

Review on Treatment of Substance Use Disorders

Monicah Wanjiku Njoroge*

Department of Health Sciences, Jomo Kenyatta University of Agriculture and Technology, Kenya

*Corresponding author: Monicah Wanjiku Njoroge, Lecturer, Department of Health Sciences, Jomo Kenyatta University of Agriculture and Technology, Kenya, Tel: +254-721243590, +254-704581488; E-mail: nmonicus@gmail.com

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Abstract

Services for mental and substance use disorders have typically been neglected, and in many countries segregated from mainstream health care with resources allocated not commensurate with the burden. The attention given to mental and substance use disorders cannot be compared to other diseases such as HIV/AIDS, Malaria, Cancer, and Diabetes among others. Mental and substance use disorders account to about 7.4% of disease burden worldwide. These disorders are responsible for more of the global burden than HIV/AIDS and tuberculosis, diabetes, or transport injuries.

The increasing number of cases of SUDs globally presents a public health challenge that requires effective evidence based interventions. One of the major challenges is inadequate treatment for SUDs which mostly plague developing countries. It may be difficult to measure the efficacy of treatment as a result of unique patient characteristics that contribute to person's treatment experience. Care factors such as duration of treatment and length of stay have been studied as having influence on the outcome of treatment. Others include patient and environmental factors.

Globally, poor treatment outcomes mostly reported include dropout rates as high as 90%; relapse rates as high as 91% and high after treatment mortality rates. Research findings have identified many evidence-based treatment strategies for managing substance use disorders, nevertheless there is a gap that continues to exist, that of a lack of success of effective interventions to be spread and implemented so as to improve the lives of those affected. Other studies have also reported these differences in the outcomes and effectiveness of treatment of substance use disorders.

There is need for enhanced interventional research that aims at providing an overview of conceptual issues relating to factors that influence treatment outcomes and identifying gaps and directions for improving treatment and treatment outcomes. The fundamental objective of enhanced research in substance use treatment is to reduce the increasing prevalence rates of substance use disorders.

Keywords: Acquired immune deficiency syndrome; Interpersonal therapy; Trans-theoretical model; Substance use

Abbreviations AIDS: Acquired Immune Deficiency Syndrome; APA: American Psychiatric Association; ASAM: American Society for Addiction Medicine; CBT: Cognitive Behavior Therapy; HIV: Human Immune-Suppression Virus; IPT: Interpersonal Therapy; MET: Motivational Enhancement Therapy; MMT: Methadone Maintenance Treatment; SUDs: Substance Use Disorders; TSF: The 12-Step Facilitation; TTM: Trans-Theoretical Model; US: United States; UN: United Nations; UNODC: United Nations Office on Drugs and Crime; WHO: World Health Organization; UKDPC: United Kingdom Drug Policy Commission

Introduction

Mental and substance use disorders will be the leading cause of disability worldwide by the year 2020 [1]. In recent years, the prevalence of mental and substance use disorders (SUDs) has been reported to be on the increase around the world. An increase of 37.6% in the global burden of diseases was reported between 1990 and 2010 [2].

Using a risk factors approach to the global burden of diseases, the proportion of the total global burden of disease attributable to specific SUDs has increased by 57% for illicit drug use (cannabis, opioids, amphetamines, and injection drug use), 32% for alcohol use, and 3% for tobacco use [3].

The UN World Drug Report [4] indicates that 230 million people use alcohol and other substances at least once a year while 27 million people are addicted; the report further indicates that substance abuse attributes to more than 0.2 million deaths every year and moderate to severe disability of 11.8 million people.

To counteract the global challenge of substance use disorders, different addiction treatment models continue to be developed. However, there is a gap between research, innovations and their adoption and implementation. This gap is wider in low-and-middle income countries especially in Africa, due to limited access to empirically supported treatments and a shortage of trained health workers to deliver evidence-based interventions [5,6].

Substance use disorders have been recognized as an escalating problem mostly affecting developing countries [7]. However, the exact prevalence of substance use disorders is difficult to attain, generally due to the developing countries limited capacity to conduct national

surveys [8]. The strengthening of the prevention and treatment of substance abuse, including narcotic drug abuse is target 3.5 of the sustainable development goals. Therefore, prevention, treatment, care, recovery, rehabilitation and social reintegration measures and programmes all play a role in addressing the problem of drug use and reducing the negative health impact on society [9].

Walker describes treatment of substance use disorders as a focused change process [10], targeting the reduction of substance use, sustained abstinence, prevention of relapse (frequency and severity) and enhancing adaptive functioning. Treatment is delivered in various settings, lasting from a few months to several years depending on an individual's needs and resources available [11]. Cases that are severe and intractable are the ones that enter treatment [12] with many cases accessing treatment during a crisis, such as acute intoxication or overdose, an accident or acute exacerbation of another health condition that is caused by substance use [13].

Interventions are often ineffective with poor treatment outcomes ranging from relapses, readmissions, drop outs and mortalities. Relapse rates as high as 90% have been reported in different countries [12,14,15]. Progress of most cases experience cycles of repeated treatments, relapses and recovery that may span for years which may lead to stable recovery, permanent disability or death [16-26].

Treatment of substance use disorders in most developing countries is often limited in nature and lack the follow-up and support that are crucial in assuring lasting sobriety. Most treatment and rehabilitation centers in these countries focus solely on detoxifying the patient and nothing else. Most of them lack the safeguards that facilities in developed countries such as US provide. In general, mental health care is limited in developing countries where substance use disorders are still not considered to be linked to mental illness [27].

Discussion

The trans-theoretical model

The trans-theoretical model (TTM) illustrates how alcohol and substance addiction treatment models, addicts' individual characteristics, age and gender as well as environmental, social and economic factors impact on treatment outcomes. This model was proposed by Prochaska and DiClemente in 1983 [28]. This is a stages of change model adopted as a guideline for clinical interventions [29]. The model outlines the behavior change process especially in addictive behaviors [30,31]. It is based on experimental data from individuals with nicotine dependence that attained smoking cessation without enrolling for treatment [31,32].

It emphasizes the importance of a broader picture of an individual, allowing a more accurate evaluation of the patient condition. This is can be compared to the historic conception that success or failure in changing addictive behavior is a function of denial [31,32].

It describes behavior change by understanding the factors that distinguish between success and failure: at every step of change, success is linked to accomplishment of a task, translating to better engagement with targets in the next step.

Intentional behavior change refers to alterations in addictive behavior linked to substance use disorders. Change of behavior is critical for the success of treatment. Intentional change is not instant; depending on the dynamic changes presented by an individual over time in relation to motivational stage. It comprises of four perspectives:

stage; processes; context; and signs of change [31,33,34]. Movements are cyclic rather than linear, and individuals can transit into and out of earlier or later stages until achieving behavioral consistency and stability.

Pre-contemplation: An individual shows no intention to change for about six months. An individual is still in denial that the behavior is a problem, or the problem has subsided so that the individual avoids facing any need to change. If the individual requests for treatment, it is usually as a result of external motivation, which may result in temporary changes in behavior. At this stage, the main task is to become conscious of the existence of a problem and of the need to change addictive behavior. The best techniques are psycho-educational, with individualized information and feedback.

Contemplation: This stage is characterized with consideration for change, but without a commitment to action. Ambivalence is a relevant characteristic at this stage. The benefits to be achieved must exceed the benefits of the negative behavior, be sufficient, according to the individual, to justify the changes and expected losses from the change of behavior that will determine progression to the subsequent level. The first strategy aims at motivating the individual to act on their choice and the positive benefits that will result from the change and allow for self-evaluation, analysis of the individual context as well as the strengthening of self-efficacy.

Preparation: The patient shows commitment to action. The task to be accomplished at this level is to strengthen the commitment and determine an action plan in relation to the individual context. The interventions might be directed towards the creation of this plan, considering a number of alternatives raised during the therapy process, so that the individuals select the alternative that is best for them and consequently commit to their decision.

Action: This is the first step towards changing the previous patterns whereby the individual is engaged adopting a new attitude. New behavior patterns may be established in about three to six months, modified and discontinued. The task in focus is to implement the necessary changes in as per the action plan. Significant interventions may consider regular review of the plan or re-establish the commitment to change [31].

Maintenance: Sustaining and integrating new habits. The aim is to avoid relapses and consolidate the gains made in the previous stage. A behavior is considered stable when it is automatically executed without the need to expend excessive energy or effort in order to maintain it. Maintenance is not a static stage but a continuous process that lasts for about six months and may go for a longer time.

Relapse: Characterized by regression in behavior change with individuals going back and forth the stages. It is usually unexpected with individuals oscillating through the stages [31,34]. The focus of the intervention in this case should be to re-establish the plan, the reinforcement of self-efficacy and renewing of confidence [31]. A spiral shape is the preferable visual description of the transformation.

After relapse, the patient oscillates through each phase before consolidating the gains in behavior change, not changing but continuing to ascend the spiral [35].

This model is fluid in nature since behavior change is a process, with individuals shifting through abstinence and relapse. There is learning and personal growth before attaining stable abstinence. Based on the current specific stages, an individual's readiness to change can be derived at any point in time (Figure 1).

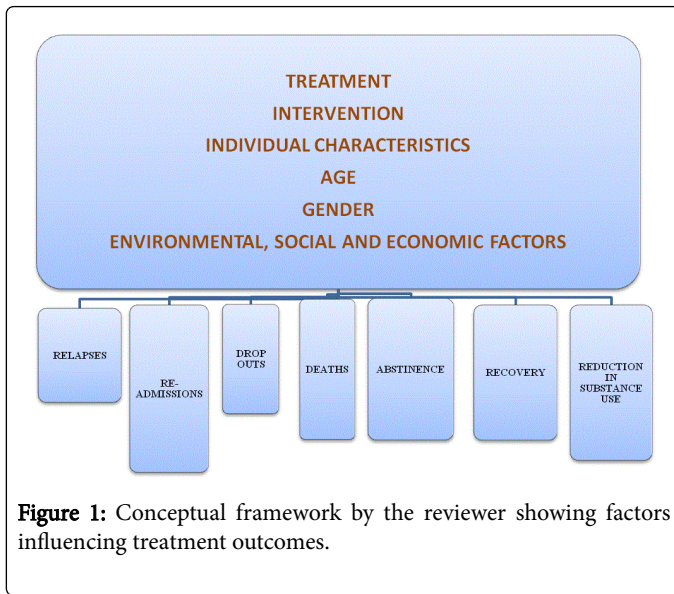


Figure 1: Conceptual framework by the reviewer showing factors influencing treatment outcomes.

There are inconsistencies in research findings that show a relationship of motivation to change to treatment outcome. Other research findings show treatment outcome as a prediction of the TTM and readiness to change upon starting treatment [36,37]. Conversely, behavior change is not related to motivation [38,39].

Substance use disorders

A substance use disorder is characterized by the inability to have voluntary control over substance use as well as health and social impairments [40]. Substance use disorders are in three levels of severity: mild, moderate, and severe [41].

SUDs are in two forms: Dependence (chronicity) and abuse or hazardous use. The symptoms range from increased tolerance for the substance, inability to abstain, replacement of healthy activities with substance use, and continued use despite medical or psychological problems which have been present for longer than 12 mths and are likely to persist if left untreated. Substance abuse is effective when people do not meet the dependence criteria reporting at least one moderately severe substance-related symptom putting them at high risk of developing dependence or harming themselves or others. Dependence requires treatment, while abuse results in referral to brief intervention or treatment [42].

Neuro-imaging studies have ascertained that a physiological basis underlies the clinical experience of SUD chronicity [43]. The findings have proved that cravings, cue reactivity, tolerance, and withdrawal can be seen in the brain; influencing brain development especially for adolescents; responding to medications as well as social and physical environment; and that chronic substance use is associated with physical changes in the brain that have an impact on brain functioning and emotional states [44-47].

Epidemiological data affirm that SUDs follow a chronic course; they emerge during adolescence and often progress in severity and complexity with continued substance misuse [48,49]. About 90 percent of individuals with dependence commence use of drugs before the age of 18, with half of them beginning before the age of 15.

Treatment of substance use disorders

Substance use disorders are treatable but challenged by increasing rates of relapse, readmissions, drop outs and mortality [12,14]. Somal and George [13] noted that most individuals with SUD access treatment during a crisis. The following factors were considered most important in a 30year systematic study of substance use disorders treatment.

- Readiness by an individual to commit to treatment
- Perceived and experienced social support
- An individual's clinical profile
- An individual's self-efficacy
- Treatment results and satisfaction
- An individual's perception of life, its meaning and search for it

Pharmacological treatments

Pharmacological treatments are beneficial for selected patients with specific substance use disorders [50]. The categories of pharmacological treatments are:

1. Agonist maintenance therapies
2. Antagonist therapies
3. Abstinence-promoting and relapse prevention therapies
4. Drugs to treat intoxication and withdrawal states
5. Drugs to treat comorbid psychiatric conditions
6. Drugs to decrease the reinforcing effects of abused substances

Two main pharmaco-therapies are recommended for use among people with substance dependence: Methadone Maintenance Treatment (MMT) and buprenorphine [51]. Other forms of pharmacological treatment for substance dependence include naltrexone, Varenicline [52]. Of these, MMT is the most thoroughly studied and widely used treatment [53].

Psychosocial treatments

A comprehensive treatment program includes the psychosocial treatments as an essential component [50]. Evidence-based psychosocial treatments include cognitive-behavioral therapies (CBT), motivational enhancement therapy (MET), behavioral therapies (e.g., community reinforcement, contingency management), the 12-step facilitation (TSF), psychodynamic therapy/interpersonal therapy (IPT), self-help manuals, behavioral self-control, brief interventions, case management, and group, marital, and family therapies. There is evidence to support the efficacy of integrated treatment for patients with a co-occurring substance use and psychiatric disorder; such treatment includes blending psychosocial therapies used to treat specific substance use disorders with psychosocial treatment approaches for other psychiatric diagnoses (e.g. CBT for depression).

A study reported MET produced greater reductions in marijuana use over the 15-month follow-up. It was not more effective in a large scale study of alcoholics [54].

CBT reduces illicit drug use among individuals on a methadone maintenance program [55]. CBT and motivational interviewing also improves the adherence and efficacy of MMT [56]. Some studies have found it more effective [57] and others have reported outcomes equivalent to IT and TST [58,59].

The 12-step treatment (TST) contains limited published literature on efficacy. One study found TST to be more effective than clinical management for cocaine and alcohol [60].

In comparison, intensive inpatient programs are not more effective than weekly psychosocial treatment as an adjunct to MMT [56].

Motivational interviewing (MI) is client-centered targeting a person's ambivalence to change. Adopting a counseling style, a counselor uses a conversational approach to help their client discover their interest in changing their substance using behavior. The objective is to examine and resolve ambivalence [61]. MI has been reported to produce lower rates of cocaine positive urines in relapse prevention after detoxification [62].

E-treatments

The treatment of substance use disorders is fast adopting electronic systems improving the quality and efficiency as well as reducing treatment gaps. It is cost effective and useful for remote areas. It based on technology as an add-on, substitute, and replacement for standard care. Technology-enhanced treatment interventions are mainly Web-based versions of evidence-based, in-person treatment components such as CBT and MET [63].

Research studies on the effectiveness of substance use disorder treatment approaches that incorporate Web and telephone-based technology. A study on the effect of daily self-monitoring calls in an interactive voice response technology system with personalized feedback compared it to standard motivational enhancement practice. Those who received the intervention decreased the number of drinks they had on the days they drink [64].

Treatment outcomes

A favorable treatment outcome is heavily dependent on completion of treatment [65]. Studies have explored the interaction of specific factors and treatment outcomes including readiness for therapy, self-efficacy [66,67] treatment outcome expectations and perceived social support [68] as directly linked to positive outcomes in treatment.

Studies have demonstrated that severe substance use often comprise a chronic condition marked by cycles of recovery, relapse and repeated treatments stretching many years before arriving at either a stable recovery, permanent disability or death [12]. Majority of people with lifetime substance dependence enter sustained recovery, though most have to take part in repeated treatment [14].

Longitudinal treatment studies have reported that most participants achieve stable recovery after 3 to 4 episodes of treatment over some years [14,15]. Dennis et al. [14] reported 27 years as the median time from first use to a year of abstinence while the median time from first treatment to a year of abstinence was 9 years with 3 to 4 treatment interludes.

Scott et al. studied the frequency and direction of transitions between points in the relapse, treatment re-entry, and recovery cycle over 2 years. About 33% moved from one point in the cycle to another each quarter; 82% transitioned at least once; and 62% transitioned multiple times [22].

There are impractical expectations that all patients entering addiction treatment have to maintain lifelong abstinence following a single episode of specialized treatment. However, most persons resume

substance use after leaving treatment in the first year following treatment, mostly within the first 30-90 days ([15,22-24].

Positive outcomes

Abstinence and reduction of substance use: Abstinence depends heavily on treatment completion [11]. It can take a year of abstinence before an individual can be said to be in remission [69].

On average, individuals reach sustained abstinence after three to four episodes of different types of treatment over a couple of years [14,15,19,22,23].

A longitudinal study with 1,271 patients, 27 years was the estimated median time from first use to at least 1 drug-free year, and the median time from first treatment to 1 alcohol and drug-free year was 9 years with three to four sessions of treatment [14].

The length of time it takes an individual to reach at least 1 year of alcohol and drug abstinence is linked to the age of first substance use and the duration of use before starting treatment [22].

Another study by Scott et al., found the median time of use being significantly longer for people who started before age 15 than for those who started after age 20 [23]. In comparison, patients who commenced treatment within 10 years of their initial drug use achieved a year or more of abstinence after an average of 15 years, while those who entered treatment after 20 or more years of use achieved after an average of 35 or more years. These results show the need for early diagnosis and intervention ideally during the first decade of substance use.

Recovery: Recovery is the voluntarily sustained control over substance use, which maximizes health and wellbeing and participation in the rights, roles and responsibilities of society.

Most individuals with substance use disorders eventually enter sustained recovery, having no symptoms for a year; however, most do so after participating in multiple sessions of treatment [14]. Continuing care following discharge from an inpatient facility is associated with improved substance use outcomes [70].

A 12 year follow-up of persons treated for cocaine dependence found 52% in stable recovery [71] and a follow-up of clients treated for methamphetamine dependence showed a recovery rate similar to those of clients treated for heroin or cocaine dependence [72,73].

A review by Sheedy and Whitter indicated that on average 58% of individuals with chronic substance dependence attained sustained recovery with rates ranging from 30-72%. A later study by White et al. established an average recovery rate at 47.6% [74].

Individuals with higher substance use severity and environmental obstacles to recovery are not likely to transition from to recovery [22,75].

In another study, Scott et al. reported active participation in treatment as a primary correlate of the transition from use to recovery [23]. Among patients who started the year in recovery, the major predictor of whether patients maintained abstinence is not treatment, but their degree of self-help group participation.

Negative outcomes

Relapse: A relapse indicates that treatment needs to be reinstated or adjusted or that another treatment should be tried. Relapse rates for individuals with substance use disorders are similar to those of other

chronic illnesses [21]. A large proportion of individuals who have been treated for substance use disorders are likely to relapse soon after treatment [76,77]. Relapse to substance abuse after treatment reaches 75% in the 3 to 6 month period following treatment [78].

In a ten year longitudinal study, about one-third of individuals in full remission relapsed in the first year, while two thirds relapsed within the follow-up period [77]. 71% of patients on outpatient treatment for marijuana dependence having achieved 2 weeks of continuous abstinence relapsed to marijuana use within 6 months [79]. Smyth et al. [80] reported 91% relapse rate; provision of a formal program of continuing care following discharge from a detoxification unit, results in low relapse rates [81].

Various causes for relapses have been cited such as depression, adverse life events, social pressure, stress, anxiety, positive mood, work stress, family dysfunction, marital conflict, and a low level of social support mostly cited [82,83]. Other factors include environmental cues, including the availability and accessibility to drugs and peer pressure, as part of the recovering individual's environment [84,85].

Re-admission: Literature is inadequate on data for readmissions. Readmission rates are increasingly being used as an outcome measure in health services research and as a quality benchmark for health systems. Studies have reported that those completing treatment have significant low risks for readmissions. Females and those arrested in the year prior to treatment had increased risks of readmission, while males and those receiving a combination of inpatient and outpatient treatments had lower risks of readmission [86].

Beynon et al. [87] in the United Kingdom found that the trend towards shorter lengths of stay was associated with increasing rates of continued drug use at discharge and readmission within the year.

Drop outs from treatment interventions: Failure to complete treatment is often referred to as drop-out. Most patients drop out of treatment as compared to those that complete [65]. It has been identified as a major mental health services challenge [88].

Recent studies report drop-out rates ranging from 21.5-43% in detoxification [89,90] outpatient treatment 23-50% [91,92], inpatient treatment 17-57% [93] and substitution treatment 32-67.7% [94,95]. A meta-analysis of psychotherapy found a dropout rate between 19 and 47% [96]. A systematic review by Brorson et al. reported dropout rates from SUD treatment up to 90% [65].

The reasons for high dropout rates are poorly understood [97-100]. Ball et al. [101] and Palmer et al. [102] found that the most commonly reported reasons for drop-out were individual or personal factors rather than program related factors.

Previous studies have shown female gender as a significant predictor of drop-out, with only 39% (11/28) of women on treatment fully engaged compared to 74% (51/69) of the men [103-105]. The high odds of females failing to fully engage in treatment is as a result of several factors including history of trauma, stress and mood related factors [106,107].

High treatment drop outs has been associated with younger age and cognitive deficits [108-111]. Proactive engagement services result in individuals remaining engaged through the treatment process [112,113]. High drop-out rates come with a high cost to society in terms of increased prevalence, rise in crime and spread of HIV [4] and causing a great deal of pain to loved ones [65].

Mortality: Individuals with alcohol and substance use disorders seeking help have lower mortality rates compared to those that do not seek help [114]. Among age-matched populations high mortality rates of 1.6 to 4.7 greater have been reported among individuals as compared to those without the disorders [115]. Post-treatment deaths are associated with post-treatment relapse [116] and are products of poisoning and overdose, cancer, liver disease, suicide, cardiovascular disease, AIDS, or homicide [20].

Mortality rates are generally high for tobacco smokers [117], for those with co-occurring psychiatric illnesses [118] and for those who concurrently consume alcohol and/or other drugs following treatment [119].

Some studies indicate that those who enter treatment sooner and stay on treatment longer are at a lower risk of mortality [22,23,71]. Studies on mortality rates following discharge from methadone maintenance treatment (MMT) reported an 8% death rate within one year of discharge from MMT in the first study [120] and a 5% death rate at six months following MMT in the second study [121]. The increased mortality rate following cessation of opiate detoxification and drug-free treatment is linked directly to the loss of drug tolerance [122].

Conclusion

There is a general lack of comprehensive data on outcomes of treatment and rehabilitation services for SUDs. Most research in this area has largely applied observational approaches. Studies shy away from interventional studies which give more practical and evidence based findings.

Most important is the need to study available and effective intervention strategies for treating substance use disorders. Continued research into effective and feasible treatment options and interventions is therefore important to inform on how to bridge the treatment-outcome gap.

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