, which is demonstrated by insulting, defiance and vegetative manifestations (restrainedness, nervousness, gloominess,

compulsive behaviour, avoidance of contact). Comorbid factors may be used to explain pathological conditions when withdrawal and the stringent regimentation of rehabilitation harm the individual.

Within this research, it is imperative to address the primary bioethical and neuroethical issues that the administration of the centre classifies as therapeutic and educational. To enhance this particular information, it was decided to incorporate the outlined therapeutic interventions and evaluate their suitability and acceptability (see Table 1).

Table 1. *Restricting certain regulations of bio- and neuroethics as an approach for rehabilitation and therapy*

The essence of bio- and/or neuroethical violation	Explanation of a mechanism for therapeutic intervention or exposure	For therapeutic-rehabilitative or other reasons	Subjective acceptability for clients
<i>Restrictions on fundamental rights (freedom of movement and exit, use of communication devices) by mutual consent</i>	<i>Sensory and communicative limitations, weakening of emotional bonds with significant objects and individuals; consent is typically given by co-dependents rather than clients</i>	Yes	Relatively acceptable
<i>All activities, actions and even passive presence are conducted according to the rules of the centre</i>	<i>Decrease in chaotic behaviour, a tendency toward autonomous impulsive choices</i>	Yes	Acceptable
<i>The ability to act only following the laws of hierarchy</i>	<i>A lack of linearity and autonomy results in new forms of social behaviour</i>	Rather not	Relatively acceptable
<i>Prohibition on performing minor actions and attending to natural needs without the group leader's permission</i>	<i>Suppressing compulsions, nurturing self-restraint and humbleness</i>	No	Unacceptable

<i>Group-wide evaluation and discussion of character flaws, conduct and other errors in the presence of the entire group and personnel</i>	<i>Developing stress tolerance in social settings, adjusting reactive and emotional behaviour and fostering self-awareness</i>	Yes	Rather not acceptable
<i>Denial of permission to express negative feelings (suppressing outbursts of anger, taking offence, etc.)</i>	<i>Nurturing socially acceptable responses and the capability to substitute destructive feelings with constructive ones</i>	Yes	Rather yes
<i>Mild physical and social punishments for willful non-compliance or violation of the centre's rules, instances of violence, etc.</i>	<i>Allowing for a limited amount of freedom (fixation) and the feeling that one is not being observed (transparent attitude) promotes the individual to take action to resolve issues and take accountability</i>	As a forced measure - yes	Yes
<i>Restrictions on experiencing sensory pleasures and entertainment (excessive sleep, games, music, consumption of sweets, conversations)</i>	<i>Desensitizing "fixed" sensory stimuli, reducing the significance of sensory pleasures as a meaning of life</i>	More likely no	No

Source: the authors' own conception

The authors of this article assume that certain actions are wholly unacceptable and appear to involve clear violations of bioethics and neuroethics. However, these actions are being justified by the staff as extreme andragogical educational methods. It is essential to consider some of the most concerning instances. This is primarily related to secretly watching clients by volunteers or "activists" and recording changes in their parameters, including their biological, social and psychological aspects. Furthermore, the policy of allowing clients to communicate with their relatives only once every two weeks, during a brief 10-minute phone call, while being supervised by the centre's head or shift manager, is a reason for concern.

Additionally, the authors observed a similar situation three times a day: meals begin as a group activity at a precisely defined time to the exact second. Before this, clients are already seated at their set tables for a few minutes, eagerly gazing at the available dishes. During this time, there is a noticeable sense of impatience, a heightened flow of saliva and nervousness. This can be attributed not so much to hunger as to the fact that mealtime represents the greatest physiological pleasure within the centre. At the moment when breakfast (lunch, dinner) begins, the majority of clients quickly dive into their meals and consume them in a very short time. The cultural aspect of food consumption takes a backseat, with the instinct to satisfy hunger coming to the forefront. This instinct is further intensified by anticipation, whereas the stimulus (the food on the table) triggers an instinctive neurophysiological reaction, leading to excessive salivation, increased gastric juice secretion and so forth.

Conclusions

The rapid advancements in neuroscience, particularly in neurobiology, have made it possible to comprehensively understand the neurophysiological mechanisms behind drug cravings and the phenomenon of relapse (returning to substance use despite extended and conscious therapy). The exploration of neurophysiological pathways associated with the recovery from drug-seeking behaviour through the triggering of anchor signals or contextual cues has proven to be particularly effective (Bossert et al., 2013). Many of these studies offer significant potential for addiction therapy.

However, a significant challenge emerges when one considers that these same human neural mechanisms play a role in both constructive and creative, as well as destructive and criminal behaviours. The external manipulation, reprogramming, or any interference with the brain, frequently regarded as the “carrier of the human soul”, raises a multitude of neuroethical questions. This becomes especially relevant in the context of addictive or other compulsive behaviours.

Below are the primary conclusions that agree with the aim and specific objectives of this article.

Surveying the most up-to-date material on neurological and biological treatments for addiction therapy uncovers unresolved issues, while the limits of ethical obedience/disobedience are often unclear and situationally interpreted. Subsequently, the authors of this article have formulated a set of five integrated principles aimed at constructing a more open framework for data selection and analysis.

The main targets of rehabilitation impact in the centre include tracking and addressing relapse symptoms (a tedious and ineffective procedure); adopting a new lifestyle and rejecting drug subculture (unsuccessful attempts); fostering maturity and resilience (yielding positive results under certain conditions); increasing motivation for recovery (although most clients are demotivated).

Instead, clients in the centre experience sensory and sometimes physical deprivation and excessive control. They exhibit neurotic or neurophysiological reactions due to background stress, as well as feel frustrated and suffer from a lack of life satisfaction.

This article presents a table outlining the eight most common neuroethical disturbances, which are positioned as necessary and effective means of rehabilitation.

Analyzing the rehabilitation process over two months in 2021 has enabled the authors of the article to determine the most difficult issues. They believe that the primary neuroethical concern is the consideration of a client's awareness and voluntary consent to intensive psychological or neurophysiological interventions. This issue is particularly relevant for individuals struggling with drug addiction since they often fail to recognize the life-threatening nature of their compulsive behaviours and may find themselves in inadequate and legally questionable states. Therefore, an ethical dilemma arises regarding the appropriateness of enforced neuro- and psycho-rehabilitation for the preservation of one's life.

The primary bioethical restriction is the prolonged absence (ranging from 1 to 6 months) of a natural right to freedom from therapeutic and rehabilitative perspectives. There is no free, rational choice that is influenced by emotional disturbances, deep depression or physical pain. On the other hand, the choice of someone under the influence of analgesics or narcotics is not free either.

A positive aspect of the centre's rehabilitation work is the use of euphemisms to replace addictive and medical terminology. For example, they refer to it as "recovery" rather than "treatment" and "being clean" instead of "abstaining from substance use". Additionally, one could observe the substitution of words and phrases denoting undesirable behaviours (such as lying, withdrawing, changing one's mind abruptly, ingratiating, or conspiring) with corresponding slang terms, which the authors have decided not to include in this article.

Furthermore, the authors appreciate the unspoken principle of "character reformation". In the centre, this principle is characterized by the absence of selfish choices and full disciplinary responsibility. Drug use in

daily life was initially a voluntary choice for those undergoing rehabilitation at the centre, and they often failed to feel responsible for or fully comprehend the consequences of their actions. Now, their brains are being trained to produce appropriate thoughts and behaviours in situations where choice is absent, and strict discipline prevails.

Research limitations

This research, due to objective reasons, has a fragmented and demonstrative nature. The issue of bio- and neuroethics in the rehabilitation of addictive individuals necessitates in-depth study and requires social and political intervention.

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References

- Ajayi, A. I., & Somefun, O. D. (2020). Recreational drug use among Nigerian university students: Prevalence, correlates and frequency of use. *PLoS One*, 15(5), Article e0232964. <https://doi.org/10.1371/journal.pone.0232964>
- Beauchamp, T. L., & Childress, J. F. (2001). *Principles of biomedical ethics*. Oxford University Press.
- Berridge, K. C. (2017). Is addiction a brain disease? *Neuroethics*, 10, 29–33. <https://doi.org/10.1007/s12152-016-9286-3>
- Bossert, J. M., Marchant, N. J., Calu, D. J., & Shaham, Ya. (2013). The reinstatement model of drug relapse: Recent neurobiological findings, emerging research topics, and translational research. *Psychopharmacology*, 229, 453–476. <https://doi.org/10.1007/s00213-013-3120-y>
- Cometa, A., Falasconi, A., Biasizzo, M., Carpaneto, J., Horn, A., Mazzoni, A., Micera, S. (2022). Clinical neuroscience and neurotechnology: An amazing symbiosis. *iScience*, 25(10), Article 105124. <https://doi.org/10.1016/j.isci.2022.105124>

- Dos Anjos, M. F. (1996). Medical ethics in the developing world: A liberation theology perspective. *The Journal of Medicine and Philosophy*, 21(6), 629-637. <https://doi.org/10.1093/jmp/21.6.629>
- Dubljević, V. (2019). *Neuroethics, justice and autonomy: Public reason in the cognitive enhancement debate*. Springer.
- Hong, P., Li, S., Yu, Y., & Deng, Q. (2022). How to enhance the motivation for drug detoxification: Consciousness guidance and behaviour restriction of family intergenerational ethics. *International Journal of Environmental Research and Public Health*, 19(1), Article 366. <https://doi.org/10.3390/ijerph19010366>
- Howell-Miller, S. S. (2019). "Crippling" addiction and liberating people who use drugs: A bioethics of disease, diagnosis, disability, and divinity in substance use and harm reduction [Unpublished doctoral dissertation]. Wake Forest University. https://wakespace.lib.wfu.edu/bitstream/handle/10339/94312/HowellMiller_wfu_0248M_11417.pdf
- Jahr, F. (1927). *Bio-Ethik: Eine Umschau über die ethischen Beziehungen des Menschen zu Tier und Pflanze* [Bio-ethics: A survey of humans' ethical relationships with animals and plants]. Kosmos. Handweise für Naturfreunde [Cosmos. Guide for Nature Lovers], 24, 2-4. <https://ru.scribd.com/doc/257657646/Bio-Ethik-Eine-Umschau-Uber-Die-Ethischen-Beziehungen-Des-Menschen-Zu-Tier-Und-Pflanze>
- Maier, J. T. (2021). Addiction is a disability, and it matters. *Neuroethics*, 14, 467-477. <https://doi.org/10.1007/s12152-021-09466-8>
- Maksymchuk, B., Sarancha, I., Husak, A., Avramenko, O., Kuzmenko, I., Kuzmenko, V., Slyusarenko, N., Chepurna, L., Pankevych, V., Babii, I., & Maksymchuk, I. (2022). Implementing the course "Human Rights" for children with special needs under the changed socio-educational conditions. *Revista Romaneasca Pentru Educatie Multidimensionala*, 14(3), 428-443. <https://doi.org/10.18662/rrem/14.3/617>
- Potter, V. R. (1971). *Bioethics bridge to the future*. Prentice-Hall.
- Pugh, J., & Douglas, T. (2016). Neurointerventions as criminal rehabilitation: An ethical review. In J. Jacobs & J. Jackson (Eds.), *The Routledge Handbook of Criminal Justice Ethics* (pp. 115-130). Routledge. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781315885933-8/neurointerventions-criminal-rehabilitation-jonathan-pugh-thomas-douglas>
- Sarancha, I., Maksymchuk, B., Gordiichuk, G., Berbets, T., Berbets, V., Chepurna, L., Golub, V., Chernichenko, L., Behas, L., Roienko, S., Bezliudna, N., Rasskazova, O., Maksymchuk, I. (2021). Neuroscientific principles in labour adaptation of people with musculoskeletal disorders. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 206-223. <https://doi.org/10.18662/brain/12.4/245>

- Sarancha, I., Kovinko, M., Maksymchuk, B., Tarasenko, H., Kharchenko, S., Demchenko, I., Dovbnia, S., Rudenko, L., Symkanych, O., Martyniuk, T., Bilan, V., Maksymchuk, I. (2022). Horticultural therapy course as an educational-therapeutic tool of rehabilitation for individuals with MSDs. *Revista Romaneasca pentru Educatie Multidimensionala*, 14(3), 180-200. <https://doi.org/10.18662/rrem/14.3/604>
- Scholl, L., Seth, P., Kariisa, M., Wilson, N., & Baldwin, G. (2018). Drug and opioid-involved overdose deaths - United States, 2013-2017. *MMWR. Morbidity and Mortality Weekly Report*, 67(5152), 1419-1427. <https://doi.org/10.15585/mmwr.mm675152e1>
- Seddon, T. (2007). Coerced drug treatment in the criminal justice system: Conceptual, ethical and criminological issues. *Criminology & Criminal Justice*, 7(3), 269-286. <https://doi.org/10.1177/1748895807078867>
- Selamoglu, A., Malinowska, A., Savulich, G., & Sahakian, B. J. (2020). Neuroethics and cannabis use globally: Impact on adolescent cognition and wellbeing. In D. J. Stein & I. Singh (Eds.), *Global Mental Health and Neuroethics* (pp. 189-209). Academic Press. <https://doi.org/10.1016/B978-0-12-815063-4.00012-5>
- Sermek, N. (2013). Socialno-andragoška metoda pri zdravljenju odvisnosti [Social andragogy method for addiction treatment] [Unpublished doctoral dissertation]. The University of Ljubljana. <https://repozitorij.uni-lj.si/Dokument.php?id=124153&lang=slv>
- Varga, C., Amariei, N., Stănceanu, M., & Copoeru, I. (2017). Learning to adults in recovery from addictions - innovative practices at European level. *Revista de Asistenta Sociala [Social Work Review]*, 2, 23-39. http://www.swreview.ro/index.pl/learning_to_adults_in_recovery_from_addictions__innovative_practices_at_european_level
- Weiss, F. (2005). Neurobiology of craving, conditioned reward and relapse. *Current Opinion in Pharmacology*, 5(1), 9-19. <https://doi.org/10.1016/j.coph.2004.11.001>