A Comparative study of Personality as a common pathway in HIV Sero-positive and Alcohol dependent cases on Five Factor Model

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ABSTRACT

Aim: The aim of this study was to identify the personality traits of alcohol and human immunodeficiency virus (HIV)-positive patients and to compare them with normal controls. Materials and Methods: This cross-sectional study included 100 consecutive patients with alcohol dependence and HIV each and a control group of 100 normal cases without any physical or psychiatric illness. A score of 2 or less on the General Health Questionnaire was taken as cutoff, and the participants were included in the study with written informed consent. All participants were assessed with the NEO personality inventory revised and sensation-seeking scale (SSS). Results: There were significant differences among the study group on all the five factors, i.e., neuroticism (N), extraversion (E), conscientiousness (C), openness to experience (O), and agreeableness (A). On factor “N,” HIV and alcohol group scored significantly more as compared to normal group. Odds ratio revealed high neuroticism to be a risk factor in alcohol-dependent and HIV cases (P < 0.05). The normal group scored significantly higher on factor “E” as compared to HIV and alcohol cases. High scores on factor “E” and “C” have a protective effect. Odds ratio found low score of factor “C” as a risk factor; however, “O” did not emerge as a risk factor. The logistic regression revealed that high scores on “N” and “E” and low “A” score had a significant association with alcohol dependence (P < 0.05). Among HIV cases, high score on “N” and “E” and low “C” score emerged significant. Alcohol cases scored significantly more on boredom susceptibility (BS) on SSS as compared to HIV and normal controls. On disinhibition (DIS), HIV cases and alcohol cases scored significantly higher as compared to normal group (P < 0.05). Conclusion: High “N” scores on NEO personality inventory are significantly associated with alcohol dependence and HIV while high scores on “E” and “C” have a protective effect. On SSS, HIV-positive cases are characterized by high DIS scores while alcohol dependence is associated with high scores on BS and DIS.

Keywords: Alcohol dependence, human immunodeficiency virus positive, NEO personality inventory, sensation seeking

There have been investigations to establish the link between personality and alcohol dependence. In clinical practice, it is commonly seen that alcohol abuse and dependence are associated with chronic anxiety, a pervading sense of inferiority, or self-indulgent tendencies. However, many people with such problems do not resort to excessive drinking. It seems likely that personality is important as an etiological factor as it increases vulnerability to other causal factors. Personality factors may partly explain the craving for alcohol observed in participants with alcohol dependence. Persons with tense temperament resort to drinking because alcohol calms their inner anxiety and

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How to cite this article: Srivastava K, Singh AR, Chaudhury S. A Comparative study of Personality as a common pathway in HIV Sero-positive and Alcohol dependent cases on Five Factor Model. Ind Psychiatry J 2016;25:47-58.
helps them relax. Alcoholics have been characterized by insecurity, anxiety, oversensitivity, and dissatisfaction with themselves and their lives.\textsuperscript{[1]} Male alcoholics tend to have higher extraversion and neuroticism.\textsuperscript{[2,3]}

Psychologically healthy or “normal” controls are characterized by high level of adaptation and a positive temperament.\textsuperscript{[4]} This has relevance in understanding the vulnerability to alcohol use disorders. Disinhibition (DIS) is associated with range of psychopathology broadly known as externalizing disorders (e.g., substance abuse and antisocial personality disorder (APD)).\textsuperscript{[5]} Negative affectivity and DIS together are posited to form a still higher order “alpha factor” while extraversion and openness to experience together account for “beta factor.”\textsuperscript{[6]} On five-factor model, factor “A” (agreeableness) and factor “C” (conscientiousness) relate to broad type of psychopathology, i.e., DIS.\textsuperscript{[7]}

The understanding of personality dimensions can be reduced to certain broadband personality traits that consistently appear in the literature focusing on alcoholism and APD, i.e. neuroticism/emotionality, impulsivity/DIS, and extraversion/sociability.\textsuperscript{[8]} Empirical support for this three-dimensional approach comes from Zuckerman et al., who factor analyzed 46 scales that purport to measure basic dimensions of personality.\textsuperscript{[9]} In addition, there is considerable support for the view that the five-factor model of personality best subsumes the different dimensions of personality.\textsuperscript{[10]} Neuroticism dimension is found to be high in clinical alcoholics.\textsuperscript{[11-13]}

Human immunodeficiency virus (HIV)/AIDS is an emerging threat to the young generation. Alcohol abuse and risk-taking behavior in HIV seem to have some common underpinnings. The commonality of traits may be attributed to the prevalence of available information on disinhibitory psychopathology and risk-taking attitude among HIV-positive cases and alcohol-dependent cases. It is also related to maladaptation. Previous analyses showed that it is possible to predict the behavior which exposes an individual to the risk of HIV infection from the personality dispositions of neuroticism and (low) conscientiousness. Perceived risk of HIV infection is related to openness to experience.\textsuperscript{[14]} Low openness interferes with the ability to accurately assess risk by restricting consideration of information and influencing other heuristic biases. Conscientiousness was related to behavior change. Systematic investigation of personality links to problem behaviors may be a useful first step in formulating theories of behavior change. The five-factor model is robust across time, observers, instruments, and culture.\textsuperscript{[15]}

Sensation seeking predicts high-risk sexual behavior among both heterosexual and gay men.\textsuperscript{[17,18]} Individuals who seek optimal stimulation and novelty (sensation seeking) may be inclined to engage in high-risk sexual acts despite the threat of HIV infection.\textsuperscript{[19]} People with alcohol use disorders are more likely than the general population to contact HIV. Similarly, people with HIV are more likely to abuse alcohol at some time during their lives.\textsuperscript{[20]} Decreasing alcohol use in individuals with HIV or at risk for becoming infected reduces the spread of HIV and the diseases associated with it. It has been reported that 60% of the patients of HIV present with a blend of extroversion and emotional instability. Unstable extroverts are individuals ruled by feeling. Furthermore, as part of their emotional instability, they experience intense fluctuations in mood. It is difficult for them to tolerate painful affect such as boredom, sadness, or unresolved drive, in order to escape or avoid such feelings as quickly as and as easily as possible. The same personality factors that increase their risk for HIV infection also decrease their ability to adhere to demanding drug regimens.\textsuperscript{[21]}

Although there appears to be common underlying personality traits in alcohol-dependent and HIV-positive cases, a comparative study to this effect is lacking. The present study aims to evaluate and compare the personality correlates of alcohol-dependent and HIV-positive cases on the five-factor model of personality and sensation-seeking scale (SSS) which will have implications for prevention and management of these cases.

**MATERIALS AND METHODS**

The sample for the study comprised 100 consecutive patients of alcohol dependence diagnosed as per the International Classification of Diseases, Tenth Edition (ICD-10) Diagnostic Criteria for Research (DCR)\textsuperscript{[22]} and equal number of age- and sex-matched HIV seropositive patients. The control group comprised same number of age- and sex-matched individuals with no physical or psychiatric disorders. The sample was derived from a large tertiary care teaching hospital.

**Inclusion criteria**
- Alcohol-dependent cases diagnosed on ICD-10 DCR or HIV-positive cases diagnosed on Elisa and Western blot method by a dermatologist
- Normal controls scoring below cutoff of two on the General Health Questionnaire (GHQ)
- Age 25–40 years
- Educational level of standard 10th pass and above
- Willing to give written informed consent.
Exclusion criteria
- Sample with any other psychiatric comorbidity with alcohol dependence syndrome
- Cases with any other severe physical disorder, e.g., cancer, or any other terminal illness
- Cases with more than 40 years of age and <25 years of age.

Tools
**NEO personality inventory revised**
The NEO personality inventory revised (PIR)\(^{[23]}\) measures the big five personality dimensions of neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C). Each of the five domains of the NEO PIR is represented by six, more specific scales that measure facets of the domain. Domain scores are, thus, designed to reflect the broadest possible dimensions of personality. There are two versions of NEO-PIR-form S for self-reports and form R for observer ratings. Form S was used in this study. It includes 240 items on 5-point scale. The scale was administered individually. The testing environment was comfortable and free of distractions. A writing desk with enough light was provided to each participant.

**Sensation-seeking scale**
The SSS is a 40-item forced-choice inventory where each represents a tendency toward sensation-seeking prosperity and two statements indicating higher or lower sensation seeking. The participants are asked to tick the choice that best suits his/her dispositions. Based on the total responses, a total score is constructed that may range from 0 to 40. Greater the score, higher is the sensation seeking. It has four subscales, namely, DIS, experience seeking (ES), boredom susceptibility (BS), and thrill and adventure seeking (TAS). Hindi version of SSS was used in this study.\(^{[24,25]}\)

**General Health Questionnaire**
It is an extensively used test to identify psychiatric morbidity in the community settings. It is designed as a screening instrument to evaluate current mental well-being for the past few weeks. GHQ-12 score <2 was used for identifying the normal controls.\(^{[26]}\)

**Procedure**
Consecutive alcohol-dependent and HIV-positive patients meeting the inclusion criteria were included in the study after obtaining informed consent. The matched normal control group was identified with the help of GHQ. A score of two and below was taken to be normal and those individuals falling in that range were included in the study with their informed consent. All the participants were interviewed for sociodemographic details, and psychological tests were administered individually.

Statistical analysis
Data on sociodemographic variables were analyzed with the help of ANOVA test. Data on psychological assessment was analyzed with the Kruskal–Wallis to evaluate the differences among the study groups on NEO-PIR and SSS. SPSS (IBM) software was used for calculating the data. Scores on various domains of NEO-PIR were categorized as higher or lower based on the actual T-score. A T-score of 45–55 falls in the average range, 55–65 in high range, while low-range scores are 35–44. T-score of 34 and lower is considered to be very low, and T-score of 66 and more is considered very high. For the purpose of comparison, the scores were categorized as follows: high and above were grouped into one category and low and very low were grouped under another category and then odd's ratio was calculated. The facets score of each factor was analyzed using Chi-square test, and logistic regression analysis was carried out between alcohol versus normal and HIV versus normal on the personality factors.

RESULTS
Demographic and clinical characteristics of the study groups are given in Table 1.

The study groups were homogeneous with respect to educational standards, monthly income, and marital status but not age. A history of sexually transmitted diseases was absent in the alcohol-dependent and normal control group but was reported in 20% of HIV cases. There was a significant difference between the study groups with respect to knowledge about modes of transmission of HIV. Individuals in HIV group had significantly higher prevalence of promiscuity compared to alcohol-dependent individuals. The majority of HIV patients (96%) with a history of promiscuity had unprotected sexual exposure compared to 57% in alcohol-dependent patients. Significantly higher number of alcohol-dependent patients had a history of blood transfusion as compared to HIV patients.

The five-factor model of personality revealed significant differences between the groups on N, E, O, C, and A [Table 2]. The mean score of HIV cases was high on “N” followed by alcohol cases. On factor E, normal group and HIV cases had scored higher as compared to alcohol cases. On factors “O” and “C”, normal group had high mean score as compared to alcohol and HIV cases. On factor A, significant difference was noted between alcohol and HIV cases. The mean score of HIV and normal group was approximately same. Comparison of facet scores of “N” domain revealed that HIV group had significantly higher scores on anxiety, anger hostility, depression, and...
impulsiveness [Table 3]. On “E” factor, normal controls obtained statistically significantly higher scores on facets of warmth, activity, excitement seeking, and positive emotions. On “O” factor, mean scores of HIV patients were statistically significantly higher on facets of fantasy and action. On esthetics, feelings, ideas, and values, normal group scored significantly higher as compared to alcohol and HIV cases. On “A” factor, the study groups differed significantly on facet of trust, straightforwardness, altruism, modesty, and tender mindedness but not on compliance. The mean score was high in alcohol cases followed by normal and HIV group on trust and straightforwardness whereas the mean score was high on altruism facet in normal group followed by alcohol and HIV cases. On facet of modesty and tender mindedness, there was significantly high mean score in alcohol cases as compared to other groups. On “C” factor, significant difference was noted between the study groups in facets of order, dutifulness, achievement striving, and deliberation facets, but not on competence and self-discipline. The mean score of normal group was significantly higher on facets of order, dutifulness, and achievement striving as compared to other groups. On deliberation, HIV patients had significantly higher scores.

The five-factor model of personality was further analyzed by categorizing scores either into high versus others (factors N, E, and O) or into low versus others...
Table 2: Mean scores on five-factor model of personality of alcohol-dependent patients, human immunodeficiency virus-positive patients, and normal controls

| Five factors   | Groups       | Mean  | SD    | Minimum | Maximum | Mean rank | Significance |
|---------------|--------------|-------|-------|---------|---------|-----------|-------------|
| Neuroticism   | Alcohol      | 53.08 | 8.84  | 37      | 80      | 148.32    | $\chi^2=22.742; df=2; P<0.01$ |
|               | HIV          | 57.43 | 10.84 | 41      | 87      | 180.75    | $\chi^2=22.742; df=2; P<0.01$ |
|               | Normal       | 50.49 | 7.47  | 36      | 79      | 122.43    | $\chi^2=22.742; df=2; P<0.01$ |
| Extraversion  | Alcohol      | 48.10 | 7.38  | 24      | 71      | 135.48    | $\chi^2=7.477; df=2; P<0.05$ |
|               | HIV          | 49.11 | 8.11  | 29      | 80      | 147.47    | $\chi^2=7.477; df=2; P<0.05$ |
|               | Normal       | 50.41 | 8.24  | 5       | 66      | 168.56    | $\chi^2=7.477; df=2; P<0.05$ |
| Openness to experience | Alcohol | 43.25 | 9.47  | 26      | 77      | 144.47    | $\chi^2=15.665; df=2; P<0.01$ |
|               | HIV          | 41.88 | 8.32  | 25      | 80      | 129.86    | $\chi^2=15.665; df=2; P<0.01$ |
|               | Normal       | 44.99 | 5.21  | 30      | 57      | 177.18    | $\chi^2=15.665; df=2; P<0.01$ |
| Conscientious-ness | Alcohol | 49.70 | 8.75  | 27      | 63      | 157.21    | $\chi^2=11.936; df=2; P<0.05$ |
|               | HIV          | 46.93 | 13.23 | 20      | 80      | 126.79    | $\chi^2=11.936; df=2; P<0.05$ |
|               | Normal       | 51.48 | 8.03  | 27      | 76      | 167.51    | $\chi^2=11.936; df=2; P<0.05$ |
| Agreeableness | Alcohol      | 48.30 | 7.66  | 29      | 69      | 195.41    | $\chi^2=40.537; df=2; P<0.01$ |
|               | HIV          | 42.59 | 8.51  | 26      | 79      | 125.78    | $\chi^2=40.537; df=2; P<0.01$ |
|               | Normal       | 42.90 | 5.93  | 20      | 59      | 130.32    | $\chi^2=40.537; df=2; P<0.01$ |

HIV – Human immunodeficiency virus; SD – Standard deviation

Table 3: Facets scores on neuroticism, extraversion, openness to experiences, agreeableness, and conscientiousness domains of alcohol-dependent patients, human immunodeficiency virus-positive patients, and normal controls

| Domains               | Facets                  | Alcohol | HIV  | Normal | Significance |
|-----------------------|-------------------------|---------|------|--------|--------------|
| Neuroticism           | Anxiety                 | 12.69   | 14.29| 16.64  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Anger hostility          | 13.47   | 15.27| 17.34  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Depression               | 15.88   | 18.78| 21.81  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Self-consciousness       | 15.45   | 16.55| 18.45  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Impulsiveness            | 15.49   | 16.59| 18.59  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Vulnerability            | 11.98   | 13.23| 14.78  | $\chi^2=9.455; df=2; P<0.05$ |
| Extraversion          | Warmth                  | 19.60   | 21.18| 22.68  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Gregariousness          | 19.25   | 21.65| 23.25  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Assertiveness           | 16.24   | 18.78| 21.28  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Activity                | 15.85   | 17.67| 19.47  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Excitement seeking      | 14.72   | 16.82| 18.72  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Positive emotions       | 19.09   | 20.63| 22.17  | $\chi^2=9.455; df=2; P<0.05$ |
| Openness to experience| Fantasy                 | 14.65   | 16.07| 17.55  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Esthetics               | 19.10   | 20.54| 22.04  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Feelings                | 17.65   | 19.03| 20.74  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Actions                 | 12.99   | 14.13| 15.66  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Ideas                   | 18.86   | 20.13| 21.68  | $\chi^2=9.455; df=2; P<0.05$ |
| Agreeableness         | Trust                   | 16.19   | 17.53| 19.08  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Straightforwardness     | 19.78   | 21.79| 23.79  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Altruism                | 19.58   | 21.58| 23.58  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Compliance              | 19.68   | 21.19| 23.19  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Modesty                 | 17.72   | 20.13| 22.13  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Tender-mindedness       | 20.08   | 21.71| 23.71  | $\chi^2=9.455; df=2; P<0.05$ |
| Conscientiousness     | Competence              | 20.37   | 20.13| 21.53  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Order                   | 18.43   | 19.43| 21.43  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Dutifulness             | 21.42   | 21.63| 23.63  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Achievement striving    | 21.73   | 22.13| 24.13  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Self-discipline         | 20.79   | 21.39| 23.39  | $\chi^2=9.455; df=2; P<0.05$ |
|                       | Deliberation            | 18.92   | 19.73| 21.93  | $\chi^2=9.455; df=2; P<0.05$ |

HIV – Human immunodeficiency virus
(on factors A and C) using univariate analysis as well as by considering five factors using logistic regression. This was carried out to validate the hypothesis proposed in the study.

For validating the hypothesis that alcohol and HIV cases will score high as compared to normal controls on “N,” the scores were divided into high and other scores, characterized by average and low scores. It was found that high proportion of HIV-positive cases had scored high scores as compared to other groups (\( P < 0.01 \)). Odds ratio was calculated for HIV and alcohol patients as compared to normal controls with respect to having high score on “N” versus other scores, which revealed that odds of having high scores on “N” were significantly more in alcohol and HIV cases as compared to normal controls [Table 4].

The hypothesis that high “E” scores are noted more frequently in alcohol and HIV is negated by the findings. Chi-square test was applied for evaluating the difference between the groups, and it revealed that normal controls had high proportion of high scores as compared to alcohol and HIV cases. Odds ratio was calculated for HIV and alcohol patients as compared to normal with respect to having high score on “E” versus other scores, which revealed that odds of having high scores on “E” among alcohol and HIV cases were 0.30 and 0.27 times odds of having high scores among normal controls; hence, it can be concluded that having high score on “E” has a protective effect [Table 4].

It was hypothesized that factor “O” on five-factor model of personality will be high in alcohol and HIV cases. Chi-square test was applied to validate the hypothesis proposed in the study. This was carried out to validate the hypothesis proposed in the study. It revealed that more number of normal cases had high scores as compared to alcohol and HIV cases (\( P > 0.01 \)). Odds ratio was calculated for HIV and alcohol patients as compared to normal with respect to having high score on “O” versus other scores, which revealed that odds of having high scores among normal controls; however, this association was not statistically significant. It can be concluded that having high score on “O” has no effect [Table 4].

It was hypothesized that factor “C” on five-factor model of personality will be low in alcohol and HIV cases. A significant difference was not noted in the findings. Chi-square test was computed for evaluating the significant difference among the groups. It revealed that more number of normal cases had high scores as compared to alcohol and HIV cases (\( P > 0.01 \)). Odds ratio was calculated for HIV and alcohol patients as compared to normal with respect to having high score on “C” versus other scores, which revealed that odds of having high scores on “C” among alcohol and HIV cases were 0.77 and 0.68 times odds of having high scores among normal controls; hence, it can be concluded that having high score on “C” has a protective effect. However, this difference was not statistically significant.

It was hypothesized that alcohol-dependent cases would score low on “C” as compared to normal group. Chi-square test was computed for evaluating the significant difference among the groups. A significant difference was noted on the low scores on “C” versus other scores in the study groups (\( P < 0.01 \)). It revealed that more number of HIV and alcohol cases had low scores as compared to normal group (\( P < 0.01 \)). Findings revealed that HIV cases had high proportion of low scores as compared to alcohol and normal cases (\( P < 0.01 \)). Odds ratio was calculated for HIV and alcohol cases as compared to normal group with respect to having low score on “C” versus other scores, which revealed that odds of having low scores on “C” among alcohol and HIV cases were 2.84 and 6.10 times odds of having low scores among normal controls. The difference was statistically significant [Table 5].

**Table 4: High scores as compared with other scores on various domains of NEO personality inventory revised of alcohol-dependent patients, human immunodeficiency virus-positive patients, and normal controls**

| Domain               | Score     | Normal | Alcohol | HIV | \( \chi^2 \) | \( df=2; \) | \( P \) | OR (95% CI) |
|----------------------|-----------|--------|---------|-----|------------|------------|------|-------------|
| Neuriticism          | High      | 14     | 35      | 44  | \( =22.16; \) | \( df=2; \) | \( <0.001 \) | 3.31 (1.56-7.07) |
|                      | Other than high | 86     | 65      | 56  | \( =22.16; \) | \( df=2; \) | \( <0.01 \)  | 4.83 (2.31-10.22) |
| Extraversion         | High      | 29     | 11      | 10  | \( =16.65; \) | \( df=2; \) | \( <0.01 \)  | 0.30 (0.13-0.68) |
|                      | Other than high | 71     | 89      | 90  | \( =16.65; \) | \( df=2; \) | \( <0.01 \)  | 0.27 (0.12-0.63) |
| Openness to experience | High     | 6      | 8       | 6   | \( =4.43; \) | \( df=2; \) | \( <0.01 \)  | 1.36 (0.41-4.53) |
|                      | Other than high | 94     | 92      | 94  | \( =4.43; \) | \( df=2; \) | \( <0.01 \)  | 0.1 (0.27-3.36) |
| Conscientous-ness    | High      | 28     | 23      | 21  | \( =14.22; \) | \( df=2; \) | \( <0.01 \)  | 0.77 (0.39-1.52) |
|                      | Other than high | 72     | 77      | 79  | \( =14.22; \) | \( df=2; \) | \( <0.01 \)  | 0.68 (0.34-1.37) |

HIV – Human immunodeficiency virus; OR – Odds ratio; CI – Confidence interval
It was hypothesized that HIV-positive cases would score low on “A” as compared to normal group. Chi-square test was computed for evaluating the significant difference among the groups. Significant difference was noted on the low scores on “A” and other than low scores in the study groups ($P < 0.01$). Low scores on “A” were noted significantly more in HIV group. Odds ratio was calculated for HIV and alcohol patients as compared to normal with respect to having low score on “A” versus other scores, which revealed that odds of having low scores on “A” among alcohol and HIV cases were 0.31 and 1.1 times odds of having low scores among normal controls. This difference was statistically significant. Hence, it can be concluded that having low scores on “A” is a risk factor for HIV [Table 5].

Univariate analysis showed that “N,” “E,” and “A” had a significant association with the presence of alcohol whereas “O” and “C” were not significantly associated. When all the factors of personality considered together and analyzed using logistic regression model, all the factors had a significant association with the presence of alcohol [Table 6].

Univariate analysis revealed that “N” and “E” had a significant association with the presence of HIV whereas “O” and “A” were not significantly associated. When all the factors of personality considered together and analyzed using logistic regression model, “N,” “E,” and “C” had a significant association with the presence of HIV seropositivity. However, “A” and “O” were not significantly associated with HIV seropositive status [Table 7].

There was no significant difference between groups on total sensation-seeking score [Table 8]. The normal group had significantly higher scores as compared to HIV and alcohol on TAS. On DIS, the HIV and alcohol group scored significantly more than the normal group. There was no significant difference between groups on ES though scores were high in the alcohol group as compared to HIV and normal group. On BS, alcohol cases had scored significantly more as compared to HIV and normal group.

Table 5: Low scores as compared with other scores on various domains of NEO personality inventory revised of alcohol-dependent patients, human immunodeficiency virus-positive patients, and normal controls

| Domain           | Score   | Normal | Alcohol | HIV | Significance | OR (95% CI)          |
|------------------|---------|--------|---------|-----|--------------|----------------------|
|                  |         |        |         |     |              | Alcohol versus normal | HIV versus normal   |
| Conscientiousness| Low     | 11     | 26      | 43  | $\chi^2=26.22$; df=2; $P<0.01$ | 2.8 (1.24-6.6)       | 6.10 (2.76-13.75)   |
|                  | Other than low | 89     | 74      | 57  |              |                      |                     |
| Agreeableness    | Low     | 58     | 30      | 62  | $\chi^2=24.36$; df=2; $P<0.01$ | 0.31 (0.17-0.58)     | 1.1 (0.64-2.17)    |
|                  | Other than low | 42     | 70      | 38  |              |                      |                     |

HIV – Human immunodeficiency virus; OR – Odds ratio; CI – Confidence interval

Table 6: Logistic regression of personality parameters of alcohol dependence versus normal controls

| Factor                     | $B$   | SE | Wald | df | Significant | Exp(B) |
|---------------------------|-------|----|------|----|-------------|--------|
| Neuroticism high score    | 0.961 | 0.414 | 5.382 | 1 | 0.020 | 2.613 |
| Extroversion high score   | -1.833 | 0.554 | 10.933 | 1 | 0.001 | 0.160 |
| Openness to experience high score | 1.730 | 0.819 | 4.468 | 1 | 0.035 | 5.642 |
| Agreeableness low score   | -1.658 | 0.351 | 22.346 | 1 | 0.000 | 0.190 |
| Conscientiousness low score | 1.151 | 0.474 | 5.895 | 1 | 0.015 | 3.163 |
| Constant                  | 0.499 | 0.240 | 4.331 | 1 | 0.037 | 1.648 |

log likelihood=224.501, Hosmer and Lemeshow test Chi-square=10.059, df=6; significant $P>0.05$. SE – Standard error

Table 7: Logistic regression of personality parameters of human immunodeficiency virus versus normal controls

| Factor                     | $B$   | SE | Wald | df | Significant | Exp(B) |
|---------------------------|-------|----|------|----|-------------|--------|
| Neuroticism high score    | 0.908 | 0.407 | 4.988 | 1 | 0.026 | 2.480 |
| Extroversion high score   | -1.254 | 0.470 | 7.120 | 1 | 0.008 | 0.285 |
| Openness to experience high score | 0.662 | 0.755 | 0.768 | 1 | 0.381 | 1.938 |
| Agreeableness low score   | -0.549 | 0.350 | 2.459 | 1 | 0.117 | 0.577 |
| Conscientiousness low score | 1.509 | 0.464 | 10.585 | 1 | 0.001 | 4.522 |
| Constant                  | -0.132 | 0.265 | 0.180 | 1 | 0.671 | 0.894 |

log likelihood=233.057, Hosmer and Lemeshow test Chi-square=2.740, df=6; significant $P>0.05$. SE – Standard error
Table 8: Sensation-seeking scale scores of alcohol-dependent patients, human immunodeficiency virus-positive patients, and normal controls

| Variables               | Groups      | Mean   | SD    | Percentage <4 out of 10 | Mean rank | Significance |
|-------------------------|-------------|--------|-------|-------------------------|-----------|--------------|
| Thrill and adventure seeking | Alcohol     | 4.67   | 1.94  | 50                      | 157.21    | $\chi^2=48.02; df=2; P<0.05$ |
|                         | HIV         | 4.29   | 1.93  | 90                      | 118.26    | $\chi^2=2.430; df=2; P>0.05$ |
|                         | Normal      | 6.03   | 1.30  | 20                      | 198.20    | $\chi^2=11.639; df=2; P<0.05$ |
| Experience seeking      | Alcohol     | 1.78   | 1.54  | 90                      | 144.72    | $\chi^2=15.604; df=2; P<0.01$ |
|                         | HIV         | 1.65   | 1.14  | 90                      | 145.55    | $\chi^2=2.430; df=2; P>0.05$ |
|                         | Normal      | 1.98   | 1.52  | 90                      | 161.24    | $\chi^2=3.850; df=2; P>0.05$ |
| Disinhibition            | Alcohol     | 1.68   | 1.96  | 80                      | 156.53    | $\chi^2=48.02; df=2; P<0.05$ |
|                         | HIV         | 1.79   | 1.87  | 80                      | 156.53    | $\chi^2=2.430; df=2; P>0.05$ |
|                         | Normal      | 1.02   | 1.41  | 90                      | 128.06    | $\chi^2=11.639; df=2; P<0.05$ |
| Boredom susceptibility   | Alcohol     | 3.08   | 1.947 | 80                      | 177.07    | $\chi^2=48.02; df=2; P<0.05$ |
|                         | HIV         | 1.18   | 1.88  | 90                      | 142.46    | $\chi^2=11.639; df=2; P<0.05$ |
|                         | Normal      | 2.10   | 1.275 | 90                      | 131.98    | $\chi^2=2.430; df=2; P>0.05$ |
| Total score             | Alcohol     | 11.21  | 4.768 | 80                      | 154.23    | $\chi^2=3.850; df=2; P>0.05$ |
|                         | HIV         | 10.12  | 3.921 | 90                      | 131.98    | $\chi^2=11.639; df=2; P<0.05$ |
|                         | Normal      | 11.13  | 3.004 | 90                      | 160.16    | $\chi^2=2.430; df=2; P>0.05$ |

SD – Standard deviation; HIV – Human immunodeficiency virus

**DISCUSSION**

In the present study, an attempt was made to assess personality on five-factor model along with sensation seeking in alcohol-dependent and HIV patients and comparing them with normal controls. Analysis of sociodemographic characteristics of the study groups revealed that the study groups were homogeneous with respect to marital status, education, and monthly income. Although there was statistically significant difference in age, it can be seen from the results that the age range differs within a year. Sociodemographic characteristics of the various groups in an earlier study noted the age of the patients of HIV group were on a higher side of 30 years and above. Monthly income of their study groups was also very low; however, in the present study, majority of the cases fall in Rs. 5000/ and above per month income group as most of the patients are in government jobs.

A positive family history of alcohol use was one of the risk factors associated with alcohol dependence. It is noted that proportion of a history of alcohol use in father is higher in alcohol group as compared to HIV-positive cases and normal controls. A cross-sectional study to evaluate risky sex and alcohol use among injection drug users revealed that alcohol use was associated with high-risk sexual behavior. A temporal link of alcohol use and HIV risk became explicit as ingestion of moderate quantities of alcohol impairs judgment. Alcohol can, therefore, increase the risk for HIV transmission by impaired personal control, increased risk taking, diminished perception of risk from unprotected sex, or due to increased sexual activity under the effect of alcohol. A history of alcohol use during sex was noted in approximately equal number of cases in alcohol and HIV group (18 and 17, respectively). The history of alcohol use has been associated with not only impairment of discretion but also disease progression in HIV cases. Alcohol use impacts HIV infection with increased transmission risk and possible disease progression. Excessive alcohol users tend to engage in high-risk behaviors, such as sex with multiple partners, unprotected vaginal and anal intercourse, often with a commercial sex worker, and injection drug use. There is also some evidence that reducing substance use may reduce risky sexual behavior.

Knowledge about modes of transmission plays a role in planning various education and information strategies. It was found that knowledge about modes of transmission of HIV was significantly more among normal group. The findings revealed that source of gaining knowledge was from books among normal group (33%); 46% of HIV cases had gained knowledge about HIV transmission through media whereas among normal group 35% had acquired this knowledge from media. It is noted that friends played little less role in gaining knowledge about HIV probably because the levels of knowledge was the same in that age group. These findings are in agreement with an earlier Indian study on migrant workers. Educational standards appear to decide the source of gathering the information as noted in the present study. Normal group had gathered the maximum knowledge from books. HIV and hepatitis B are more likely to be transmitted through unprotected sexual activity, the viruses can be transmitted by nonsterile tattooing and piercing practices. It is noted that among normal group, history of tattoo and intravenous drug abuse (IDA) was absent. Significant difference was not noted in the presence of history of IDA and tattoo between HIV and alcohol cases. Findings do not concur with the available literature because low number of IDA in the study groups.
In the present study on five-factor model, “N” was high among HIV and alcohol cases, which is in agreement with the available literature. In “E,” alcohol cases had lowest mean score followed by HIV cases and significantly less than normal. It is interesting to note that “E” as a factor is not implicated as noted by the present study. The desurgent personality pattern was noted among alcohol cases compared to normal.[33]

In the present study, “N” was high in alcohol group along with low “C” as compared to normal group. There appears to be common personality profile marked by high “N,” low “C,” and low “A” in substance use disorders.[33] However, in “O,” normal group had high mean score as compared to alcohol cases. Similarly, the mean score of “A” was also noted to be significantly more in alcohol as compared to HIV and normal group. It appears that the social desirability parameter of “A” is a modifiable dimension as noted in the study. Since these patients were part of the group under treatment, the therapeutic interventions might have buffered some of the findings. The findings are broadly in agreement with a meta-analysis that reported a general pattern of high “N,” low “C,” low “A,” and low “E” in people with clinical symptoms.[34]

Certain qualifications are in order as other authors have also found the relationship between the onset of alcohol consumption and personality pattern. In the present study, neuroticism was noted to be high among alcohol cases, and it might have facilitated the use of alcohol as it reduces anxiety, one of the factors of neuroticism. Neuroticism appeared as a risk factor as noted in other studies.

The applicability of various big five measures to the prediction of various socially and culturally significant behavioral variables (such as alcohol consumption) has also been studied. In the cases of alcohol consumption, neuroticism/emotionality, impulsivity/DIS, and extraversion/sociability have been found to be correlates of concurrent alcoholism, future alcoholism, or risk for alcoholism. Extraversion and nonconscientiousness played a determinant role in the prediction. There appears to be internal consistency in the finding.[35]

A study of the association between health behavior and personality dispositions found “C” to be a strong predictor of health behavior and low “A” to be responsible for risk taking.[36] A cross-sectional study of health-related habits of over 1000 university students reported a significant relationship between “C,” “A,” and health-related behaviors such as current alcohol consumption.[37] Alcohol cases had slightly higher score on agreeableness as compared to HIV and normal controls though the scores were within the average range. Most probably, the higher age group (mean age - 33.35 years) in the alcohol cases might have influenced the findings. As the age increases, conformity also increases. This is in concurrence with the results of other studies. Authors have found low score on “O” to be associated with prejudice, and low “A,” suggesting a lack of altruism and sympathy. However, in the present study age might have influenced the findings.[38] Hence, it appears that age and experience might have influenced the findings of the present study.

High “N” and low “C” are in concurrence with the available literature. Personality patterns were consistent with those of people with psychiatric disorders and substance use disorders.[39]

In the present study, HIV cases had scored significantly higher from alcohol and normal cases on “N,” “E” and significantly low on “C”. Further facet domains on each of the factors also revealed, HIV cases having higher mean score on anxiety, anger-hostility depression, followed by vulnerability facet in “N” domain. In “E” domain also, HIV cases were noted to be low in assertiveness and comparatively higher in excitement seeking facet as compared to alcohol cases. In “O” domain, HIV cases scored significantly higher on fantasy facet. In “A” domain, trust and straightforwardness were noted to be significantly less among HIV cases. Low score on trust and straightforwardness qualifies for the tendency to manipulate others through flattery, craftiness, or deception. Similarly, low score on trust tends to be skeptical of others motives. On “C” domain, significant difference was noted on dutifulness, achievement striving, and deliberation facets. The mean score of HIV group is lowest on “C” parameters as compared to other groups. Low “C” appears to be more directly associated with HIV risk behavior.

“N” has consistently appeared as one of the risk factors in personality domain. “N” seems to play a significant role in both groups: alcohol and HIV cases. The hypothesis that high “E” scores are frequently noted in alcohol and HIV is negated by the findings of the present study. In fact, it can be concluded that having score on “E” has a protective effect. To qualify the findings, one needs to analyze the higher-order dimensions of extraversion and find the relationship with the construct. Eysenck and Eysenck found that taxonomy of traits is strongly related to one another[40] and has several component traits in common. Extraverts are gregarious, friendly, dominant, and socially facile. They enjoy being with other people and are confident and comfortable when interacting with them. Thus, all of these views strongly emphasize the social/interpersonal aspects of the construct. Eysenck and Cattell included a substantial affective component in their models— they describe extraverts as cheerful, optimistic, and enthusiastic. These energy and affective components have become even more prominent in recent formulations. More recent formulations have retained many of the traditional primary
traits, the most notable of these being an increased focus on the positive emotional aspect of the dimension. Studies have repeatedly demonstrated that self-rated mood is characterized by two dominant dimensions that reflect the crucial role of valence in affective experience. Specifically, negatively valenced mood terms strongly co-occur in individuals, and so combine to form a broad factor called “negative affect;” similarly, positively valenced mood states also tend to co-occur, and so jointly compose the higher-order dimension of PA. Both of these dimensions can be assessed either as a state (i.e., transient mood fluctuations) or as a trait (i.e., stable individual differences in general affective level). Costa and McCrae were the first investigators to explore these relations systematically, and they subsequently incorporated these findings into their model of extraversion. The most significant addition is the inclusion of a facet called “positive emotions.” This facet reflects stable individual differences in the tendency to experience positive emotions. It is worth mentioning here that extraversion facets (especially warmth, activity, and assertiveness) are also related to state PA, at least to some extent. Hence, normal controls having this dimension probably ascertain the underlying constructs of extraversion. In the present study, also, when facet domains of warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions were compared in the study groups, significant differences were noted in warmth, gregariousness, excitement seeking, and positive emotions. PA and extraversion are consistently associated with normalcy as noted in the present findings wherein normal group has scored higher on these dimensions.

“O” in five-factor model of personality was hypothesized to be high in alcohol and HIV cases. However, findings did not reveal any significant difference between the groups. It can be concluded that having high score on “O” has no effect. Perceived risk of HIV infection is related to “O.” Low “O” may inhibit accurate assessment of risk by restricting consideration of information and influencing other heuristic biases. However, analysis of the facets revealed significantly higher mean score of HIV cases in fantasy and actions as compared to other groups and lower in values facet. The overall interpretation qualifies tendency to try different activities. These findings are to be synthesized toward holistic profile of HIV cases.

“C” has emerged as very important factor for clinical conditions as well. On some of the facet of “C,” i.e., dutifulness, achievement striving and order HIV cases had scored lowest as compared to other study groups. Conscientiousness, defined as social conformity and impulse control, is the degree to which a person makes an effortless adaptation to authority. Individual differences is “C” form a continuum, from those who lack “C” - who are unable to resolve conflicts with authority to those with excessive “C” - who are compulsive, stingy, dependent. In consonance with the above, in the present study, low “C” was identified as a risk factor. Fowles noted that Tellegen’s constraint dimension, which is related to the Goldberg-Norman conscientiousness factor in the five-factor model, contains items such as cautious, restrained, avoidant, and timid, associated with self-control. These traits are directly linked with risk-taking behavior. Analysis of sensation-seeking score in the study groups revealed no difference in total score. The low mean score among the study groups on sensation seeking can be qualified from a developmental point of view. Most probably, middle age of the sample might have led to low scores on sensation seeking. The theory of sensation seeking states that high sensation seekers possess a strong need for varied and intense stimulation. Impulsivity has been conceptualized in a number of different ways. A prominent feature of impulsivity, in contrast to sensation seeking, is failure to inhibit behavior that is likely to result in negative consequences. Impulsivity may be a particularly impairing trait, because when faced with a problem, a person high on the trait of impulsivity may be likely to rely on coping methods that can be quickly implemented and provide short-term relief, regardless of the potential long-term negative consequences. As far as alcohol use is concerned individuals high on impulsivity may be inclined to use alcohol to cope with distress, this is not necessarily expected for individuals high on sensation seeking. Hence, sensation seeking needs not be primarily implied in alcohol-dependent cases.

Individuals who seek optimal stimulation and novelty (sensation seeking) may be inclined to engage in high-risk sexual acts despite the threat of HIV infection. It is, therefore, plausible that these same attributes contribute to behaviors that risk infecting others after one tests HIV seropositive.

In the present study, alcohol cases had scored significantly more scores on BS as compared to HIV and normal. Items on this factor indicate an aversion for repetitive experiences of any kind, routine work, or even dull work. Other items indicate a restless reaction when things are unchanging. Probably, alcohol cases had greater tendency to experiment with different experiences. Significantly, high BS among alcoholics has been noted by other authors.

On DIS, the HIV cases and alcohol cases had scored significantly higher scores as compared to control group. This scale comprises items describing the need to disinhibit one’s behavior in the social sphere by drinking, partying, and seeking variety in the sexual partners. A significant relationship among heterosexual experiences and DIS and BS has been reported. Studies have also reported DIS processes including impulsivity as an underlined factors in alcohol dependence.
The present study was a cross-sectional study. A longitudinal study in the study group will help in ascertaining the role of personality factors in both alcohol and HIV cases. The data are required to be followed up to evaluate treatment implications in alcohol and HIV cases. The study had only male individuals and females also could have been included as part of the study group.

**CONCLUSION**

On five-factor model, there were significant differences among alcohol dependence, HIV, and normal controls on all the five factors, i.e., Neuroticism (N), Extraversion (E), Conscientiousness (C), Openness (O), and Agreeableness (A). On factor “N,” HIV and alcohol cases had scored significantly more as compared to normal group. Odds ratio also revealed high “N” to be a risk factor in alcohol and HIV cases. The normal group had scored significantly higher on factors “E” and “O” as compared to HIV and alcohol cases, and high scores on “E” were found to be protective. Factor “O” did not emerge as a risk factor in the present study. Similarly, on “C” domain, score and facet of competence and order normal group had scored higher as compared to HIV and alcohol cases. On achievement striving, HIV cases had scored lowest. Odds ratio found low score of “C” as a risk factor for HIV and alcohol cases. Factor “A” domain scores among the study groups did not have much variation. High scores on “C” were considered to be protective in the study. The logistic regression revealed that high scores on “N” and “E” and low scores on “A” were significantly associated with alcohol dependence. Among HIV cases, factors which emerged significant were high score on “N” and “E” and low “C”.

Sensation seeking in totality was not implicated in the present study. Alcohol-dependent patients had scored significantly more on BS as compared to HIV and normal controls. On DIS, the HIV cases and alcohol cases had scored significantly higher as compared to normal group.

To sum up, it was interesting to note that findings of study elucidated role of personality factors and highlighted protective factors and risk factors in alcohol and HIV cases. This is a worth mentioning indication of the study, wherein neuroticism, emerged as a risk factor for both alcohol and HIV cases and extraversion emerged as a protective factor in HIV and alcohol-dependent cases. High scores on conscientiousness were considered to be protective in the study. This has future implications where in positive emotionality can be given impetus as protective factors.

It is recommended that future research in this area can include correlation with biological parameters to ascertain the heritability and environmental influences in the cases of alcohol and HIV. This will help in qualifying the modifiability of traits. The intervention and modification of traits can help in identifying treatment implications in alcohol and HIV cases. Longitudinal study will help in suggesting these outcome variables.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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