

COGNITIVE IMPAIRMENT AS A CORRELATE OF EMOTIONAL DYSREGULATION AMONG MIDDLE-AGED MEN WITH ALCOHOL DEPENDENCE**Sumit Kumar Gakkhar¹**¹Assistant Professor, Department of Psychiatry, Jaipur National University Institute for Medical Sciences and Research Centre, Jaipur

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Corresponding author: Dr. Sumit Kumar Gakkhar

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Abstract

Background and Aims: Impaired cognition and poor control over emotion are both well described in alcohol dependence, yet the two are usually studied separately and it is not known whether they move together within the same patient. This study measured the level of cognitive function and emotional dysregulation in middle-aged men with alcohol dependence and tested whether the two are related.

Materials and Methods: One hundred and twenty consecutively attending male outpatients aged 45–60 years, diagnosed with alcohol dependence by ICD-10-DCR criteria and dependent for at least five years, were recruited into this hospital-based cross-sectional study. Participants with comorbid psychiatric illness, intellectual disability or dementia were excluded. Each completed a sociodemographic and clinical pro forma, the Montreal Cognitive Assessment (MoCA) and the 18-item Difficulties in Emotion Regulation Scale–Short Form (DERS-SF). Data were analysed with descriptive statistics, the Kruskal–Wallis H test, Pearson correlation and linear regression.

Results: The mean MoCA score was 23.66 ± 5.06 and 72 participants (60.0%) scored below the normal cut-off of 26, indicating mild cognitive impairment. The mean DERS-SF score was 26.94 ± 7.65 , reflecting a high level of emotional dysregulation. MoCA score differed significantly across educational strata ($H = 9.74$, $df = 3$, $P = 0.021$) and correlated negatively with age ($r = -0.224$, $P = 0.014$). No sociodemographic variable was associated with DERS-SF score. Linear regression showed a significant inverse association between MoCA and DERS-SF scores ($B = -0.776$, $\beta = -0.513$, $R^2 = 0.264$, $F = 42.23$, $P < 0.001$).

Conclusion: Cognitive impairment and emotional dysregulation are inversely related in men with alcohol dependence. Screening for one may help identify the other, and remediating either may improve treatment outcome.

Keywords: Alcohol Dependence; Cognitive Impairment; Emotional Dysregulation; Difficulties In Emotion Regulation Scale; Montreal Cognitive Assessment; Executive Function.

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Introduction

Alcohol dependence is a chronic relapsing condition whose course is shaped as much by what happens in the mind of the drinker as by the pharmacology of the substance itself. Two mental domains have attracted sustained attention. The first is emotion regulation, the set of processes through which a person influences which emotions arise, when they arise, and how they are experienced and expressed. When these processes fail repeatedly the resulting state is called emotional dysregulation, and it has been linked to outcomes across the whole spectrum of psychiatric illness [1,2].

Patients with alcohol dependence consistently report difficulty in accepting distress, in acting

purposefully while upset, and in reaching for strategies that reduce unpleasant affect [1,3]. These difficulties are not simply a by-product of drinking. Emotion-regulation skills measured at the start of treatment predict how much alcohol a patient will consume both during and after cognitive behavioural therapy [4]. Indian data, although limited, point in the same direction; a study of socio-emotional functioning found more intense anger expression and less adaptive affect management among patients with severe dependence [5].

The cognitive picture is equally well documented. Sustained heavy drinking injures the frontal lobes, the limbic system and the cerebellum, producing

deficits in executive function, episodic memory and visuospatial ability [6,9]. A meta-analysis of neuropsychological studies confirmed that these deficits are broad and persist well beyond the withdrawal period [7]. Work from India has described impairment across virtually every cognitive parameter in alcohol-dependent men [8].

What is far less clear is how the two domains behave in relation to one another within the same patient. Theoretically the link should be close. Executive control is delivered by a distributed cognitive control network [10], and the medial prefrontal and anterior cingulate hubs of that network are the same structures that appraise, label and dampen emotional signals [11]. Executive weakness predicts a poorer affective course in geriatric depression [12], while affective dysregulation is now recognised as an early marker of incipient neurodegeneration [13]. Shared and distinct mechanisms have been mapped in schizophrenia and depression [14]. In substance dependence specifically, disordered emotional processing degrades decision making [15], and executive impairment is a recognised predictor of relapse [16].

Despite this convergence, the two constructs are usually measured in separate studies of alcohol dependence and their joint behaviour is seldom described. The gap matters clinically. If cognitive capacity and emotional control vary together, then a patient identified as cognitively impaired is also a patient at risk of affective instability, craving and relapse; cognitive remediation then becomes a plausible route to better emotional outcomes, and emotion-focused therapy a plausible route to better cognitive engagement. Middle-aged patients are of particular interest, because the fifth and sixth decades are when alcohol-related cognitive change first becomes measurable while still being potentially reversible.

This preliminary study was therefore designed to describe the level of cognitive functioning and of emotional dysregulation in a consecutive sample of middle-aged men with alcohol dependence, and to examine whether the two are associated. We hypothesised that poorer cognitive performance would be accompanied by greater difficulty in regulating emotion.

Materials and Methods

Study design and setting: This was a hospital-based, cross-sectional, observational study carried out over six months in the outpatient department of a tertiary care teaching hospital in southern India. The protocol was approved by the institutional ethics committee before recruitment began, and written informed consent was obtained from every

participant after the purpose and procedures had been explained in the local language.

Participants: Consecutive male patients attending for routine follow-up were screened. Inclusion criteria were an age between 45 and 60 years, a diagnosis of alcohol dependence syndrome made by a qualified psychiatrist according to ICD-10-DCR criteria, and a documented dependence pattern of at least five years' duration. Patients with any comorbid psychiatric diagnosis, intellectual disability, diagnosed dementia, delirium, a history of significant head injury, or current withdrawal symptoms were excluded, as were those judged unfit to complete the assessments. Assuming a moderate effect size, a two-tailed alpha of 0.05 and 80% power, the required sample size was calculated as 112. Of 156 patients screened, 120 fulfilled the criteria and completed both instruments.

Assessment tools: Sociodemographic and clinical pro forma. A semi-structured pro forma recorded age, gender, religion, level of formal education, socioeconomic status, family type and duration of dependence.

Montreal Cognitive Assessment (MoCA). The MoCA is a ten-minute bedside screening instrument developed to detect mild cognitive impairment [17]. It samples visuospatial and executive ability, naming, attention and working memory, language, abstraction, delayed recall and orientation.

Total scores range from 0 to 30, and a score of 26 or above is conventionally regarded as normal. The instrument has been used successfully to screen patients with substance use disorders [18,19] and has acceptable validity in general psychiatric settings [20]. The version validated for use in the local language was administered by a single trained rater.

Difficulties in Emotion Regulation Scale–Short Form (DERS-SF). The original 36-item DERS was developed to capture the multidimensional nature of emotion regulation [21], and the 18-item short form retains its six domains: non-acceptance of emotional responses, difficulty engaging in goal-directed behaviour, impulse control difficulty, lack of emotional awareness, limited access to regulation strategies, and lack of emotional clarity [22]. Each item is rated from 1 (almost never) to 5 (almost always), higher totals indicating poorer regulation. The short form shows internal consistency coefficients between 0.78 and 0.91 and concurrent validity comparable to the parent scale.

Statistical analysis: Data were analysed using SPSS version 22 (IBM Corp., Armonk, NY). Continuous variables are summarised as mean $\pm$ standard deviation and categorical variables as

frequency and percentage. Because MoCA and DERS-SF scores were not normally distributed across the unequal sociodemographic strata, group differences were tested with the Kruskal–Wallis H test. The relationship of age with each score was examined using Pearson correlation, and the association between cognitive function and emotional dysregulation was modelled by simple linear regression with DERS-SF total score as the dependent variable and MoCA total score as the predictor. A two-tailed P value below 0.05 was accepted as statistically significant.

Results

All 120 participants were men. Their mean age was 51.60 ± 4.56 years (range 45–60). The mean MoCA score was 23.66 ± 5.06 (range 8–30), and 72 participants (60.0%) scored below the normal cut-off of 26, placing the sample in the range of mild cognitive impairment.

The mean DERS-SF score was 26.94 ± 7.65 (range 13–44), indicating a substantial level of emotional dysregulation. Table 1 sets out the sociodemographic and clinical profile of the sample.

Table 1: Sociodemographic and clinical characteristics of the study sample (n = 120)

Variable	Category	Frequency (%) / Mean $\pm$ SD
Gender	Male	120 (100.0)
Age (years)	45–60	51.60 ± 4.56
Socioeconomic status	Lower	77 (64.2)
	Middle	39 (32.5)
	Upper	4 (3.3)
Education	Uneducated	33 (27.5)
	Primary school	33 (27.5)
	Middle school	39 (32.5)
	High school	15 (12.5)
Religion	Hindu	116 (96.7)
	Muslim	2 (1.7)
	Christian	2 (1.7)
Family type	Nuclear	47 (39.2)
	Joint	73 (60.8)
MoCA total score	8–30	23.66 ± 5.06
Cognitive impairment (MoCA < 26)	Present	72 (60.0)
DERS-SF total score	13–44	26.94 ± 7.65

MoCA – Montreal Cognitive Assessment; DERS-SF – Difficulties in Emotion Regulation Scale–Short Form; SD – standard deviation.

Table 1 shows a sample drawn overwhelmingly from the lower socioeconomic stratum, with almost two-thirds of participants in that group and only four men in the upper stratum. Formal education was limited: more than half had either no schooling or only primary schooling, and just 15 men had reached high school. Almost all participants were

Hindu and three in five lived in joint families, a distribution that mirrors the predominantly rural catchment of the hospital. Clinically, the sample sat just below the MoCA cut-off on average, with three-fifths of participants scoring in the impaired range, while DERS-SF totals were well above the midpoint of the scale.

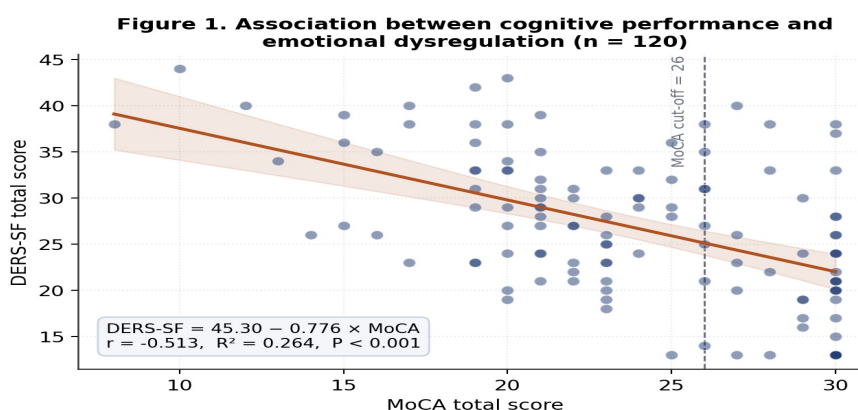


Figure 1. Scatter plot of MoCA total score against DERS-SF total score with fitted regression line and 95% confidence band (n = 120).

Figure 1 displays the central finding of the study. The scatter runs clearly from upper left to lower right: participants with the weakest cognitive performance recorded the highest DERS-SF totals, while those scoring at or above the cut-off of 26 clustered in the lower half of the emotional dysregulation range. Simple linear regression gave the equation $\text{DERS-SF} = 45.30 - 0.776 \times \text{MoCA}$,

with a standard error of 0.119, a standardised coefficient of -0.513 and $t = -6.50$.

The model explained 26.4% of the variance in emotional dysregulation ($R^2 = 0.264$, $F = 42.23$, $df = 1$, $P < 0.001$). Each additional MoCA point corresponded to roughly a three-quarter point fall in DERS-SF score.

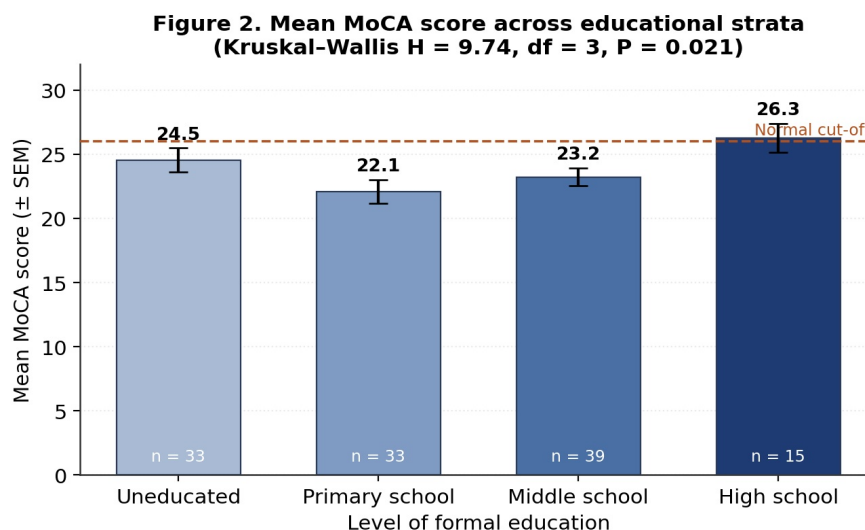


Figure 2. Mean MoCA total score across the four educational strata, with standard error bars and the normal cut-off marked.

Figure 2 shows how cognitive performance varied with formal education. The Kruskal–Wallis test confirmed a significant difference across the four strata ($H = 9.74$, $df = 3$, $P = 0.021$). Men who had completed high school achieved the highest mean score, 26.27 ± 4.33 , the only group whose average sat above the normal cut-off. Those with primary

schooling scored lowest at 22.09 ± 5.34 , with the uneducated and middle-school groups intermediate at 24.55 ± 5.36 and 23.23 ± 4.40 respectively. The gradient was therefore not strictly linear, but the advantage of the best-educated group over every other stratum was consistent and statistically robust.

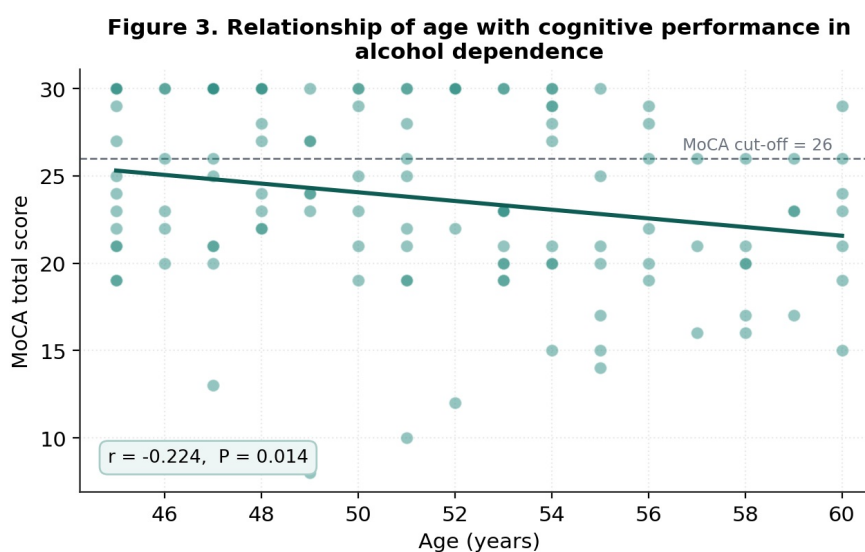


Figure 3. Scatter plot of age against MoCA total score with fitted regression line ($n = 120$).

Figure 3 plots cognitive performance against age across the narrow 15-year band sampled. Despite

this restricted range, a significant inverse relationship emerged: Pearson correlation between

age and MoCA score was -0.224 ($P = 0.014$), so that older participants performed less well. The fitted line falls by approximately 0.25 MoCA points per additional year of age, amounting to a drop of nearly four points across the full span of the

sample. Scatter around the line remained wide, indicating that age accounted for only a small proportion of the variance. Age was not significantly correlated with DERS-SF total score ($r = 0.166$, $P = 0.070$).

Table 2: Kruskal–Wallis comparison of MoCA and DERS-SF scores across sociodemographic groups (n = 120)

Variable	Category	n	MoCA mean rank	H (P)	DERS-SF mean rank	H (P)
Religion	Hindu	116	61.62	3.78 (0.151)	60.20	3.15 (0.207)
	Muslim	2	33.00		39.75	
	Christian	2	22.75		98.75	
Socioeconomic status	Lower	77	61.58	0.32 (0.851)	61.62	0.82 (0.665)
	Middle	39	59.14		57.19	
	Upper	4	53.00		71.25	
Family type	Nuclear	47	59.53	0.06 (0.806)	61.44	0.06 (0.813)
	Joint	73	61.12		59.90	
Education	Uneducated	33	67.76	9.74 (0.021)	59.82	0.26 (0.967)
	Primary school	33	50.03		61.73	
	Middle school	39	55.88		61.49	
	High school	15	79.57		56.73	

Degrees of freedom: 2 for religion and socioeconomic status, 1 for family type, 3 for education. MoCA – Montreal Cognitive Assessment; DERS-SF – Difficulties in Emotion Regulation Scale–Short Form.

Table 2 compares the two scores across every sociodemographic stratum. Education was the only variable that distinguished cognitive performance, with mean ranks climbing from 50.03 in the primary-school group to 79.57 among high-school-educated men ($H = 9.74$, $P = 0.021$). Religion, socioeconomic status and family type produced no significant difference in MoCA score, although the

very small Muslim and Christian subgroups make those comparisons unstable. Emotional dysregulation was strikingly uniform: no sociodemographic variable came close to significance, education yielding an H of only 0.26. Difficulty in regulating emotion therefore appeared to be a feature of the illness rather than of social background.

Figure 4. Profile of DERS-SF domain scores in participants with and without cognitive impairment

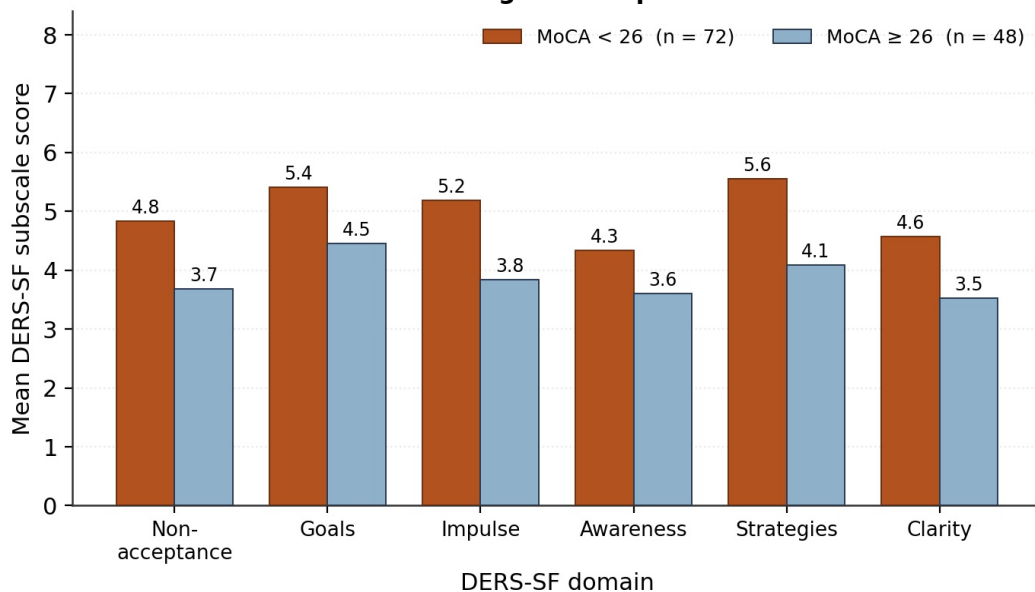


Figure 4: Mean DERS-SF domain scores in participants with (MoCA < 26) and without (MoCA ≥ 26) cognitive impairment.

Figure 4 breaks the DERS-SF total into its six constituent domains and compares participants

above and below the MoCA cut-off. Cognitively impaired men scored higher on every domain, and

the overall difference in total score was significant (29.29 ± 6.64 versus 23.42 ± 7.78 , $U = 2495.5$, $P < 0.001$). The widest separations appeared for limited access to regulation strategies (5.6 versus 4.1) and for impulse control difficulty (5.2 versus 3.8), the two domains most dependent on executive resources. Emotional awareness showed the narrowest gap (4.3 versus 3.6), suggesting that the deficit lies less in noticing emotion than in managing it.

Discussion

This preliminary study set out to place cognitive function and emotional dysregulation side by side in the same group of patients with alcohol dependence, and the central result is straightforward: the two vary inversely. Each additional point on the MoCA was associated with a fall of roughly three-quarters of a point on the DERS-SF, and cognitive performance alone accounted for just over a quarter of the variance in emotional dysregulation. For a single bedside screening score, that is a substantial share.

The degree of impairment observed deserves comment. Three out of five participants scored below the MoCA cut-off at a mean age of just 51 years. Population studies from India have not reported cognitive impairment on anything like this scale in the fifth decade of life [25], which suggests the finding reflects the illness rather than normal ageing. The result is consistent with the broader literature describing persistent deficits in executive function, memory and visuospatial ability after sustained heavy drinking [6,7]. Mean DERS-SF scores were correspondingly high, matching earlier reports that patients with alcohol dependence struggle to tolerate distress and to access effective regulation strategies [1,3].

A plausible neurobiological account links the two findings. The frontal lobes, limbic structures and cerebellum are among the region's most vulnerable to alcohol-induced injury [9], and these same regions constitute the cognitive control network that supports executive function [10]. Medial prefrontal and anterior cingulate cortex sit at the intersection of that network and the circuitry of emotional appraisal [11].

Damage there would be expected to impair cognition and emotion regulation simultaneously, which is precisely what the domain profile in this study suggests: the largest gaps between impaired and intact participants appeared on the strategies and impulse subscales, both of which make heavy demands on executive control, while emotional awareness differed least.

The direction of causation cannot be settled by a cross-sectional design, and the theoretical literature is genuinely divided. Cognitive models hold that

appraisal shapes affect, whereas affect-infusion accounts propose that mood biases cognitive processing.

A reciprocal reading fits this dataset best. Weak executive control leaves the patient unable to reappraise or inhibit an emotional impulse; the resulting distress drives further drinking; continued drinking deepens the cognitive injury.

Dysregulated affective processing is already known to degrade decision making in substance dependence [15], and emotion-regulation deficits measured before treatment predict subsequent alcohol consumption [4], while executive weakness predicts relapse [16]. The vicious cycle is therefore supported from both directions.

Education emerged as the only sociodemographic variable related to cognition, with the high-school-educated group alone scoring above the cut-off. This is consistent with the cognitive reserve hypothesis, under which greater educational attainment buffers the behavioural expression of underlying pathology and slows measurable decline [24]. The inverse correlation between age and MoCA score across a narrow 15-year band also fits established patterns of age-related slowing in processing speed and executive function [23], likely accelerated here by alcohol. Notably, no sociodemographic factor predicted emotional dysregulation, reinforcing the impression that it is intrinsic to the dependence syndrome.

The clinical implications are practical. The MoCA takes ten minutes, requires no specialist equipment and performs adequately in substance use populations [18,19]; a low score should prompt attention to emotional as well as cognitive management. Conversely, patients presenting with marked affective instability may warrant cognitive screening, since affective dysregulation can herald cognitive decline [13] and executive impairment shapes the affective course of other psychiatric disorders [12]. Cognitive remediation and emotion-focused relapse prevention may reinforce each other, and comparable relationships in schizophrenia and depression [14] suggest the principle is trans diagnostic.

Limitation

The cross-sectional design precludes causal inference, and the absence of a healthy control group limits interpretation of impairment levels. Recruitment from a single tertiary centre introduces referral and selection bias, the sample was exclusively male, and brief screening instruments cannot substitute for detailed neuropsychological testing.

Conclusion

In middle-aged men with alcohol dependence, cognitive impairment and emotional dysregulation are common and inversely related, with cognitive performance explaining roughly a quarter of the variance in emotion regulation difficulty. Education appears protective of cognition, while emotional dysregulation is independent of social background and seems intrinsic to the dependence syndrome. These findings argue for routine screening of both domains in addiction clinics, since a deficit in one flags risk in the other. Longitudinal studies with control groups and full neuropsychological batteries are needed to establish the direction of the relationship and to test whether remediating either domain improves treatment outcome.

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