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CAFFEINE USE DISORDERS IN MEDICAL AND PSYCHIATRIC PATIENTS

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ABSTRACT: Background: The dependence producing properties of caffeine has been underrated and there are very few studies on its prevalence in medical and psychiatric patients. The present study was undertaken with the aim of defining the patterns of caffeine use in medical and psychiatric patients and to identify differences, if any, in the patterns of caffeine use disorders between general population and patients suffering from medical and psychiatric ailments. **Method:** The study included 460 subjects (200 psychiatric patients, 160 medical patients and 100 normal subjects). The subjects were matched in terms of socio demographic characteristics. **Result:** Results showed statistically significant increase in caffeine use and prevalence of caffeine use disorders in psychiatric patients as compared to normal subjects and medical patients. **Conclusion:** there is increased caffeine consumption and increased prevalence of caffeine use disorder in psychiatric patients as compared to normal subjects and medical patients.

KEY WORDS: caffeine, dependence, abuse.

Caffeine has been used since antiquity. It is the most widely consumed psychoactive agent in the world, ingested by millions of people, in multitudes of tones, often in large quantities (Gilbert, 1984; Gilbert, 1976; Graham, 1978; Lewy & Zylber–Katz, 1983). Yet, for most of the 20th century, caffeine seemed to interest neither clinician nor investigators. Few physicians asked patients about their caffeine intake. Substance abuse experts tended to perceive caffeine as a relatively innocuous agent. The Food and Drugs Administration (FDA) listed caffeine as one of the substances that are " Generally recognized as safe (GRAS) " (FDA, 1980). The drug was not even mentioned in the second edition of American Psychiatric Association's DSM- II (1967) and had no official status as a substance of abuse. Nor was it commonly considered as a potential confounding variable in clinical studies, even when investigators were conducting pharmacological trial of anti-anxiety agents. However, this situation has changed. Beginning in the 1970s, scattered clinical reports called attention to caffeine's pharmacological consequences. The syndrome of clinical features resulting from acute or chronic overuse of caffeine was given a name – "Caffeinism" (Greden, 1974). Epidemiological studies began to be published, documenting caffeinism as a widespread clinical entity. Neuroscientist rediscovered the drug: it was employed as a pharmacological probe in the study of brain neurobiology (Waldeck, 1974). In 1978, the FDA decided to reassess the GRAS issue, appointing a committee to investigate these substances and subsequently publishing a report on caffeine (Select Committee on GRAS Substances, 1978). These reports stimulated further research. Incorporation into American Psychiatric Association's official nosology occurred in 1980, when DSM – III (1980) listed specific criterion for caffeine's intoxication.

Caffeine is reinforcing drug but its reinforcing properties are not clear. Proposed mechanisms include rapid and prompt distribution to brain, sensitization of central catecholamine postsynaptic receptors causing increase in extra cellular dopamine transmission in nucleus accumbens and its ability to antagonize adenosine receptors in the brain antagonizing its sedative, anxiolytic and anticonvulsant properties (Kaplan & Sadock, 1995; Griffiths, & Biglow, 1986). Despite its wide use caffeine has been grossly underrated by professionals to be causing any use disorder, in fact DSM – IV (1994) does not consider any of caffeine use disorders. However Strain et al (1994) contended that caffeine exhibits the

features of a typical psychoactive substance of dependence and recommended inclusion of caffeine dependence as a clinical syndrome. The magnitude of the problem can be discerned by the fact that 85 % of Americans are known to consume about 200 mgms of caffeine on an average day (Schriber et al, 1988) Surprisingly despite the wide use, the prevalence of caffeine use, use disorders in psychiatric and medical patients do not appear to have been investigated in our country. Since this is likely to have a role in primary prevention of some of these conditions it was considered worthwhile to ascertain the patterns of caffeine use in general population as well as those suffering from medical and psychiatric ailments. It was considered that besides the obvious heuristic value any significant association between caffeine consumption with that of medical and psychiatric conditions might give indication for possible prevention of future progression of the particular disability. As identification of use disorders i.e. dependence and abuse will obviously include specific therapeutic inputs thereby reducing distress, the present study was carried out.

MATERIAL AND METHOD

SETTING: The study was conducted in a large tertiary care service hospital. The hospital has 60 bedded psychiatric center, which offers inpatients and outpatients facilities. The unit provides consultation liaison services for multi-speciality hospital and is a tertiary care centre for other psychiatric centers located elsewhere in the various parts of the country.

SAMPLE: All patients admitted from October 1999 to February 2000 constituted the study group. As the admissions are restricted to males only, females do not form a part of the study group. 100 healthy personnel were selected from local units and attendants of Psychiatric and medical patients, who did not have physical or mental illness on standard physical and mental status examination. 160 patients were chosen at random from patients suffering from various medical ailments, without any identifiable psychiatric illness on mental status examination. Clinical data from case documents and information from concerned specialist was received and recorded. 200 patients were selected serially from those attending psychiatric OPD and admitted in psychiatric department suffering from psychiatric illnesses (patients declared as PSY (INV) – NAD were excluded). Clinical data from case documents and information obtained from concerned specialist was recorded.

PROCEDURE: Patients thus selected were informed of the study, their consent was taken and cooperation was sought. After establishing rapport all the patients were asked about current and lifetime use of caffeine and information from each person was recorded.

INSTRUMENTS

Caffeine dependence: Eric Strains modification of DSM-IV criteria (Strain et al, 1994): only four criteria were considered (out of seven) while making a diagnosis of dependence. These criteria were chosen to represent clinically meaningful aspects of pathological use of a substance that is widely used and culturally acceptable. The four criteria were tolerance (criterion 1), withdrawal (criterion 2), persistent desire or unsuccessful efforts to cut down or control use (Criterion 4) and continued use despite knowledge of persistent or recurrent physical or psychological problems that is likely to have been caused or exacerbated by substance use. Out of four individual should meet at least three criteria to label him as caffeine dependent.

Caffeine abuse: Following DSM – IV (1994) criteria was used to identify cases with caffeine abuse – " continued use .... despite knowledge of persistent or recurrent social, occupational or physical problems that is caused or exacerbated by use of the substance."

STATISTICAL ANALYSIS: Statistical analysis was done using software MS – Excel for windows ME. Qualitative data was analyzed using Chi – square test (with Yates continuity correction as applicable) and Fisher exact probability test as appropriate. Quantitative data was analyzed using ANOVA as first step analysis and Student – Newman Keuls test as second step analysis.

RESULTS

BASELINE DEMOGRAPHIC DATA: Socio demographic characteristics of the sample are summarized in Table 1. A total of 460 individuals was included in the study. The difference among subgroups was not significant except in their marital status and family history of mental illnesses and substance abuse.

Primary vehicle of caffeine consumption: Of all the subjects included in the study 435 subjects (94.57%) were using caffeine (Table 2). Tea was the main vehicle in most of the subjects constituting nearly 80% of all the subjects. The difference observed was significant.

TABLE 1. Socio-demographic characteristics of subjects of the study

Characteristic	Normals (n =100)	Medical patients (n =160)	Psychiatric patients (n =200)	Statistical analysis
Age (in years)	32.29 (4.56)	33.83 (8.22)	33.09 (7.87)	F 1.81555 P>0.05 (NS)
Service	13.19 (3.97)	14.55 (7.59)	13.57 (7.35)	F 1.778 P>0.05 (NS)
Education	10.4 (2.00)	10.44(2.06)	9.67 (3.98)	F 3.5888 P>0.05 (NS)
Marital status Married Unmarried	82(82%) 18	131(81.87%) 29	144(72%) 56	X^2 6.4036 D.F. 2 P <0.05 (S)
Place of origin Rural Urban	91 (91%) 9 (9%)	146 (91.25%) 14 (8.75%)	181 (90.5%) 18 (9.5%)	X^2 2.2185 D.F. 2 P >0.05 (NS)
Religion Hindus Others	82 (82%) 18 (18%)	140 (87.5%) 20 (12.5%)	175 (87.5%) 25(12.5%)	
Family history of mental illness Present Absent	0 100	0 160	4 196	D.F. 2 Pvalue <0.05 (S)
Family history of substance abuse Present Absent	2 (2%) 98 (98%)	3 (1.87%) 157 (98.13%)	20(10%) 180 (90%)	X^2 14.348 D.F. 2 P value <0.001 (S)

TABLE 2. Vehicle of caffeine consumption

Vehicle	Normals (n =100)	Medical patients (n =160)	Psychiatric patients (n =200)	Total
Tea	86 (86%)	128 (80%)	152 (76%)	366 (79.5%)
Coffee	3	3	8	40
Both tea & coffee	3	9	17	29
Neither	8	9	8	25
Total	100	160	200	460

X^2 13.620 D.F. 6 P value <0.05 (S)

CAFFEINE CONSUMPTION : Mean caffeine consumption was 118 mg/day in normal population compared to 166.09 mg and 173.13 mg in medical and psychiatric population respectively (Table 3). The difference between normal population and those with either medical or psychiatric ailments was statistically significant, but the difference between medical and psychiatric population was statistically not significant.

TABLE 3. Caffeine consumption

Category	Caffeine consumption (mg/day) Mean	SD	Post hoc (Newman Keuls) test 'q' Value	
Normals (A) (n =100)	118	62.36	A & B = 5.444	Significant
Medical patients (B) (n =160)	166.09	89.78	B & C = 0.957	Not significant
Psychiatric patients (C) (n =200)	173.13	129.85	A & C =	Significant

F Value 14.3739 $p < 0.001$ (S)

TABLE 4. Caffeine use disorders

Category	Caffeine use disorder Dependence N (%)	Abuse N (%)	Total N (%)	Nondependent Non abuse use N (%)	Total
Normals (A) (n =100)	3 (3)	6 (6)	9 (9)	91 (91)	100
Medical patients (B) (n =160)	25(15.6)	27 (16.8)	52 (32.5)	108 (67.5)	160
Psychiatric patients (C) (n =200)	79 (39.5)	35(17.5)	114 (57)	86 (43)	200
Total	107	68	175(38.4)	285	460

X^2 66.825 D.F. 2 P value <0.05 (S)

TABLE 5. Caffeine use disorder in psychiatric patients

Category	Caffeine use disorder Dependence	Abuse	Total	Nondependent Non abuse use	Total
Neurotic & stress related disorders (n=41)	17 (41.4%)	5 (12.1%)	22 (53.6%)	19 (46.34%)	41
Mood disorder (n=33)	19 (57.6%)	3 (9.09%)	22 (66.7%)	11 (33.33%)	33
Substance use disorder (n=65)	19 (29.2%)	11 (16.9%)	30 (46.1%)	35 (53.84%)	65
Psychotic disorder (n=61)	24 (39.3%)	16 (26.2%)	40 (65.5%)	21 (34.42%)	61
Total = 200	79 (39.5%)	35 (17.5%)	114 (57%)	86 (43%)	200

X^2 6.38 D.F. 3 P value >0.05 (NS)

CAFFEINE USE DISORDERS: almost 32.5 % of medical subjects and 57 % of psychiatric subjects were meeting criteria for any caffeine use disorder as compared to only 9% of normals (Table 4). The difference was statistically significant. On further analysis of the same table the difference in between groups was also significant (normals and medical patients X^2 18.919, D.F. 1, P <0.001; normal and psychiatric patients, X^2 62.323 , D.F. 1, P <0.001 and between medical and psychiatric patients X^2 20.617, D.F. 1, P <0.001).

Among the psychiatric population (Table 5), nearly 53.6% of neurotics, 66.7 % of patients with mood disorder, 46.1% of patients with substance use disorder (apart from caffeine) and 65.5% of patients with psychotic conditions had some caffeine use disorder. The difference obtained was not significant statistically.

TABLE 6. Caffeine use disorder in neurotic and stress related disorders

Category	Caffeine use disorder Dependence	Abuse	Total	Nondependent Non abuse use	Total
Adjustment disorder (n=18)	6	3	9 (50%)	9 (50%)	18
Generalized anxiety disorder (n=5)	2	0	2 (40%)	3 (60%)	5
Mixed anxiety depression (n=7)	5	2	7 (100%)	0 (0%)	7
Neurotic depression (n=4)	4	0	4 (100%)	0 (0%)	4
Others (n=7)	0	0	0 (0%)	7 (100%)	7
Total = 41	17	5	22 (53.6%)	19 (46.4%)	41

Fischer exact test applied. D.F. 4 P value 0.0000119233 (S)

Among patients with neurotic and stress related disorders (Table 6), caffeine use disorder was present in nearly 50% of those with adjustment disorder, 40% of those with generalized anxiety disorder, 100% of those with mixed anxiety depression and neurotic depression and 0% in obsessives and other neurotic disorders. The difference observed in between the categories was highly significant suggesting higher prevalence in neurotics with pure depression than neurotics with pure anxiety and is a further high in patient with both.

Among patients with mood disorder, nearly 74% of those with unipolar depression and 62% of those with bipolar disorder met criteria for either of caffeine use disorder. However, the difference observed between them was statistically not significant.

Among psychotic population (Table 7), almost 75% of schizophrenics were meeting criteria for either of caffeine use disorders, as compared to 50% of nonschizophrenics. The difference was, however statistically not significant.

TABLE 8. Caffeine use disorder in patients with mood disorder

Category	Caffeine use disorder Dependence	Abuse	Total	Nondependent Non abuse use	Total
Unipolar depression (n=15)	10	1	11 (73.3%)	4	15
Bipolar disorder (n=18)	9	2	11 (61.11%)	7	18
Total = 33	19	3	22	11	33

X^2 0.549 D.F. 1 P value > 0.25 (NS)

TABLE 7 Caffeine use disorder in patients with psychotic disorders

Category	Caffeine use disorder Dependence	Abuse	Total	Nondependent Non abuse use	Total
Schizophrenia (n=39)	18	11	29 (74.35%)	10	39
Nonschizophrenia (n=23)	6	5	11 (50%)	12	23
Total = 61	24	16	40 (65.5%)	21	61

X^2 0.690, D.F. 1, P > 0.05 (NS)

DISCUSSION

The present study was carried out with the aim to study the patterns of caffeine use in medical and psychiatric patients and to identify if there is any difference in the patterns of caffeine use disorders between general population and patients suffering from medical and psychiatric ailments. Basic epidemiological information is lacking in our country. Despite extensive search of the available journals, no convincing data on caffeine could be produced. Hence present study can be considered as a determined step to ascertain the patterns and prevalence of caffeine use in medical and psychiatric patients. The study was carried out in armed forces set up and all the subjects included in this study were male service personnels with obvious advantage of making a homogenous sample. A total of 460 subjects were included in the study, which makes this study as one of largest study of it's kind. The samples were matching for their age, years of service, education, place of origin and religion.

Evaluation of marital status of the subjects revealed that almost 82% of normal control subjects and medical patients were having cordial marital relations, as opposed to only 72% of those with psychiatric ailments. Especially, alcoholics from the psychiatric population admitted to more marital disharmony than others did. More disharmonies in psychiatric patients is in consonance with the finding of previous studies. Similarly more psychiatric patients than normal or medical patients admitted to family history of mental illnesses and substance abuse.

Analysis of primary vehicle of caffeine revealed that tea was the primary vehicle for most subjects. Though no corroboratory evidence could be found, this appears to be in consonance with the national prevalence as well as the conventions in service set up, where service personnel are generally provided tea 2-3 times a day. At the same time, it was observed that psychiatric subjects prefer coffee than tea than other categories. It could be because of increased caffeine content of coffee than tea.

One of the important finding of this study is that the amount of caffeine consumption is significantly higher in medical and psychiatric patients compared to normals. Winsted (1979) studied 135 psychiatric inpatients and found that 25% were using more than five cup of coffee per day. The mean caffeine consumption was less as compared to western figures. Difference could be most likely due to socio-cultural difference. However it is important to stress that dependence properties of an individual are independent of the amount of the drug use. Another highlighted finding of the study is significantly higher lifetime prevalence of caffeine use disorder in psychiatric patients as compared with normals and medical patients, that is corroborated by previous studies (Winsted, 1976; Greden, 1978).

Looking at the prevalence of the type of caffeine use disorder, it reveals that normals have twice the chance of developing abuse than dependence, in contrast with psychiatric patients, who develop dependence twice likely than abuse. This brings out the finding that, psychiatric population has more tendencies to become dependent on substance than normals.

Among psychiatric population, nearly 53.6% of neurotics, 66.7% of patients with mood disorder, 46.1% of patients with substance use disorders and 65.5% of psychotics had some caffeine use disorders. Though it appears that prevalence is higher in patients with mood disorder and psychotics, the difference observed did not reach statistical significance. Importantly in all categories, prevalence of dependence was higher than abuse, which goes along with previous assumption. Among neurotics, the prevalence of caffeine use disorder was 50% in those with adjustment disorder and 40% of those with generalised anxiety disorder compared to 100% in patients with neurotic depression. It appears that due to anxiogenic properties, it's use disorders are less prevalent in those neurotics with predominant anxiety than those with predominant depression. Another interesting finding is that, all the patients of generalised anxiety disorder meeting criteria for caffeine use disorder, had dependence rather than abuse, reflecting possibility of caffeine induced anxiety disorder getting misdiagnosed as generalised anxiety disorder. The possibility was highlighted by Greden (1974). The sample size however is too small (n=5) to comment on this. Regarding patients with mood disorder, they appear to be at signoficant greater risk of developing caffeine use disorder more of dependence type than other psychiatric patients.

Russ (1988) proposed an association between caffeinism and alcoholism. This study is a further step in that direction. It clearly establishes that of 65 patients with alcoholism 30 (46.1%) had some caffeine use disorder of which 30% had dependence and 16% had abuse.

Analysis of the Schizophrenia patients reveals that nearly 3/4th met criteria for caffeine use disorder some time in their life, compared to 50% of non – Schizophrenic group. This finding is in consonance with that of previous researches (Edwin, 1978; Edna et al, 1998).

LIMITATIONS: Firstly, being a retrospective study it relied on subject's memory and compliance, though co-operation was sought. Secondly, inclusion of only service personnel limits it's generalisability. Thirdly, though sample size of 200 psychiatric patients appears large in comparison to all the studies done so far, number of patients in individual psychiatric disorder fell short of the desired number that could give rise to a statistically significant difference.

CONCLUSION

The study has brought out not only increased caffeine consumption in psychiatric patients than normals but it has also demonstrated increased prevalence of caffeine use disorder as compared to normals and medical patients. It is to be stressed that almost 57% of psychiatric population has Caffeine use disorder as compared to only 9% of general population. This poses medical patients at risk of developing Caffeine use disorder 3.61 times more than normals and psychiatric patients at risk of 6.23 times than normals. Psychiatric patients are again 1.85 times more vulnerable for developing caffeine use disorder than medical patients.

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