
A Review on Cognitive Representations in Substance Use Disorders and Essence of Cognitive Therapy

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Substance dependence is a chronic and highly prevalent condition leading to dysfunction in personal, occupational and social area that can occur during periods of heavy alcohol consumption and even following treatment. According to WHO estimates in year 2010, 3.4-6.6 per cent of the world's population in age group of 15-64 had used an illicit substance at least once in their life (WHO, 2012). Illicit drug use globally led deaths in range of 99,000 to 253,000 in the year 2010 (WHO, 2012). Recent report of WHO (2014) suggests that 38.3% of the global population consume alcohol and on an average, an individual over 15 years of age consume 6.2 litres of alcohol annually. Thus drug dependence has become a worldwide crisis as it is associated with adverse social and economic consequences as well as physical and mental illness.

There is a vast difference among use, abuse and dependence and not everyone who uses substance is abuses or is dependent on them. A variety of potential contributing factors, including age, mood instability, stress, and personality characteristics such as poor distress tolerance, inadequate social skills, and lack of assertiveness etc. found to be associated with substance dependence and dealt with using number of intervention strategies but still relapse rate found to be too high among these individuals. The research has established the clinical relevance of identification and modification of cognitive components as it is often associated with better treatment outcome and low rate of relapse across various disorders. Although, recently rapid attempts have been made to explore underlying cognitive elements in substance use but these elements are still less identified and as a result management of these elements using psychological intervention still less translated into routine practice in the clinical care. Hence, it is important to study systematically the substance use disorders in terms of associated cognitive elements. The current article is aimed to review systematically the published literature on identification and modification of dysfunctional cognition in substance use disorders.

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MATERIALS AND METHODS

Search Strategy:

A literature review was undertaken using several electronic databases (PubMed, ScienceDirect and specific journals, which pertain to psychosocial issues in addictive disorders and guidelines for the same) for relevant publications. The search was carried out in July 2015 and included publications until (and including July 2015). Furthermore, all the publications listed using the search term “Dysfunctional attitude;” “schemas;” “core beliefs;” “dysfunctional assumptions;” “negative automatic thoughts;” “dysfunctional cognitions;” “cognitive distortions;” “cognitive errors;” “Thinking errors;” “Logical errors;” were screened for alcohol/substance/drug use, abuse, dependence. Relevant studies were also searched in Indian Context. Additional published material was identified from the bibliography of the studies screened and evaluated on the related topics.

Study Selection:

For the purpose of the present review, English language peer-reviewed studies conducted among individuals consuming any substance were included.

Data extraction:

Information was extracted using a structured Performa from the publications that met the above-mentioned inclusion criteria. Data were extracted pertaining to cognitive elements and alcohol/drug/substance use disorders. Furthermore, the publications that assessed effectiveness of cognitive behaviour therapy (CBT) in alcohol or substance use disorders were also included in the review. Articles that clearly states the techniques or components of CBT used in study were considered for review purpose. All information was extracted by two authors using predefined criteria.

COGNITIVE REPRESENTATIONS:

Role of cognition is implicated across various disorders including substance use, identification and modification of underlying deeper cognitions makes individual less likely to relapse (Hollon et al., 1992). Cognitive representations consist of following cognitive elements including schemas/Core beliefs, dysfunctional beliefs (assumptions, attitude and rules), automatic thoughts and cognitive distortions. Cognitive factors can be referred as cognitive vulnerability to predict psychopathology including disorders such as obsessive compulsive disorder, depression, eating disorders and substance use etc.

A) Schema and substance use

Early maladaptive schema is one of the cognitive elements recently defined by Ball (2007) as “enduring and pervasive themes about oneself, others, and the world”, develops on the basis of early traumatic childhood experiences. Schemas are categorized into two categories: helplessness and unlovability. A third one added by J.S. Beck (2005) as schema of worthlessness. Young, Klosko, & Weishaar (2003) have talked about 18 early maladaptive schemas that individuals can possess, divided into five domains: Disconnection and rejection (schemas of defectiveness,

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mistrust/abuse, abandonment, social isolation, and emotional deprivation), Over vigilance and inhibition (schemas of punitiveness, unrelenting standards, emotional inhibition and negativity/pessimism), Other directedness (schemas of approval seeking, self-sacrifice, and subjugation) Impaired autonomy and performance (schemas of failure, dependence, vulnerability, and enmeshment), Impaired limits (schemas of grandiosity and insufficient self-control). Recent studies have emphasised on differences in schemas for individuals with substance abuse as compared to normal population and also across different substance use. Brotchie, Meyer, Copello, Kidney, & Waller (2004) carried out a cross sectional study on group of alcohol abusers, opiate abusers, combined alcohol and opiate abusers and a non-clinical group, participants were assessed on Young Schema Questionnaire-SF. Result reveals that schemas were highest in alcohol abusers and these schemas were significantly high in clinical than non clinical group. This difference of schemas in clinical substance abuse group and non clinical group was supported by other studies as well (Jalali, Zargar, Salavati, & Kakavand, 2011; Shaghaghv, Saffarinia, Iranpoor, & Soltanynejad, 2011; Razavi, Soltaninezhad, & Rafiee, 2012; Shorey, Stuart, & Anderson, 2013a). Jalali, Zargar, Salavati, & Kakavand (2011) performed a study among 56 opioid users and 56 non opioid users and found that parenting origin assessed on Young Parenting Inventory is significantly associated with related schemas among opioid users. Thus Addiction potential can be predicted by assessment of schemas in undergraduate students (Bojed & Nikmesh, 2013)

Reduction in schemas after intervention is estimated in hardly few studies. Roper, Dickson, Tinwell, Booth & McGuire (2010) identified maladaptive cognitive schemas in alcohol dependence group and also the changes associated with a brief residential abstinence program. 100 participants were recruited, comprising an alcohol dependent clinical (ADC) group ($n = 50$) and a non-clinical group ($n = 50$). Groups were compared on schemas. Level of anxiety and depression on pre & post assessment for alcohol dependent clinical (ADC) group was compared. The two groups differed significantly on 6 of 15 schema beliefs. Significant improvements on post assessment in depression, anxiety, and 13 out of 15 maladaptive schemas obtained following a period of abstinence with participation in a psycho-educational program. Changes in early maladaptive schemas also found after residential treatment for substance use (Shorey, Stuart, Anderson & Strong, 2013b). Pre-post analysis on Young Schema Questionnaire-LF by the end of the 4-week treatment on 12 step facilitation therapy was carried out among alcohol and opioid-dependent treatment seeking adult males ($N = 97$). On post assessment 8 of the early maladaptive schemas significantly decreased with small to moderate effect size.

B) Dysfunctional Beliefs and substance use

Cognitive Schemas which generally develops in childhood plays major role in the development of intermediate dysfunctional beliefs which consists of dysfunctional attitudes, rules and assumptions. Three major categories of dysfunctional beliefs found to be associated with the patient's acute decision to engage in substance abuse: Anticipatory, Relief-oriented, and Facilitative or permissive (Beck, 1993). Alcoholic thinking is explained in the form of

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grandiosity, omnipotence, and low frustration tolerance as ways of thinking and rationalization. Wright, Beck, Newman, & Liese (1993) depicts that drug-related beliefs are an important factor in drug abuse and its treatment. Study by Miguel & Antonio (2012) explored the changes in core beliefs associated with substance abuse and compared the group of substance-dependent patients with and without personality disorders. They focused on necessity to assess variety of dysfunctional beliefs associated with addiction as degree of identification with dysfunctional beliefs found to be strong predictor of craving and alcohol use and that the course of identification with beliefs was more unpredictable in alcohol-dependent individuals with comorbid Personality Disorders. Another study by A'zami, Doostian, Mo'tamedi, Massah, & Heydari (2015) assessed dysfunctional attitudes and coping strategies among two groups of substance dependent and normal individuals, it was a causal-comparative study in which addicts selected through simple random sampling and was assessed on coping strategies questionnaire and dysfunctional attitudes scale. Total 100 addict men attending addiction rehabilitation centers and 100 ordinary individuals were matched with the addicts. Significant difference was found in terms of their dysfunctional attitudes and coping strategies.

Gjestad, Franck, Hagtvet & Haver (2011) have carried a study to see changes in alcohol consumption, dysfunctional attitudes and depression among female patients after treatment (psychotherapy & medication) for alcohol addiction. Assessment was done twice over a 2-year period on total 120 female patients using the alcohol use inventory, depression scale from the Symptom Checklist-90 and the dysfunctional attitude scale. Decrease in alcohol consumption, depression and dysfunctional attitude was observed after treatment on follow up.

Feldman, Harvey, Holowaty & Shortt (1999) explored alcohol use beliefs and behaviours among high school students, 62 randomly selected classrooms in three Canadian urban schools, 1236 Grade 9–13 students in which 39% were current moderate drinkers and 11% were current heavy drinkers. It was noted that beliefs associated with drinking was for enjoyment and to get in a party mood. Dysfunctional attitudes also found to be significant predicting factor for development of later problem drinking in college population, even when the effect for level of alcohol consumption, gender, age and depression was controlled (Heinz, Veilleux, & Kassel, 2009).

C) Automatic Thoughts and substance use

Automatic thoughts can be words or images that go through one's mind, are situation specific and considered as most superficial level of cognition. These thoughts often underlie emotions but occur quite rapidly with little awareness and people do not recognize them properly. Problem avoidance, ruminating negative events, holding a negative outlook on the world and on own personal future, and avoidance of responsibility have been associated with the patterns of substance abuse and their urge for drinking among individuals with alcohol abuse (Rohsenow et al., 1989).

D) Cognitive distortions and substance use

Cognitive distortions also referred as thinking errors that are prevalent in many forms of mental illness. These are systematic negative bias in the cognitive processing. Beck (1979) explained common errors associated strongly with emotional and behavioural disorders including substance abuse. These are all or nothing, catastrophization, emotional reasoning, labelling, mental filter, magnification/minimization, mind reading, overgeneralization, personalization, should and must statement, tunnel vision. Three defences are found in the form of cognitive distortions that are held by active alcoholics such as they cannot control drinking, drink excessively because of pain and that drinking relieves their pain, they usually do not realize that drinking becomes the source of pain and they mostly remains ignorant and hopeless about solving this problem.

There are very few studies that have examined the cognitive distortions among substance use individuals. One of the prospective study by Kirisci, Tarter, Vanyukov, Reynolds & Habeych (2004) found that Cognitive distortions in early adolescents (12-14 years) do not directly predict substance use disorder by young adulthood but mediates the association between neurobehavioral disinhibition (10-12 years) and marijuana use (age 16 years) which, in turn, predicts substance use disorder by age 19 years. Another study (Kempton, 1994) has examined cognitive distortions among adolescents (135), they were grouped in four category of depression group, conduct disorder group, depression and substance abuse group, conduct disorder and substance abuse group and group combining all three. Adolescents with multiple Axis I diagnoses scored highest on cognitive distortion.

COGNITIVE BEHAVIOUR APPROACH AND SUBSTANCE USE DISORDER:

Cognitive behavioural interventions consist of a wide array of learning principle based approaches and emphasize that behaviour is influenced by cognitive processes. CBT combines both cognitive and behavioural strategies, cognitive strategies basally include cognitive restructuring and behavioural strategies consists of coping with cravings for substances, cue exposure, contingency Management, relaxation training and promotion of non-drug related activities etc. RPT emphasize on functional analysis of cues related to drug use as well as systematic training to develop alternative responses to these cues. This approach is known as Relapse Prevention (RP) as it focuses on the identification and prevention of high-risk situations. These high risk situations make one highly vulnerable to engage in substance use behaviour (Marlatt & Donovan, 2005).

The evidence for the efficacy of CBT exists for a wide range of substances including alcohol, cannabis, amphetamines, cocaine, and heroin and injecting drug use (Botvin, Baker, Renick, Filazzola & Botvin, 1984; Feeney et al., 2004; Petitjean et al., 2014). CBT based studies that have proved their efficacy for treatment of Substance related cases have basically used diverse set of elements in the intervention program such as coping skill training, contingency management (Longabaugh & Morgenstern, 1999, Litt, Kadden, Cooney, & Kabela, 2003), life skills management (Botvin, Baker, Renick, Filazzola & Botvin, 1984). Petitjean et al., (2014)

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have used CBT manual of Carroll, (1998) for treatment of substance abuse. Khodayarifard (2010) used CBT for treatment of couple with substance abuse.

Individual CBT programs vary as per the degree of use of various components. A cognitive behavioural intervention manual for cocaine dependence includes components of functional analysis, behavioural strategies to avoid triggers, drug refusal and coping skills, and building problem-solving (Carroll, 1998). Evidence for the efficacy of CBT for substance use disorder is supported in meta-analytic reviews, with effect size estimations in the low moderate range using heterogeneous comparison conditions (Dutra et al., 2008) and large effect sizes compared to no-treatment control groups (Magill & Ray, 2009). The table below has summarised evidences in favour of CBT along with the CBT components used in research for intervention purpose and shows that most of the study have used behavioural strategies to deal with substance use disorder.

Table-3: Evidence in Favour of CBT for Substance Use Disorders and CBT Components Used for Intervention.

CBT Based Study	CBT Components Used in Substance Use Disorders	Results
A Randomized, Controlled Trial Of Combined Cognitive-Behavioural therapy Plus Prize-Based Contingency Management(CM) For cocaine Dependence Petitjeana et al., (2014)	<ul style="list-style-type: none"> • functional analysis • behavioural strategies to avoid triggers • drug refusal & coping skills • building problem-solving 	Both were effective but effectiveness of CM & CBT was greater than CBT alone
Alcohol Dependence: The Impact Of Cognitive Behaviour Therapy With Or Without Naltraxone On Subjective Health Status Feeney et al., (2004)	<ul style="list-style-type: none"> • Identification and modification of Alcohol Expectancies • Increasing Drinking Refusal Skills • Coping Skill Training • Problem Solving 	Both CBT+Naltraxone and CBT alone were equally effective in terms of subjective health status
Cognitive-Behavioral Couple Therapy Of Drug-Abuse In Iran Khodayarifarda , (2010)	<ul style="list-style-type: none"> • Relaxation Exercise • Problem Solving • Psycho education • Distraction Techniques • Cognitive Restructuring 	Effective on post assessment and follow up

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<p>Naltrexone And Cognitive Behavioral Therapy For The Treatment Of Outpatient Alcoholics: Results Of A Placebo-Controlled Trial. Anton et al., (2003)</p>	<ul style="list-style-type: none"> • Manual Guided CBT Focused On Coping Skill Training 	<p>Effectiveness of CBT & Naltraxone was greater than CBT & Placebo</p>
<p>A Cognitive-Behavioral Approach To Substance Abuse Prevention Botvin, Baker, Renick, Filazzola & Botvin (1984)</p>	<ul style="list-style-type: none"> • Peer Led And Teacher Led Interventions Using: • Social Skills • Communication Skills • Assertiveness Skills • Problem Solving • Relaxation Exercises 	<p>CBT was effective than no intervention</p>
<p>Coping Skills And Treatment Outcomes In Cognitive-Behavioral And Interactional Group Therapy For Alcoholism. Litt, Kadden, Cooney, & Kabela(2003)</p>	<ul style="list-style-type: none"> • Coping Skills Therapy 	<p>CBT was equally effective as Interactional Therapy in enhancing coping and drinking outcome</p>
<p>Cognitive-Behavioral Therapy For Substance Use Disorders Review Paper <u>Mchugh</u>, Hearon, Otto (2011)</p>	<ul style="list-style-type: none"> • Motivational Interventions • Contingency Management Strategies • Relapse Prevention with Functional Analysis 	<p>CBT was more effective than other treatment and no treatment</p>
<p>Cognitive-Behavioral Treatment With Adult Alcohol And Illicit Drug Users: A Meta-Analysis Of Randomized Controlled Trials Magill & Ray (2009)</p>	<ul style="list-style-type: none"> • Coping-Skills Training • Drug-Refusal Skills Training • Functional Analysis of Substance Use • Increasing Non use-Related Activities 	<p>CBT was effective than no treatment</p>
<p>Efficacy of Disulfiram And Cognitive Behavior Therapy In Cocaine-Dependent Outpatients Carroll et al., (2004)</p>	<ul style="list-style-type: none"> • Functional Analyses • Identifying And Coping With Cravings • Managing Thoughts About Drugs And Alcohol • Developing Effective Drug-Refusal Skills, Developing Problem-Solving Skills • Developing Emergency 	<p>Effectiveness of Disulfiram + CBT was greater than Disufiram + IPT, CBT + Placebo, IPT + Placebo</p>

	<p>Coping Plans</p> <ul style="list-style-type: none"> • Improving Decision-Making Skills 	
<p>Naltrexone And Coping Skills Therapy For Alcohol Dependence a Controlled Study O'malley, et al., (1992)</p>	<ul style="list-style-type: none"> • Coping Skill Training 	<p>Effectiveness of Naltraxone + Coping skill therapy was greater than Naltraxone + Supportive therapy. Naltraxone was effective than placebo Placebo</p>

DISCUSSION

Cognitive Behaviour interventions are found to be successful in treatment of substance use but still relapse rate is of serious concern. Majority of intervention based studies have basically worked on individual’s motivation level, interpersonal relationship and comprised array of behaviour components for intervention purpose and have given less attention to individuals’ deeper cognitions using cognitive techniques in treatment regime for substance abuse or dependence.

Cognitive therapy (CT) is a system of psychotherapy that attempts to reduce excessive emotional reactions and self-defeating behaviour by modifying the faulty or erroneous thinking and maladaptive beliefs that underlie these reactions. It helps in modification of underlying deep cognitive elements including schema, dysfunctional beliefs in terms of self rather than just focusing on superficial aspects of thinking. Similarly like other disorders, cognitive restructuring in the context of drug cues may be helpful in enhancement of skills even apart from the treatment setting (Otto, O’cleirigh, & Pollack, 2007). Cognitive theory is well validated in number of cognitive science studies, and cognitive therapy found to be effective in hundreds of randomized controlled trials across a wide range of psychiatric disorders and medical conditions (Beck, 2005). Studies have shown the effectiveness of CT helping patients not only to overcome disorders but also in prevention in relapse (Hollon et al., 2005). Therefore, as part of cognitive therapy, cognitive restructuring is considered as an important area of intervention.

There are studies focusing on restructuring superficial aspect of cognition only i.e. addictive beliefs using functional analysis as aim of cognitive intervention rather than modifying underlying dysfunctional cognitive structure which is often developed in early childhood and leads to difficulties in various other area of individuals’ life.

Intervention studies even haven’t made any attempt towards objective assessment of individuals’ deeper cognitive structure and therefore, the degree of change in underlying deeper cognition is also not estimated after treatment or intervention. These studies have not even discussed about the basic nature of common cognitive elements found among substance abuse individuals.

CONCLUSION

It is very well known that elements of cognition, feelings and behaviour are interconnected. These all elements influence each other equally. Underlying deeper cognitions such as schemas, dysfunctional assumptions, negative automatic thoughts and cognitive distortions all are essentials elements and have major role in influencing mood and subsequently substance taking behaviour. Identification and modification of underlying deeper cognitions can decrease the rate of relapse (Hollon et al., 1992). There is enough evidence in favour of CBT for treating various psychological disorders including substance use disorder but still reality of high rate of relapse specifically in case of substance use disorders cannot be ignored. Evidence for cognitive restructuring needs to be expanded and should also include research on identification of underlying cognitions in objective way using psychological measures. Besides, changes in cognitions also need to be assessed after cognitive restructuring as part of psychological intervention as CT claims on identification as well as modifications in cognitions which as a result lead to reduction in substance taking behaviour. Therefore, future intervention studies need to assess not only the end consequence i.e. reduction in substance use but also assess the mid process i.e. change in cognitions through which final or ultimate change takes place.

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