Research Article

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Factor Analysis of Coping Strategies among Subjects of Alcohol Dependence Syndrome: A Study at Tertiary Care Center

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Abstract

Objective: To assess successful adaptive coping strategies to handle craving among subjects with alcohol dependence syndrome.

Methodology: Alcohol dependent subjects on follow-up who were abstinent for a period of 1 month were assessed on coping strategies inventory to assess the strategies to remain abstinent. The study was done by purposive sampling method at a tertiary care centre over a period of 24 months.

Results: An exploratory factor analysis was used to study the structural framework of the items. Parallel analysis using Keeling's regression equation showed 8 factor model of the scale. Self-regulation, problem solving, avoidance, self-criticism, low emotional regulation & problem solving (mixed factor), catharsis, fantasizing and self-criticism mixed factor) & denial & problem confrontation (mixed factor) were important 8 factors used by the patients to maintain abstinence.

Conclusion: Self-regulation, Problem solving, avoidance which are the main coping strategies should be the incorporated into the main line of treatment to prevent relapse of alcohol dependence subjects.

Keywords: Coping strategies; Alcohol dependence syndrome; Factor analysis

Introduction

Coping is characterized as perpetually portraying an ability of cognitive and behavioural change in an effort to oversee particular external and internal demands that are assessed as saddling or surpassing the resources that an individual possesses. Active coping is the process of taking active steps to try to remove or circumvent the stressor or to ameliorate its effects. Avoidant coping generally involves removing oneself from experiencing or thinking about a stressful situation. Problem-focused coping involves suppressing the processing of competing channels of information in order to concentrate more fully on the challenge or threat at hand. Restraint coping is waiting until an appropriate opportunity to act presents itself, holding oneself back and not acting prematurely [1].

Coping technique utilized was the most noteworthy indicator of forbearance in treated dependent subjects rather than number of adapting procedures utilised post finishing twelve weeks of treatment [2]. Increased coping skills during treatment were a significant predictor for abstinence [3]. Coping, self-efficacy, positive expectancies and the abstinence violation effect were considered factors for relapse according to relapse prevention model [4], however only abstinence violation effect was seen to be significant independent predictors of relapse in later study [5]. Coping skills of alcohol dependent subjects are inferior to the coping skills of non-alcoholics particularly in situations that commonly pose a risk of relapse [6].

Avoidant coping has been found to foresee consequences related to alcohol. Low levels of avoidant coping have been identified with both increased amount of alcohol consumption and increased relapse rates proposing that an absence of any adapting system might be prescient of drinking [7]. Emotion focussed strategies have been conceptualized by Moos et al. [8] as avoidant adapting techniques as they don't attempt to determine the issue causing stress and has been discovered that individuals who have been abstinent from alcohol have been found to utilize more such emotion focussed procedures [9]. Mixed research is seen in supporting the assumption that avoidant coping is identified with expanded drinking.

Enhanced social and coping skills could prevent relapse in interpersonal high-risk situations (e.g., conflict with others) as well as ameliorate relapse risk in intrapersonal high-risk situations (e.g., boredom, loneliness, and depression) [10]. Coping skills have proven to be significant predictors for both alcohol consumption and for outcome among treated alcoholics, coping skills training aims to provide the patient with specific strategies to use adaptive skills to handle cravings [11]. Coping skill training also helps patients to feel less overwhelmed by urge-provoking stimuli and therefore are less likely to relapse [2].

Although coping skills training is routinely used in prevention and treatment of alcohol problems, coping research has suffered from a poor theoretical framework. Different patients use different strategies to handle craving. Clinically one may not be able to ask about all these strategies during the follow-up. Understanding the ways of handling coping is important in treatment. This would help the therapist to

tailor successful strategies for relapse prevention. Hence there is a need to systematically assess the craving handling strategies in subjects with alcohol dependence.

Methodology

The aim of the current study is to assess successful adaptive coping strategies to handle craving among subjects with alcohol dependence. The study is a cross sectional study conducted at Kasturba Hospital and Dr A.V. Baliga Memorial Hospital over a period of 24 months from September 2015 to September 2017. Purposive sampling was used for recruitment of patients. Patients who were on follow-up for alcohol dependence syndrome were recruited on out-patient basis. A total of 400 patients were recruited in the study. Inclusion criteria used for the study is male subjects who are above 18 years, able to read and write English or Kannada, diagnosis of alcohol dependence syndrome according to ICD 10 criteria by a consultant psychiatrist, abstinent from alcohol for a period of at least one month at the point evaluation. Exclusion criteria include any co morbid psychiatric illness, any debilitating physical illness, other substance dependence except tobacco.

Tools for the study include socio demographic proforma and Coping strategies inventory. Socio demographic proforma is semi structured proforma made by the researcher for collection of data such as age of 1st drink, duration of alcohol consumption, duration of abstinence from alcohol. Coping strategies inventory [12] is a 72-item self-report questionnaire. The scale is designed to assess strategies of thoughts and behaviors in response to a specific stressor. There are 14 subscales on the CSI which includes eight primary scales, four secondary scales and two tertiary scales. Factor structure for subscales is obtained using hierarchical rotation by Wherry et al. [13] and coping assessment literature by Tobin et al. [14]. The alpha coefficients for the CSI is 0.83. As only the English version of the questionnaire was available to the investigator, it was necessary to be translated to the vernacular language of the state, Kannada. Accordingly each of the items was translated into Kannada. The translated items together with the original questionnaires were given to language expert who carried

out corrections wherever required. The final Kannada version that has incorporated corrections was retained for the use in present study.

Procedure

Department and institution ethics committee clearance was taken. Patients were recruited into the study based on inclusion and exclusion criterion. Written informed consent was taken from the patient in the presence of a witness. Socio demographic details were taken and coping strategies inventory was administered to subjects who were abstinent at the time of assessment.

Factor analysis

Statistical package for social sciences (SPSS) 20.0 for windows was used for analysis of collected data. KMO test and Bartlett's test of sphericity was done to check the sampling adequacy. Principal component analysis was done on items of coping strategies to identify underlying factors. For identification of factors, Kaiser's criterion to retain Eigenvalues greater than unity, Cattell's scree plot inspection and Horn's parallel analysis were used. Varimax rotation with Kaiser Normalisation was done to generate rotated factors, Stevens's recommendation to suppress all values less than 0.4 was used [15-18].

Results

The sample characteristics have been summarized in Table 1. The age of the subjects ranges from 18-59 years and mean age was found to be 38.14 (12.4) years. The age of onset of first episode of alcohol consumption ranges between 15-45 years and mean age was found to be 23 (5.6) years. The age of onset of daily drinking ranges from 15-55 years and the mean age was found to be 27 (6.4) years, the number of days of alcohol consumption prior to abstinence ranges from 1-7 days per week and mean was found to be 3.8 days per week, the number days of abstinence at the time of assessment ranges from 30 days-1092 days (3 years) and mean was found to be 93.35 (141.8) days, units of alcohol consumption prior to abstinence ranges from 1 to 4 standard drinks per day and mean was found to be 1.37 standard drinks.

Variables	Mean (SD)
Age (years)	38.14 (12.4)
Age of 1st drink (years)	23 (5.6)
Age of daily drinking (years)	27.13 (6.4)
No. of days of alcohol consumption per week prior to abstinence	3.8 (2.2)
Abstinence duration at the time of assessment	93.35 (141.28)
Amount of alcohol consumption prior to abstinence(standard drink)	1.37 (0.51)

Table 1: Sample Characteristics.

Factor analysis of the coping strategies inventory

An exploratory factor analysis using Principal Component Analysis was used to study the structural framework of the items. The principal component analysis is a procedure which identifies underlying factors from the observed variables. Kaiser Meyer Olkin and Bartlett's test of

sphericity was used to examine the strength of relationships of variables as a part deciding whether factor analysis could be carried out. KMO sampling adequacy (0.883) and Bartlett's test of sphericity was found to be significant at $p < 0.00.1$ indicates the data is suitable for analysis (Table 2).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity Approx. Chi-Square	df	P
0.88	15966.71	2556	<0.001

Table 2: Tests for sample adequacy for Tests for sample adequacy for Principal Component Analysis (PCA).

Three criteria for retaining the number of components were considered: Kaiser's criterion to retain Eigenvalues greater than unity, Cattell's scree plot inspection for the point of inflexion, and Horn's parallel analysis. Parallel analysis was performed with criterion values replicating a randomly generated data set obtained using the regression equations developed by Keeling. Only factor loadings with an absolute value>.4 was interpreted. Orthogonal rotation (varimax rotation with Kaiser normalization) was initially done and revealed dual loading >.4 on more than 1 factor [19].

Principal component analysis using Kaiser's criterion to retain Eigenvalues showed that around 16 factors had values greater than 1, however Cattell's scree plot inspection for the point of inflexion showed 8 factors which was confirmed by Horn's parallel analysis (Figure 1). Parallel analysis using Keeling's regression equation showed only the first 8 Eigenvalues exceeded the criterion values for a randomly generated data matrix of the same size (400 patients × 72 items) (Tables 3-5).

Component number	Actual Eigenvalue from PCA	Criterion value from parallel analysisa	Decision
1	19.6	1.77	Accept
2	9.44	1.74	Accept
3	7.23	1.71	Accept
4	4.09	1.68	Accept
5	3.43	1.65	Accept
6	19.6	1.62	Accept
7	2.72	1.59	Accept
8	2.23	1.57	Accept
9	1.52	1.54	Denied

Table 3: Comparison of Eigenvalues from PCA and the corresponding criterion values obtained from parallel analysis. PCA: principal components analysis. Parallel analysis using Keeling's regression equation.

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.16	19.67	19.67	12.57	17.46	17.46
2	6.80	9.45	19.67	4.43	6.15	23.61
3	5.20	7.23	9.45	2.93	4.07	27.68
4	2.94	4.09	7.23	2.88	3.99	31.68
5	2.51	3.49	4.09	2.87	3.98	35.66
6	2.25	3.13	3.49	2.78	3.87	39.54
7	1.96	2.72	3.13	2.74	3.81	43.35
8	1.61	2.24	2.72	2.33	3.24	46.58
9	1.52	2.12	2.24	2.20	3.06	49.65
10	1.43	1.98	2.12	2.00	2.78	52.43

11	1.35	1.87	1.99	1.76	2.45	54.89
12	1.28	1.77	1.87	1.70	2.37	57.26
13	1.19	1.66	1.77	1.70	2.36	59.63
14	1.15	1.60	1.66	1.57	2.19	61.81
15	1.08	1.50	1.60	1.56	2.18	63.99
16	1.06	1.47	1.50	1.45	2.02	66.01

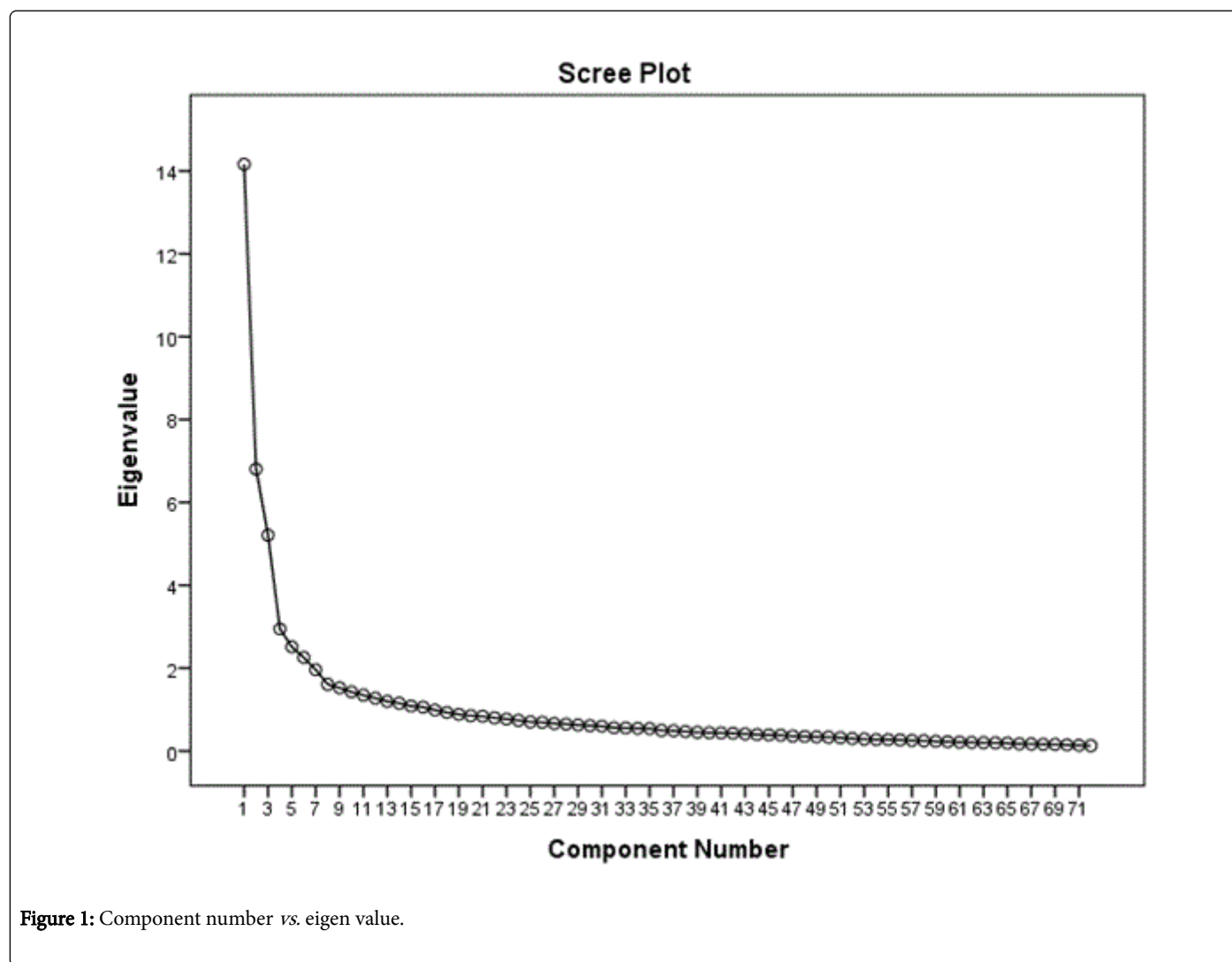**Table 4:** Total variance explained.

Figure 1: Component number *vs.* eigen value.

Factors analysis for coping strategies inventory has shown 8 factors which are

- Factor 1 Self-regulation: Variance for this factor was 17.46%. Items such as CSI 62 (I wished I could have changed what happened), CSI 10 (I looked for the silver lining, so to speak; tried to look on the bright side of things), CSI30 (I wished that the situation would go away or somehow be over with) had high factor loading. This factor had 24 strategies and most of the strategies are related to self-regulation.

- Factor 2 Problem Solving: Variance for this factor was 6.14%. Items such as CSI57 (I worked on solving the problems in the situation), CSI66 (I went over the problem again and again in my mind and finally saw things in a different light), CSI2 (I tried to get a new angle on the situation) had high factor loading. This factor had 8 strategies and most of the strategies are related to problem solving.

- Factor 3 Avoidance: Variance of this factor 3 was 4.073%. Items such as CSI 32(I avoided being with people.) CSI 5(I slept more than usual) had high factor loading. This factor had 5 strategies and most of them were related to avoidance.

- Factor 4 Self-criticism: Variance of the factor 4 was 3.98% Items such CSI15 (I realized that I brought the problem on myself) and CSI23 (I blamed myself) had high factor loading. This factor had 4 strategies and most of them were related to self-criticism.

- Factor 5 (Mixed factor) Low emotional regulation and problem solving: Variance of this factor was 3.97%. Items such CSI 45(I avoided the person who was causing the trouble) and CSI 67(I was angry and really blew up) had high factor loading. This factor had 4 strategies and the strategies were mix of both low emotional regulation and problem solving.

- Factor 6 Catharsis: Variance of this factor was 3.87% Items such CSI35 (I let my feelings out somehow), CSI 18 (I told myself things that helped me feel better) had high factor loading. This factor had 4 factors and most of the factors were related to catharsis.

- Factor 7 (Mixed factor)-Self-criticism and fantasizing: Variance of this factor was 3.80%. Items such CSI 70 (I thought about fantastic or unreal things that made me feel better) CSI 71 (I told myself how stupid I was) had high factor loading. This factor had 3 strategies and were a mix of both self-criticism and fantasizing.

- Factor 8 (Mixed factor)-Denial and problem confrontation: Variance of this factor 8 was 3.23%, CSI 53 (I made light of the situation and refused to get too serious about it.), CSI41(I knew what had to be done, so I doubled my efforts and tried harder to make things work) had high factor loading. This factor had 3 strategies and were a mix of both denial and problem confrontation.

Factor	Variables				Eigenvalues	Variance
Factor loading (>.4)						
1 Self-regulation	62(.8) 10(.7) 30(.7) 31(.7) 34(.7) 63(.7)	61(.6) 39(.6) 65(.6) 8(.6) 24(.6) 47(.6)	19(.6) 56(.5) 54(.5) 46(.5) 16(.5) 6(.5)	60(.5) 64(.5) 4(.5) 13(.5) 43(.5) 21(.4)	19.6	17.46
2 Problem solving	48(.7),40(.7),66(7),52(.7),57(.5),58(.5),54(.5),2(.4)				9.44	6.14
3 Avoidance	32(7),68(6),5(.5),69(.4)				7.23	4.07
4 Self-criticism	15(.6),23(.6),28(.6),36(.5)				4.09	3.99
5 (Mixed) Low emotional regulation and problem solving	45(.6),67(.6),4(.5),55(.4)				3.43	3.98
6 Catharsis	35(.7),18(.6),33(.4),59(.4)				3.13	3.87
7 (Mixed) Fantasizing and self-criticism	72(7),70(.6), 71(.5)				2.72	3.80
8 (Mixed) Denial and problem confrontation	53(.7),41(.5),38(.5)				2.23	3.23

Table 5: Summary of factor analysis.

Discussion

The present study has been conducted in a tertiary care hospital where patients have been previously admitted for alcohol dependence syndrome and have been on follow up for the same. The mean age of patients in the study is 38.14(12.4), Study done by Sarkar et al. [20] which has been done in tertiary care centre showed highest prevalence of alcohol dependence among 30-40 year age group. Neufeld et al. [21] study found that use of alcohol in India peaked in the fifth decade of life compared to the second decade of life in the United States. Sarkar et al. [20] study also showed that majority of the sample have age of 1st alcohol consumption in the age group of 20-29 years. Current study showed days per week of alcohol consumption to be 3.8(2.2) days

which has finding similar to study done by Gupta et al. [22] which has reported that over 50.6% of its sample having alcohol consumption four or more days per week and 32.8% reported drinking six or more days per week. This denotes that current sample alcohol consumption status is in line with the literature reviewed. Factors analysis of the scale has shown 8 subscales which include self-regulation, problem solving, avoidance, self-criticism, low emotional regulation and problem solving (mixed factor), catharsis, fantasizing and self-criticism (mixed factor) and denial and problem confrontation (mixed factor). The hierarchical factor structure of coping strategies inventory by Holroyd et al. [23] had shown that there are eight primary factors, four secondary factors and two tertiary factors. This indicates that the scale adapted for alcohol dependence individuals is similar to the original scale with respect to factor structure.

The results from the factor analysis showed self-regulation, problem solving and avoidance are the most important factors to maintain abstinence. Study by Naqv et al. [24] has shown that the cognitive regulation strategy of focusing on long-term negative consequences reduces self-reported cue-induced alcohol craving and had lesser relapse rates among alcohol dependence subjects and social drinkers. It was also seen in the study that self-regulation helped in decreased in food craving which lead to hypothesis that this common factor functions to regulate all appetitive emotional states, including food craving as well as craving for alcohol.

Study by Merrill and Thomas, [25] showed that problem-focused coping tends to be linked with lower levels of alcohol. Study by Cooper et al. [26] found that greater use of problem solving method of coping was associated with less alcohol consumption, controlling for the effects of alcohol expectancies and drinking to cope. Hussong [27] found that problem solving coping buffered against risk for heavy drinking related to both school related stress and social adjustment difficulties. Aldridge-Gerry et al. [28] also found that problem-focused coping protected against the negative effects of stress on drinking behavior. Additional studies support problem focused coping as a protective factor against alcohol-related problems among both adolescents and young adults [29].

Study conducted by Opalach et al. [30] to assess the coping strategies among alcohol dependent subjects, it was found that a combination of emotion and avoidance-oriented styles is the most common coping strategy followed by mixed styles. Avoidance-oriented style was the single most common style and task oriented style was least common style used coping strategy, however positive expectancies for alcohol, an avoidant coping preferences and stress were predictive of drinking to cope, alcohol use and alcohol related problems, hence it can be hypothesized that although avoidant coping may predict drinking behavior, tending to use avoidant coping strategies is likely less relevant for when one uses drinking specifically as a coping strategy on any given occasion. Study done by Nadkarni et al. [31] which was an exploratory qualitative study aimed at understanding the explanatory models of alcohol use disorders in India showed behaviours such as avoidance, substitution, distraction, involvement in religious activities, support from AA/ Friends/family, restricting means to buy alcohol and anger management were effective coping strategies to remain abstinent.

Coping strategies such as self-regulation, problem solving and avoidance which are most common strategies used must be incorporated into main line of treatment of alcohol dependence syndrome to prevent relapse. Strategies must be tailored maid by the therapist depending on the personality traits as one size doesn't fit all.

It should also be emphasized that the therapist must also emphasize on mixed strategies in case of high risk strategies. Coping to consume alcohol should be emphasized as maladaptive coping strategy.

The total variance explained by the factors was only around 48%, personality traits related to coping and pharmacological treatments were not controlled hence their interaction with other treatment modalities on status of alcohol consumption cannot be commented are the main limitation of the study. Descriptive studies on factors which help in maintain abstinence, difference in coping strategies before and after treatment, psycho social factors which maintain abstinence and relationship between personality traits and coping strategies needs further research.

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