

The Effectiveness of Acupuncture Therapy in the Drug Addiction to Ward Off the Social Culture Threats

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Abstract

Drug addiction is a social-cultural threat and has a serious impact on national defense. It is required a comprehensive approach as it would influence the quality of the next generation. Treatment for drug addicts is called the rehabilitation process and one of the stages is the detoxification process, where drug-class substances are removed from the addict's body. The current detoxification process uses pharmacological and non-pharmacological methods. Acupuncture through the NADA (National Acupuncture Detoxification Association) protocol can be a non-pharmacological approach to the drug detoxification process by overcoming the weakness of previous pharmacological and non-pharmacological therapies. This article is a narrative review from the last ten years published in PubMed, Embase, Google Scholar, and Elsevier. This literature review aims to study whether or not acupuncture is a beneficial therapy in the detoxification process in the rehabilitation of drug addicts proven with scientifically based evidence. This result then could become a consideration for stakeholders to make a standard protocol in the rehabilitation process for drug users in Indonesia. Based on the studies reviewed in this literature review, the NADA protocol is feasible to become a non-pharmacological approach in the rehabilitation of drug addicts. Additional research on the use of the NADA protocol is needed.

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INTRODUCTION

In the past, national security only revolved around military security. However, security concerns have now departed and welcomed security aspects including political

security, economic security, and health security. Nowadays, the global security condition is marked by the increasing intensity of asymmetric security threats in the form of cross-border security threats. Acts of piracy, smuggling of weapons and explosives, smuggling of women and children, illegal immigrants, illegal logging, disposal of hazardous toxic waste (B3), human trafficking, and narcotics and illegal drugs (narcotics) are forms of threats that most prominent in cross-border security in the last decade (Ministry of Defense of the Republic of Indonesia, 2008).

Drug addiction is a serious social-cultural threat that needs serious attention and has a negative impact not only on the users, but also on national, regional, and international security. Security is defined not only as dealing with external military threats but as addressing challenges to the effective functioning of society. It poses a risk to security at the individual level as the younger generation is a national asset of defense. Drug addiction could affect the productivity of the next generation if does not resolve properly (Ministry of Defense of the Republic of Indonesia, 2015). According to 2021 global data released by the United Nations Office on Drugs and Crime (UNODC), 275 million people in the world use drugs, with approximately 36.3 million or about 13% of them experiencing drug dependence. Drug users tend to increase annually, there was an increase of 22% in drug users between 2010-2019. From previous data, it is estimated that drug users globally will increase by 11% in 2030 (United Nations Office on Drugs and Crime, 2021). According to the Research Center for Data and Information of the National Narcotics Agency (2022), in 2021 there were 1.95% or 3.66 million drug users di Indonesia. This data increased by 0.15% compared to 2019, which was 1.80% or 3.41 million people (Research Center for Data and Information of the National Narcotics Agency, 2022).

The rehabilitation process was more challenging for people who have a dependence on illegal drugs because the body was used to being in a state of pleasure and comfort as a result due to taking drugs as a result of increased dopamine levels in the brain. Increased dopamine levels in the brain through the intake of exogenous opiates were believed to be an addiction mechanism in drug users (Lin, Chan, & Chen, 2012). There are four steps in the process of rehabilitation of drug users: examination, detoxification, stabilization, and activity management. The detoxification process plays a vital role in the rehabilitation process of drug users, the length of the process also varies depending on the individual variance. There are two detoxification mechanisms in the rehabilitation process of drug users, pharmacological and non-pharmacological approaches. Pharmacological detoxification therapy or known as Rapid Opiate Detoxification (ROD) uses opioid antagonists, such as naloxone and naltrexone (Tanum et al., 2017). This pharmacological detoxification has quite good results in the rehabilitation process, but it has weaknesses such as the cost of rehabilitation tends to be high. The second detoxification mechanism is non-pharmacological, it allows a natural detoxification process in the user's body, however, this process tends to be painful because the body will enter a withdrawal phase causing dysphoria and significant suffering an also other side effects e.g miosis, respiratory depression (Lin et al., 2012). The non-pharmacological approach could become an option for the deterrent

effect to drug users but still leave a painful suffering process (Stuyt, Voyles, & Bursac, 2018).

Acupuncture has the potential as a therapeutic option in the detoxification process of drug addiction considering the weakness of existing pharmacological and non-pharmacological therapies. Acupuncture therapy for opiate addiction is (1) inexpensive, simple, and has no side effects; (2) acupuncture can be used for the prevention of opiate relapse; and (3) acupuncture therapy is safe for pregnant and parturient women. Acupuncture is less painful and simple. The NADA protocol only uses five points (Lin et al., 2012). The NADA protocol is an ear acupuncture method used to treat addiction. The NADA protocol uses five acupuncture points in the ear: The *Shen Men* (acupuncture point located on the superior antithetical crus, just above the Hip Point), Sympathetic (presented in the groove of the descending helix), Kidney (On the inside of the ascending helix, right in the concavity, at the level of the triangular fossa, Liver (On the right ear in the mediolateral portion of the concha), and Lung points (On the right ear in the mediolateral portion of the concha). The results of several studies regarding the NADA protocol and drug addiction show that the NADA protocol can reduce withdrawal symptoms and improve the quality of drug addict rehabilitation (Carter, Olshan-Perlmutter, Marx, Martini, & Cairns, 2017). A systematic review from Baker & Chang (2016) showed there were significant differences between NADA protocol administration compared to controls. One study reported that the dose of MMT (methadone maintenance treatment) became less after the administration of the NADA protocol.

This study will discuss the effectiveness of acupuncture as a non-pharmacological method in the rehabilitation process of drug addicts. The result of this article could become a literature guideline to use the NADA protocol for drug addiction rehabilitation in Indonesia as addiction is a social and cultural threat to national and global security.

METHODS

During the research process, the authors conducted a search of studies published in the last 10 years publication from PubMed, Embase, Google Scholar, and Elsevier with keywords are ((((((acupuncture[MeSH Terms]) OR (ear acupuncture[MeSH Terms])) OR (NADA protocol[MeSH Terms])) AND (narcotic addiction[MeSH Terms]))) OR (narcotic abuse[MeSH Terms])) OR (narcotic-related disorder[MeSH Terms])) OR (drug addiction[MeSH Terms]). The inclusion criteria were (1) publication in English; (2) Meta-Analysis, Randomized Controlled Trial, Systematic Review, Literature Review; and (3) studies that used NADA protocol for drug addiction or drug rehabilitation. Exclusion criteria were (1) comments and replies and (2) animal study. This study was conducted from literature searching and selected appropriate literature according to the keywords. After duplication screening and excluding the literature that does not meet the criteria, then finally the authors determined which literature to be included. All authors write the manuscript together from the selected studies.

RESULTS AND DISCUSSION

The literature search described in the Methods section resulted in 92 studies in the initial search. After the screening, four studies met the criteria to be included in this literature review.

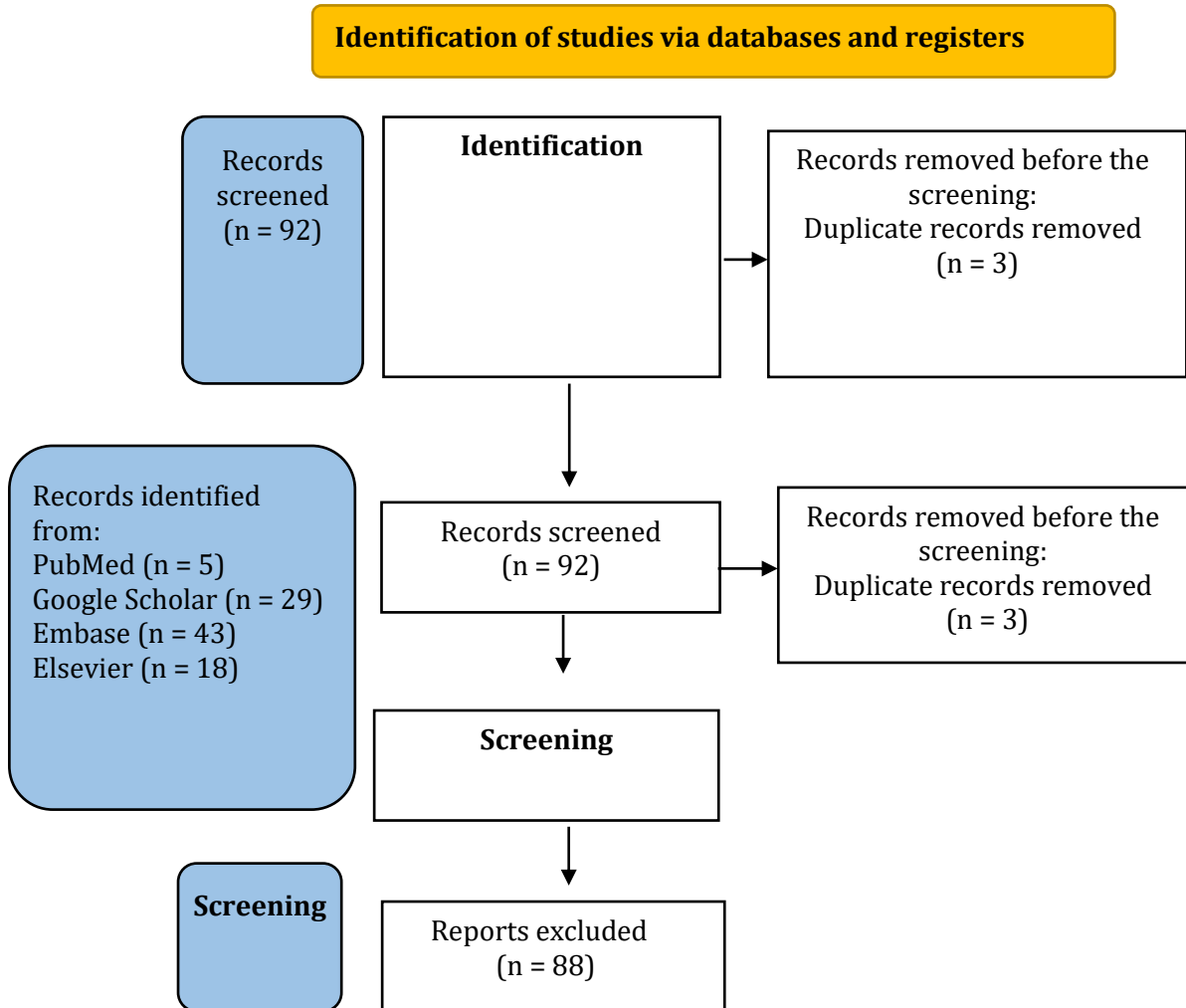


Figure 1. Search Strategy Scheme adapted with change from <http://prisma-statement.org>

The trend of global developments influences the characteristics of threats with the emergence of new security issues that require handling with a more comprehensive and integrative approach including the area of medical science. These security issues are terrorism, cross-border security threats, the proliferation of weapons of mass destruction, biological weapons, the use of drugs and narcotics, etc. The emergence of new security issues is inseparable from globalization, advances in information technology, primordial identity, and the strengthening of the role of non-state actors (Ministry of Defense of the Republic of Indonesia, 2008).

According to Indonesian National Narcotics Agency (BNN) in cooperation with the Center of Health Studies of the University of Indonesia (UI) survey in 2015, the prevalence number of drug abuse in Indonesia was 2.20% which indicates that about 4 million people were narcotic drug users. The number of narcotic drug users is still

increasing to 5.9 million people and ironically, 1.7 million increases were new users (Rifqi & Bangun, 2020).



Figure 2. The Nature of Threats (Ministry of Defense of the Republic of Indonesia, 2015)

The current and future threats can be classified into three types hybrid threats, military threats, and nonmilitary threats. These can be classified into factual and nonfactual threats. The factual threat is a threat prioritized in handling terrorism and radicalism, separatism and armed uprisings, natural disasters, border trespassing, piracy, natural resources theft, epidemics, cyber-attack, and espionage, as well as trafficking and drug abuse.



Figure 3. Factual and Nonfactual Threats (Ministry of Defense of the Republic of Indonesia, 2015)

National securities are defined as creating safe conditions mostly by combating “existing threats” or even perceived threats. The goal of national security is to ensure the survival of the nation-state, which consists of two main elements, the continuation of the next generations, and the maintenance of their nation-state in the future. Drug abuse is a national threat that weakens a country's ability to maintain its national security and defend itself from external threats. Narcotic drugs can damage the nation's generations, both physically and mentally. The long-term impact is expensive and difficult to recover (Ministry of Defense of the Republic of Indonesia, 2015).

A drug is a substance that is taken into the human body and alters some processes within the body and can be used in the diagnosis, prevention, or treatment of a disease. Most drugs that can affect the work of nerves are said to be misused if they are overused. Drug abuse is the use of drugs for the reason not for the treatment but to enjoy the effects. Meanwhile, another source said that drug abuse is the use of pathological drugs which have lasted one month, disrupting work, and social function. It can be concluded that the definition of drug abuse includes (1) the nonmedical use of a substance, (2) altering mental state, (3) hurting the individual or community, and (4) illegal. The use of the "abuse" term only when the user becomes dysfunctional consequences include being unable to maintain employment and daily activity, impaired social relationships, aggressive behavior, and or significantly endanger health (Rifqi & Bangun, 2020).

There are three parts of a holistic strategy oriented toward long-term prevention. In dealing with the narcotic drug problem, prevention consists of primary prevention and secondary prevention. Primary prevention is carried out to prevent unexposed populations from exposure to drugs. Secondary prevention is carried out to prevent the worsening of drug abuse in the population that has been exposed to drugs (abusers). The aim of secondary prevention is also to recover abusers and prevent the spread of drug abuse from users to the population. Secondary prevention is carried out through a rehabilitation program. Rehabilitation must be carried out sustainably, i.e. through the post-rehabilitation program to prevent former users from relapsing and empowering them to return to society as productive people (Rifqi & Bangun, 2020). In secondary prevention and rehabilitation, acupuncture could play a role in recovering the abusers.

The NADA protocol is an acupuncture method used to treat drug withdrawal symptoms in cases of narcotics addiction. The NADA protocol uses five acupuncture points in the ear which are *Shen Men*, Sympathetic, Kidney, Liver, and Lung points (Baker & Chang, 2016; Lua, Talib, & Ismail, 2013; Oleson, 2002). The history of acupuncture for narcotic addiction started in 1972 when Dr. Wen, a neurosurgeon doctor from Hong Kong, accidentally discovered that acupuncture was not only used for anesthetic but also could be used in patients with opioid dependence. NADA protocol was also developed to help addicts with their recovery dealing with trauma, anxiety, depression, irritability, and craving. Since then, many studies have been carried out to prove the effectiveness of acupuncture for narcotic addiction. In 1985, dr. Michael Smith, the Director of the Center for Detoxification, The National Acupuncture Detoxification Association formed five points of the ear acupuncture protocol which is currently widely known as the NADA protocol (Cui, Wu, & Li, 2013).

The five acupoints were named the Lincoln Model, which NADA later introduced widely to the rest of the world. The NADA protocol has been shown to increase dependency retention, decrease drug dropout symptoms, and reduce long-term morbidity in drug-dependence patients. Currently, the NADA protocol has become a very effective approach for many populations receiving behavioral rehabilitation and primary health rehabilitation (Baker & Chang, 2016). The NADA protocol as it exists today consists of the insertion of a small, stainless-steel, disposable acupuncture needle

administered to the left and right ears as much as one to five ear acupuncture points on the outer surface of a person's ear. The NADA protocol can be used effectively in both acute and chronic dropout conditions, addiction treatment, and recurrence prevention. The focus of treatment is to establish emotional balance and homeostasis. The NADA protocol makes the detoxification process more convenient, and faster, and a much smaller dose of narcotics compared to the standard method of methadone detoxification (MMT).

The ear acupuncture points are *Shen Men*, Sympathetic, Kidney, Liver, and Lung points (see Figure 2). The Sympathetic point lies in the confluence between the inferior crus and the ear scapha and serves for the regulation of the central nervous system. *Shen Men*'s point lies at the apex of the fossa triangularis, and acts on the medulla oblongata, overcoming insomnia, anxiety, depression, and drug dependence. *Shen Men* is well known as an ear point that produces a sensation of relaxation. The Kidney, Liver, and Lung points located on the concha, together serve to reduce cravings in addiction (Stuyt et al., 2018).

Bearn et al. (2009) performed the NADA protocol daily for 30-40 minutes using a 32G needle for 14 days. Lua et al. (2013) intervened in the NADA protocol for 2 months, 3 times a week for 30 minutes at 1-3 mm depth. Washburn et al. 1993) carried out the NADA protocol for 21 days, for 20-45 minutes. Wells et al. (1995) conducted 5 days per week for the next 2 weeks every day for 6 months with a duration per session of 20-45 minutes (Baker & Chang, 2016). Therapy is given as often as possible; it is usual to do it daily for 30-45 minutes. Therapy can also be given by the application of seeds or beads at *Shen Men* points (Stuyt et al., 2018).

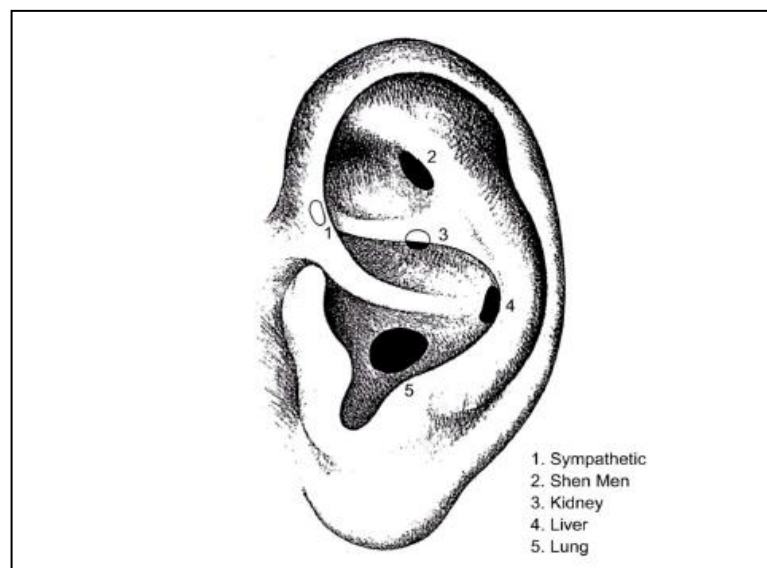


Figure 2. Ear acupuncture points for the NADA protocol (Stuyt et al., 2018)

Addiction is defined as a behavioral, cognitive, and physiological phenomenon that develops after the continuous use of a substance characterized by using compulsive drugs, the inability to limit the consumption of drugs, and the appearance of drug dropout syndrome during the discontinuation of drug use. Addiction includes a strong

desire to take the drug, and difficulties in controlling its use, despite the dangerous consequences. Drug addiction is a complex chronic disease that occurs in the brain, and which modulated by genetic, developmental, and environmental factors. Drug addiction is modulated by genetic, developmental, and environmental factors. The most consistent in drug addiction is that the abused substance activates the mesolimbic dopamine system.

The mesolimbic system consists of dopaminergic neurons in the ventral tegmental area and their axonal projections into the terminal planes in the nucleus accumbent and the prefrontal cortex, proven to play an important role in the mechanisms of opioid addiction. Opioids, alcohol, nicotine, cannabis, and psychostimulants work to increase dopamine at synapses (Gupta & Kulhara, 2007). Opioid abuse-induced changes in dopamine levels in the brain are associated with feelings of comfort and pleasure, providing positive reinforcement of sustained opioid abuse. In contrast, discontinuation of chronic opioid use reduces dopamine flow in the accumbent nucleus. The cessation of opioid use causes significant dysphoria and suffering, a state that drug user addicts want to avoid and one that can be the main motive for continuing the use of opioids (negative reinforcement) (Lin et al., 2012).

The mechanism underlying the work of ear acupuncture in lowering addiction involves the stimulation of the parasympathetic nervous system. The ear of the concha part is largely innervated by sensory and parasympathetic nerve fibers with numerous connections to the central nervous system. Stimulation of ear acupuncture induces an increase in the size of parasympathetic flows such as high-frequency bands on the HRV (*Heart Rate Variability*) analysis spectrum as well as a decrease in plasma cortisol levels. Acupuncture works by mechanisms against sympathetic dominance and autonomic imbalance in patients with narcotic addiction (Krause et al., 2020). Another hypothesis is from excitatory to the vagus nerve. It is known that the stimulation of small nerve fibers of the skin can induce axon reflexes that affect the functioning of surrounding skin structures innervated by the autonomic nervous system such as sweat glands, promotor muscles, or blood vessels (Krause et al., 2020). It is well known that this local excitatory on the skin can be continued towards the segmental and central. In the central, acupuncture can stimulate the production of various types of endogenous opioids, such as endorphins, enkephalin, endorphin, and dynorphins (Lin et al., 2012).

In 2008, Yang et al reviewed the mechanisms that may underlie the effectiveness of acupuncture in the treatment of drug addiction and this review provides clear evidence for the biological effects underlying the use of acupuncture to treat drug abuse. This review provides a hypothetical model of the effect of acupuncture on the release of dopamine in the nucleus of the accumbent. Regarding positive reinforcement, acupuncture treatment activates GABA (Gamma-aminobutyric acid) receptors on dopamine cell bodies and activates presynaptic opioid receptors in the accumbent nucleus through dynorphin neurons, resulting in a decrease in dopamine release. Regarding negative reinforcement, acupuncture treatment stimulates enkephalin neurons in the hypothalamus and interacts with opioid receptors to inhibit the

interneuron of the ventral tegmental area of GABAergic and thereby increase the release of dopamine in the nucleus accumbent (Lin et al., 2012).

In a systematic review from Baker & Chang (2016) of 4 RCT (Randomized Clinical Trial) studies on the effectiveness of the NADA protocol on drug addiction, two studies showed no benefit from the addition of the NADA protocols compared to standard therapy, and two studies showed there were significant differences between nada protocol administration compared to controls. One study reported that the dose of MMT (methadone maintenance treatment) became less after the administration of the NADA protocol. Two studies reported a decrease in retention of withdrawal syndrome MMT therapy with significant differences. There were no reports of side effects from the 4 reported RCTs. One study showed an improvement in quality of life and psychosocial relationships as a positive result of the NADA protocol. This was slightly different from a systematic review conducted in 2011 in which 10 RCTs showed that acupuncture provided significant results against drug dropout symptoms and significantly decreased drug dropout symptoms in 6 of 7 studies. Researchers also reported changes in psychological symptoms to positive in acupuncture groups from 3 RCT studies (Lin et al., 2012). A systematic review involving 41 studies with 5,227 study subjects concluded that there were no significant differences between the acupuncture therapy group and the control groups (acupuncture sham, standard treatment) on the incidence of relapse after therapy. Twelve studies mentioned the little risk of serious side effects, although participants may experience slight bleeding or pain at the needle-piercing site (Grant et al., 2016).

A randomized controlled trial conducted by Krause et al. aimed to assess the effect of the NADA protocol acupuncture on cardiovascular autonomic function, psychological effects, and abstinence in alcohol addiction patients. The results obtained in the NADA protocol acupuncture group were an increase in heart rate variability immediately after therapy and persisted four weeks after therapy. There was no change in the other groups (Krause et al., 2020). The detoxification stage is an important part of the rehabilitation process for drug addicts. Based on recent studies, shows that the NADA protocol has good results in overcoming symptoms caused during the detoxification process. Since acupuncture is simple, effective, cost-efficient, and drug-free, this acupuncture method with the NADA protocol can be an alternative option for optimal results in the rehabilitation process carried out can run optimally. Further research with a randomized controlled trial study design to assess the effectiveness of the NADA protocol in the rehabilitation process of illegal drug addiction in Indonesia is highly recommended. The stakeholder could make the NADA protocol a standard in the rehabilitation process of drug users in Indonesia based on the evidence of its efficacy.

CONCLUSIONS, RECOMMENDATIONS, AND LIMITATION

NADA protocol is a reasonable approach to overcoming symptoms caused by the detoxification process and could become an alternative option for optimal results in the rehabilitation process. From the literature, the NADA protocol is effective for the treatment of drug addiction supported with evidence-based although some studies

showed no benefit from the addition of the NADA protocols compared to standard therapy. But the significant positive result is more than no effect. From the literature, we also conclude that acupuncture has minimal side effects. The limitation of this review is the absence of research on the NADA protocol in the rehabilitation process in Indonesia. Further research with a randomized controlled trial study design to assess the effectiveness of the NADA protocol in the rehabilitation process of illegal drug addiction in Indonesia is highly recommended so that the stakeholder could consider the NADA protocol as a standard in the rehabilitation process of drug users in Indonesia.

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