A clinical study of stress in alcohol use disorder

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Background— *Stress is studied with special interest in alcohol dependence. It is known to affect the prognosis of this disorder. Till date mutual relationships between stress and alcohol have been investigated less with alcohol dependence syndrome and there is hardly any record from North East India.*

Methods— *Using Perceived Stress Scale, levels of stress among 60 alcohol-dependent in-patients selected through convenience sampling techniques were measured after the period of detoxification (on 2nd week of admission). Analysis was done to examine association of stress and alcohol as well as relationships of stress with other socio-demographic and alcohol-related variables.*

Results— *A significant associations between level of stress and severity of alcohol dependence. Individuals with higher PSS scores were more severely dependent. Stress and alcohol dependence was found to be highly correlated. The Pearson Correlation Half Matrix revealed that PSS was significantly positively correlated with SADQ.*

Conclusion *– The findings of the study point towards a strong association between stress and severity of alcohol dependence in individuals with alcohol dependence. All the factors namely level of stress and severity of alcohol dependence are correlated.*

Keyword: *Perceived Stress Scale(PSS), Severity of Alcohol Dependence Questionnaire(SADQ)*

I. Introduction

Alcohol is beverage with multiple objective uses. There are three main uses depending on its physical properties: nutritional use, medicinal use and use as an intoxicant. The use of alcohol as a gift and for sacral purposes are examples of the derived uses that are based on its cultural meanings rather than on its physical properties. In consuming alcohol, all the three effects of nutrition, medicine and intoxication interact simultaneously. Thus the different uses interact on the level of drinking behaviour without distinct boundaries and in overtime, excessive consumption of alcohol can lead to the development of many chronic diseases and other serious health problems.

There is much evidence to show that many people drink to help deal with stress and depressive thoughts. It reveals that alcohol can be an easy coping mechanism. There are two potential problems in using this coping mechanism. Firstly, self-medicating with alcohol can become self-perpetuating. Underlying anxiety leads to increased alcohol use, which changes the physiology of the brain and leads to a depletion of the neurotransmitters that it needs to reduce anxiety naturally. Therefore, the individual feels more anxious and needs more alcohol to 'numb' their anxiety. In the long term, this can lead to an individual becoming tolerant of alcohol – that is, they need increasingly large amounts of drink to experience the same reduction in their anxiety. The second problem with using alcohol to self-medicate is that it is difficult to maintain exactly the amount of alcohol needed to reduce the negative feelings. Keeping the optimum balance of alcohol to reduce anxiety is almost impossible because the effect of alcohol on the brain is such that after the initial 'euphoria' or stimulation from the first drink, alcohol acts as a depressant and the feelings of anxiety may rapidly return. Increased drinking to cope with those feelings leads to a rapid increase in the levels of alcohol in the blood and may become counter-productive. The problem with drinking to relieve depression is similar to the problems described above with anxiety. Regular drinking changes the chemistry of the brain and, of particular relevance here, depletes the levels of the neurotransmitter serotonin. This leads to the cyclical process of drinking to relieve depression, becoming more depressed as levels of serotonin become more depleted, thus needing more alcohol to medicate the depression. Increased alcohol consumption can also affect social relationships and work life, which in turn can contribute to depression. Alcohol depresses the central nervous system, and this can have a disinhibiting effect which can reveal or amplify our underlying feelings. This is one of the reasons that many people become angry or aggressive in drunken state [1].

Despite of high correlation between depression and stress, limited study has been done to see the effect of depression to alcohol dependence in this part of India. Moreover a lot of socio-cultural factors influence a person's attitude towards alcohol and other related psychoactive substance substances, which may affect the

associated acceptance-rejection, guilt, feelings of incompetence and inadequacy etc. Again the stress perceived by an individual has impact of socio cultural factors that influences ones's life from childhood till old age.

Considering the clinical and theoretical importance of stress in the course of alcohol dependence, the present study was designed to assess stress in individuals with alcohol dependence and to see the association between stress and alcohol dependence.

II. Materials And Methods
Site of Study:
This was a cross sectional study done at LGB Regional Institute of Mental Health, Tezpur. This institute is a tertiary care institute providing mental health facility to the whole of North-East region, for treatment of alcohol and other substance disorders.
Universe of study:
The universe of the study consists of all the patients fulfilling the exclusion and inclusion criteria with alcohol dependence admitted in indoor services of LGBRIMH during the study period.
Study design:
Cross sectional observational study.
Sample size:
The sample size consists of 60 subjects.
Duration of study:
The duration of the study was for a period of one year .
Sampling method
Convenience sampling method was used for the selection of sample.
Selection criteria:
Inclusion criteria:
• Alcohol dependence according to ICD-10 DCR (F10.2).
• Age - 18 – 60 years.
• Treatment naive for depression.
• Literate persons.
• Informed consent.
Exclusion criteria:
• Any co-morbid psychiatric disorders other than alcohol dependence (e.g., manic episodes, psychosis , other substance dependence except nicotine) on the basis of clinical observations and results of the MINI International Neuropsychiatric Interview plus 6.0
• Severe physical conditions like complications due to diabetes, hypertension, peripheral neuropathy, arthritis, cirrhosis etc.

Tools for assessment:
• Semi-structured study proforma containing proforma for socio demographic variables, alcohol related and other clinical variables.
• MINI International Neuropsychiatric Interview plus 6.0[5].
• For assessing severity of alcohol dependence-
  Severity of Alcohol Dependence Questionnaire (SADQ[2].
• For assessing Stress-
  Perceived Stress Scale (PSS)[3].

III. Methodology:
Patients who were diagnosed as Alcohol dependence syndrome and fulfilling inclusion criteria were selected for study. Interviews were conducted in 2nd week of their admission after detoxification. A written informed consent was taken from the patients before collecting the data, explaining them the objectives and the procedure of the study in detail. After getting informed consent, patient's socio-demographic and clinical details were collected with the help of semi-structured study proforma. Following this, patients scored on SADQ, PSS.

Statistical analysis
Statistical Package for Social Science version 20 (SPSS 20) was used in the present analysis. Baseline data was statistically processed by frequency, percentage and presented by suitable graphs. All continuous variables were reasonably assumed to be normal because sample size was 60. Data were presented as arithmetic means and standard deviations (mean ± SD) for parametric as well as ordinal variables such as PSS etc. For purely qualitative nominal or non-parametric variables, count and percentage was used. Usually correlation of two parametric variables measured by truely measurable scale is quantified by Pearson correlation. Since

Perceived Stress etc. like any other likert or subjective scale, it was done by Spearman correlation beside Pearson correlation. It was done for transperancy as well as confirmation. Whenever required, correlation was presented by scatter plot and linear regression. Association between one quantitative variables and one qualitative variable was studied by one way analysis of variance (ANOVA) while the same between two qualitative variables was studied by Pearson chi square test.

IV. Results And Observations

This study was done in Lokopriya Gopinath Bordoloi Regional Institute of Mental Health on individuals with alcohol dependence admitted in the indoor of the institution. Total number of individuals selected for the study was 60.

Socio-demographic variables
Age

Mean age of the study population was 37.33 ± 7.89 years; (SD± years). Range varied from 22-55 years. (Table 1) It might be due to help seeking nature of this population age group and most of them are working or earning member of the family, independent, staying alone. Even after onset of harmful drinking to development of dependence it takes certain period of time. So this might be a reason for majority of the age group belongs to 31 to 40 years.

Table 1: Distribution of age group

		n(%) N=60
Age Group	21-30 Yrs	11(18.3%)
	31-40 Yrs	32(53.3%)
	41-50 Yrs	13(21.7%)
	>50 Yrs	4(6.7%)

Gender
All the study subjects (100%) were male.

Religion

Almost all of the subjects (96.7%) were hindu (Table 2). According to 2011 census, majority (79.8%) of the population of India practices Hinduism in comparing to other religion. This may be a reason that majority of the participants were found to be Hindu by religion. Help seeking nature of hindu population might also be a reason. Even drinking alcohol is prohibited in some cultures, whereas in some it is part of their cultural practice.

Table 2: Religion of the sample population

		n(%) N=60
Religion	Hindu	58(96.7%)
	Muslim	2(3.3%)

Marital Status

68.3% of the study population were married (Table 3). As most of the study population belonged to the age group of 31-40 years and majority of hindu males usually get married by that age so it might be a reason for majority of participants being married. Even marriage is considered to be situational crises which may make the individual stressed and prone to drink alcohol.

Table 3: Marital status of the sample population

		n(%) N=60
Marital status	Unmarried	19(31.7%)
	Married	41(68.3%)

Residence

Majority (78.3%) of the subjects belonged to rural area (Table 4). According to 2011 census majority 69% of the Indian population i.e 700 million people lived in rural areas and 31% of the population lived in urban areas. Moreover most of the area of Assam also belongs to rural area so most participants were found from rural background of Assam. Even cultural practice of drinking alcohol is more common in rural areas. So this might be a reason for the present finding.

Table 4: Distribution of residence of sample population

	Subgroup	n(%) N=60
Residence	Rural	47(78.3%)
	Urban	13(21.7%)

Educational status

As far as the level of education is concern, most of the subjects had studied at least up to senior secondary level (38.3%). (Table 5) As majority of the study population belongs to 31-40 years of age usually by that time education is completed and majority are in government service in the population. So this might be a reason.

Table 5: Educational status of the study population

		n(%) N=60
Education	Primary	9(15.0%)
	Upper primary	8(13.3%)
	Secondary	12(20.0%)
	Sr. Secondary	23(38.3%)
	UG and above	8(13.3%)

Occupation

Almost 90% of the study samples were employed. Among them majority were government employee (38.3%) and self employed (33.3%). (Table 6) Mostly individuals those who are employed might come in contact with hospital services. It might be a reason for majority of the study population being government employee or businessman.

Table 6: Occupation of sample population

		n(%) N=60
Occupation	Student	1(1.7%)
	Govt. Service	23(38.3%)
	NGO Service	5(8.3%)
	Business	4(6.7%)
	Self employed	20(33.3%)
	Manual Labour	4(6.7%)
	Unemployed	3(5.0%)

Family Type

The most of the subjects were from nuclear family types (91.7%), followed by joint family types (8.3%). (Table 7) The finding suggests the changing trends in the family structure. In the present day society, most of the people tend to live away from their families due to different reasons for some it is accessibility to resources, for some it may be for the purpose of job.

Table 7: Family types of sample population

		n(%) N=60
Family type	Nuclear	55(91.7%)
	Joint	5(8.3%)

Socio-economic status (SES)

Only 3.3 % of sample population belonged to lower middle class and in contrast 61.7% belonged to upper class (Table 8). High amount of money is spent for care and treatment of alcohol use disorders. So individuals those are earning might come in contact with the hospital service.

Table 8: Socio-economic status of sample population

		n(%) N=60
Socioeconomic status	Upper	37(61.7%)
	Upper Middle	4(6.7%)
	Middle	3(5.0%)
	Lower Middle	2(3.3%)
	Lower	14(23.3%)

Family history of Mental illness (Other than substance use)
3.3 % of study population had family history of mental illness like psychosis and clinically diagnosed mood disorder.

Table 9: Family History of Mental illness in sample population

		n(%) N=60
Family history of mental illness	Present	2(3.3%)
	Absent	58(96.7%)

Family history of alcohol use disorder (AUD)
It is found that 58.3 % of the study subjects had family members with alcohol use disorder at some point of their lives. Among them 43.3 % were 1st degree relatives.

Table 10: Family history of AUD in sample population

		n(%) N=60
Family history of alcohol use disorder	Present in first degree relative	26(43.3%)
	Present in 2nd or 3rd degree relative	9(15.0%)
	Absent	25(41.7%)

History of lifetime criminal charge
8.3 % of the study population had criminal charges (indicative of anti-social behaviour) of some sort in their lifetime.

Table 11: History of lifetime criminal charge in study population

		n(%) N=60
History of lifetime criminal charge	Present	5(8.3%)
	Absent	55(91.7%)

Alcohol related variables
Mean age of onset of problem drinking (harmful use) in the study population was 24.43 years and that of onset of alcohol dependence syndrome (ADS) was 27.78 years. Mean years of dependence at the time of interview was around 9.38 years (though there was an outlier of 30 years of dependence) (Table 12).

Table 12: Statistics related to age of onset and years of dependence

	Range	mean± SD
Age of onset of harmful drinking(AOHD) Yrs	18-37	24.43±3.57
Age of onset of dependence(AOD) Yrs	20-40	27.78±3.82
Years of dependence(YOD)	2-30	9.38±6.04

Alcohol withdrawal complications
In the study samples 33.3 % had previous history of Delirium tremens and 40 % had history of alcohol withdrawal seizure. Most of the subjects had no past history of admission (60%)

Table 13: Comparison of major alcohol withdrawal complications

		n(%) N=60
History of withdrawal seizure(HOWS)	Present	24(40.0%)
	Absent	36(60.0%)
History of delirium tremens(HODT)	Present	20(33.3%)
	Absent	40(66.7%)
Number of past hospitalizations	No past admission	36(60.0%)
	Once	12(20.0%)
	Twice	10(16.7%)
	Thrice	2(3.3%)

Table 14: Severity of Alcohol Dependence

Alcohol Dependence Level	n(%)	Alcohol Dependence Score	
		Range	Mean± SD
Mild physical dependency	5(8.3%)	8-15	12.40±3.21
Moderate dependence	42(70.0%)	16-30	22.40±4.23
Severe alcohol dependence	13(21.7%)	32-36	32.69±1.18

Total	60(100.0%)	8-36	23.80±6.58

It found that 8.3% with mild physical dependency, 70.0% with moderate dependence and 21.7% with severe alcohol dependence.
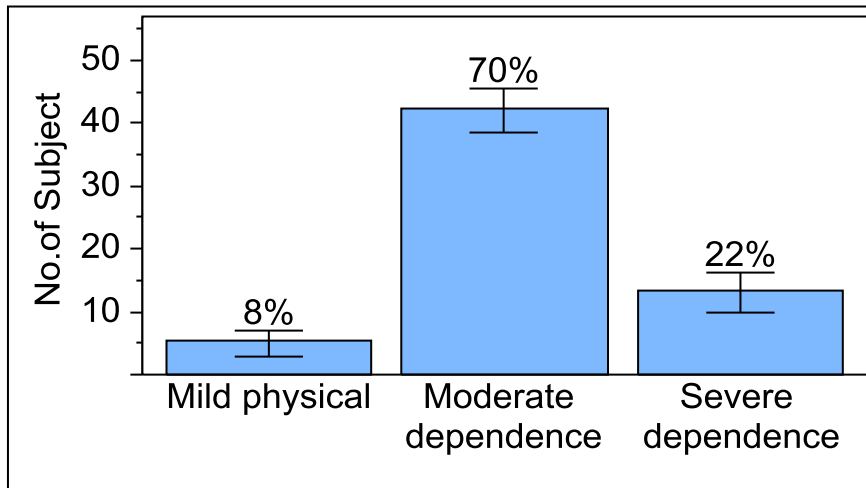

Figure 1: Bar diagram showing severity of alcohol dependence.

Table 15: Level of Stress

Stress Level	n(%)	Perceived Stress Score	
		Range	Mean± SD
Low	26(43.3%)	3-13	8.88±3.57
Moderate	24(40.0%)	14-26	17.96±3.69
Severe	10(16.7%)	27-35	29.30±2.41
Total	60(100.0%)	3-35	15.92±8.09

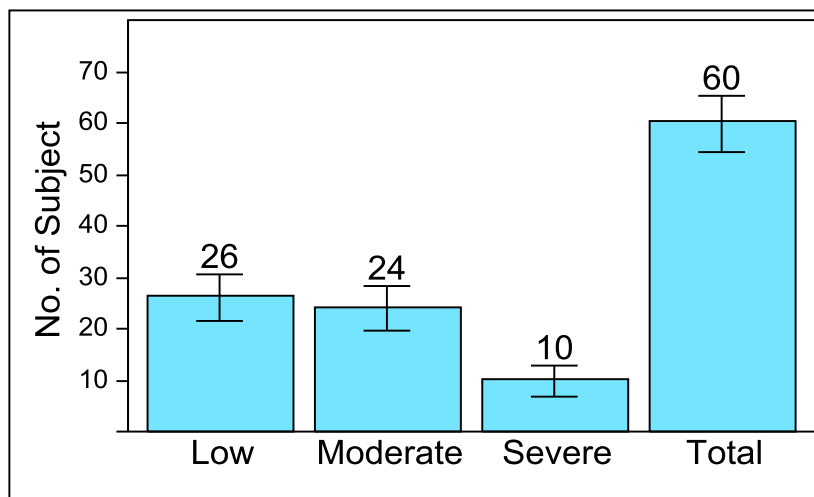Table 15 depicts that there were 43.3% subjects with low stress, 40.0% with moderate stress and 16.7% with severe stress.

Figure 2: Bar diagram showing distribution of level of stress

Table 16: Association of level of Stress with socio demographic factors

	Mean	Pearson Correlation	Spearman's *rho*
Age(Yrs)	37.33±7.89	0.125[NS]	0.179[NS]
Stress	15.92±8.09	(*p*=0.341)	(*p*=0.170)

Socio demographic factors	Sub Group	Stress Level			Total	Fisher Exact *p*
		Low	Moderate	Severe		
Marital status	Unmarried	12(63.2%)	5(26.3%)	2(10.5%)	19(100%)	.128[NS]
	Married	14(34.1%)	19(46.3%)	8(19.5%)	41(100%)	
Residence	Rural	19(40.4%)	21(44.7%)	7(14.9%)	47(100%)	.373[NS]
	Urban	7(53.8%)	3(23.1%)	3(23.1%)	13(100%)	
Education	Class I-XII	10(34.5%)	14(48.3%)	5(17.2%)	29(100%)	.383[NS]
	Class XII Passed & above	16(51.6%)	10(32.3%)	5(16.1%)	31(100%)	
Occupation	Service Man	10(35.7%)	13(46.4%)	5(17.9%)	28(1%)	.720[NS]
	Self employed	12(50%)	9(37.5%)	3(12.5%)	24(100%)	
	Unemployed	4(50.%)	2(25%)	2(25%)	8(100%)	
Family type	Nuclear	24(43.6%)	22(40%)	9(16.4%)	55(100%)	.999[NS]
	Joint	2(40%)	2(40%)	1(20%)	5(100%)	
Socioeconomic status	Upper	17(45.9%)	13(35.1%)	7(18.9%)	37(100%)	.877[NS]
	Middle	3(33.3%)	5(55.6%)	1(11.1%)	9(100%)	
	Lower	6(42.9%)	6(42.9%)	2(14.3%)	14(100%)	
Total		26(43.3%)	24(40%)	10(16.7%)	60(100%)	

[NS] Not significant

In table 16: Clubbing has been done in education, occupation and socioeconomic subgroups due to very less number of subjects available in each of these subgroups and association between religion with level of stress was not possible for less number of subjects in muslim subgroup;

From Table 16: it is seen that stress level was not significantly associated with age group, religion, marital status, residence, education, occupation, family type, and socioeconomic status.

		Stress Level			Total	Chi Sq	df	*p*-value
		Low	Moderate	Severe				
Family history of mental illness	Present	2(100%)	0(0%)	0(0%)	2(100%)	2.71	2	.259[NS]
	Absent	24(41.4%)	24(41.4%)	10(17.2%)	58(100%)			
Family history of alcohol use disorder	Present in first degree relative	14(53.8%)	8(30.8%)	4(15.4%)	26(100%)	2.74	4	.603[NS]
	Present in 2nd or 3rd degree relative	3(33.3%)	5(55.6%)	1(11.1%)	9(100%)			

	Absent	9(36%)	11(44%)	5(20%)	25(100%)			
History of lifetime criminal charge	Present	2(40%)	2(40%)	1(20%)	5(100%)	.05	2	.975 NS
	Absent	24(43.6%)	22(40%)	9(16.4%)	55(100%)			
		26(43.3%)	24(40%)	10(16.7%)	60(100%)			

Table 17: Association of level of Stress with other related variables

Table 17 shows that Stress level was also not significantly associated with Family history of mental illness, Family history of alcohol dependence and History of lifetime criminal charge.

Table 18: Correlation between stress with severity of alcohol dependence

		Severity of Alcohol Dependence
Perceived Stress	Pearson *r*	.540**
	p-value	<.001

**Correlation is significant at the 0.01 level (2-tailed).
In table 18; Correlation between perceived stress and severity of alcohol dependence was significant;

V. Discussion
This study was done in Lokopriya Gopinath Bordoloi Regional Institute of Mental Health on individuals with alcohol dependence admitted in the indoor of the institution. The study tried to evaluate if there

is any relationship between stress with alcohol dependence. Additionally also observed other socio-demographic and alcohol related variables and their relationship with stress.

Majority of the study population is found to have low stress (43.3%) followed by moderate stress (40.0%) and severe stress (16.7%). While in severity of alcohol dependence, it is found that 8.3% was having mild physical dependency while there was 70.0% with moderate dependence and 21.7% was having severe alcohol dependence.

Stress and alcohol dependence was found to be highly correlated, (Fisher's Exact Test $p<.001$). Other correlation measures also supported the evidence, Pearson $r= 0.79$; ($p<.001$). All the factors namely, level of stress and alcohol dependence found to be interrelated.

The findings can be supported by the following studies done previously-

Probably the most influential theory on the relationship between stress and alcohol is the tension reduction hypothesis, where it is assumed that individuals drink alcohol for its stress- reducing properties and that alcohol consumption reduces stress.

Fox et al found that exposure to stress and to alcohol cues each produced significant increases in alcohol craving, anxiety, and negative emotions and decreases in positive emotions. Stress induced alcohol craving was significantly correlated with increases in sadness, anger, and anxiety ratings, but alcohol cue induced craving was associated with decrease in positive affect and increases in anxiety and fear ratings [7].

Jesse Wynn et al studied the roles of perceived stress, coping styles, and perceived social support on the alcohol consumption among American college students was assessed with sample of ($N = 201$) University of Denver undergraduate students between the ages of 18-25 complete measures of perceived stress (PSS), coping strategies, perceived social support, and alcohol use. Results of a hierarchical regression analysis indicated that utilization of functional coping strategies is a statistically significant predictor of lower levels of alcohol consumption [6].

Darshan MS et al conducted a study on professional stress, depression and alcohol use among Indian IT professionals. A total of 129 subjects participated in the study. 43.4% of the study population were found to be a risk for developing depression. Subjects who were at risk for developing depression had 4.1 times higher prevalence of harmful alcohol use compared with those who were not at risk for developing depression [8]**.**

So, the study largely supports previous studies in this field. The findings suggested that the association between level of stress in alcohol dependence.

Till date study in this field in India is scanty. But further thorough longitudinal investigations, using stronger methodology are needed to ascertain the findings.

VI. Summary And Conclusion

The present chapter highlights on the findings from the analysis on subjects diagnosed with alcohol dependence syndrome according to ICD-10 DCR, with regard to the socio-demographic variables, alcohol related variables and clinical variables like depressive symptoms and impulsivity.

In the socio-demographic variables, study population was comprised of male subjects of mean age 37.33 (± 7.89 years). Majority of them were married, hailed from rural area, belonged from nuclear family and were educated up to senior secondary level or above. Majority of the population were government employee (38.3%) followed by self employed (33.3%). Sample population consisted only 3.3 % lower middle class and in contrast 61.7% belonged to upper class. 58.3% of the subjects had family history of alcohol dependence and 8.3% had history of criminal charges against them.

In alcohol related variables, mean age of onset of problem drinking (harmful use) in the study population was 24.43 (± 3.57 years) and that of onset of dependence was 27.78 (± 3.8 years). Mean years of dependence at the time of interview were around 9.38 (± 6.04 years) (though there was an outlier of 30 years of dependence). 33.3% had previous history of delirium tremens whereas 40% had history of withdrawal seizure.

In clinical variables, mean score of stress as per PSS in our population was 15.92±8.09.

Regarding correlation of stress in alcohol dependence, statistical analysis revealed that stress in alcohol dependence was found to be highly correlated , Fisher's Exact Test $p<.001$. Correlation between stress and severity of alcohol dependence was significant, Pearson $r=0.540$, $p <.001$;

Results indicate a strong association between stress and severity of dependence in alcohol-dependent patients.

The study largely supports previous studies in this field. But further thorough longitudinal investigations, using stronger methodology are needed to ascertain the findings.

VII.   Limitations

- Sample size was comparatively small.
- There was no female sample. So, gender variations could not be assessed.

- It was a hospital-based study. The results may not be applicable to the general population. Convenience sampling technique was used. It limits the usefulness of the various interpretive statistical analysis used in the study. The results should be interpreted only in terms of the study population and findings again may not be applicable to the general population.
- Lack of healthy control group limits the comparison of various variables.

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