

**PREVALENCE OF ALCOHOL USE AMONG PATIENTS ATTENDING TRAUMA CENTER IN A TERTIARY CARE HOSPITAL: A CROSS SECTIONAL STUDY**S. Arun<sup>1</sup>, A. John Dinesh<sup>2</sup>, Alok Pandey<sup>3</sup>, Shripathy M. Bhat<sup>4</sup>, Sreejayan<sup>5</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: HYPOTHESIS:** Significant number of cases attending trauma center are associated with alcohol use. **AIM:** To study the prevalence, pattern and severity of alcohol use in patient attending trauma center with an emergency in a tertiary care hospital. **MATERIALS AND METHODS:** Total of 100 consecutive patients attending the trauma center from 6pm – 6am and who were fulfilling the inclusion criteria and had consented to participate in the study were recruited. Alcohol breath analyzer was administered and then the rating scales SMAST, AUDIT and QIAD were administered. **RESULTS:** On socio demographic profile of study subjects' age group between 18-30yrs, male gender and nuclear family background were found to be more predominant. Twenty one (21.9%) patients in alcohol breath analysis and Twenty three (23.9%) patients in SMAST screening were found to be positive for alcohol use. On evaluation of injury related variables; RTA and injury at single site were found to be more among the total subjects. In alcohol positives injuries at multiple sites and admission were found to be more as compared to negatives. Most of the patient among breath positives (70%) scored 8 and above in AUDIT scale indicating hazardous level of drinking. Fifteen patients (15.6%) were found to be "alcoholics" by QIAD analysis. **CONCLUSION:** In agreement with findings of previous several studies of worldwide, the present study draws attention to recognizing the alcohol use as a significant contributory factor to trauma, especially RTA.

**KEYWORDS:** Alcohol, Road traffic accident, Injury, Breath analyzer.

**INTRODUCTION:** Alcohol is a major risk factor for traumatic outcomes that kill or disable individuals at a relatively young age, 8th leading risk factor for deteriorating health status of population. It contributes both directly and indirectly to the occurrence of injuries and thus is a potentially modifiable factor.<sup>(1)</sup> Road Traffic Injuries (RTIs) are often associated with alcohol use as it impairs judgment and increases the possibility of involvement in other high risk behaviors (e.g., speeding, violating rules, etc.).<sup>(2)</sup>

Effects of alcohol are dose related, but can be observed at a blood alcohol concentration (BAC) of 0.05 volume percent in most people and at 0.08 volume percent in virtually all people.<sup>(3)</sup> Blood alcohol levels of 0.05g/100ml are linked with an increased risk of crash involvement.<sup>(4,5)</sup> Emergency room (ER) studies, implicate alcohol as a major risk factor for injury.<sup>(6,7)</sup> ER trauma cases involved 20-30 percent alcohol use.<sup>(8)</sup> 40 to 50 percent of traffic fatalities and 25 to 35 percent of nonfatal motor vehicle injuries are associated with alcohol use.<sup>(9)</sup>

In the WHO study around 12 countries proportion of injury cases with alcohol involvement was ranged from 6% to 45%.<sup>(1)</sup> General population surveys have found those reporting five or more drinks per day at least three times a year at elevated risk of injury.<sup>(10)</sup> Patients who were intoxicated on the initial admission were 2.5-fold more likely to be readmitted than those not intoxicated.<sup>(11)</sup>

## ORIGINAL ARTICLE

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Positive Serum Alcohol Concentrations (SAC) had a greater probability of having a psychiatric history and more frequently had a prior or subsequent injury.<sup>(12)</sup> Brief interventions for alcoholics attending the trauma center is associated with reduction in alcohol intake and a reduced risk of trauma recidivism.<sup>(13,14)</sup>

The prevalence of problem drinkers admitted in the private general hospital is 14.6 %.<sup>(15)</sup> Alcohol related problems made up 17.6% of the case load of psychiatric emergencies in an Indian general hospital (Adityanjee et al., 1989).

### **MATERIALS AND METHODS:**

**Data Collection:** The study was conducted in Trauma center of Kasturba hospital, Manipal. It's a tertiary care hospital catering major area in the south zone of Karnataka. Hundred consecutive patients presenting to trauma center from 6PM to 6AM who were fulfilling the inclusion criteria and willing to give consent were taken up for study.

**Breath Analysis:** Alco-Sensor breath alcohol analyzer (Intoximeters, Incorporated) was used to measure the blood alcohol concentration.

Questionnaire SMAST was used for screening the subjects and AUDIT, QIAD were used to identify the severity, pattern and social adverse effects of alcohol use.

**STATISTICS:** Statistical analyses were conducted using SPSS statistical software 13.0 version. Descriptive statistics method was used. Chi square was used as test of significance.

**RESULTS:** Out of 100 patients screened 4 patients were excluded from the study as 3 patients gave inconsistent reports and one patient died.

On socio-demographic variables Males (88.5%) and age group between 18-20 years (73%) were found to be more among the total subjects. Most of them were from MSES (67.7%) and unmarried (66.8%).

Significant numbers of patients (80.9%) with alcohol breath positives were from the nuclear family when compared to the negatives (21.3%). Skilled laborer (57.1%) and Students (38.1%) were found to be more and had residence mostly in Semi urban (47.7%) and then in rural (38.1%) areas (Table-1).

**Screening:** Twenty-one (21.9%) patients out of 96 patients were found to be positive on alcohol breath test. Using SMAST as a screening instrument, among the total study subjects 73 (76%) patients were found to have no problems, 8 (8.3%) had possible problem, 1 (1.04%) had probable problem and 14 (14.6%) had definite problem.

Seventeen (81%) patients who were breath positive also screened positive on SMAST but the other 4 (19%) breath positive patients screened negative on SMAST.

In contrast six (26%) patients who showed problem on SMAST screening were found negative in breath analyzer (Table-2).

**BAC & Diagnosis:** Among positives, most of them (52.4%) had alcohol level in the range between 0.06 – 0.09% g/l. Occasional use (52.4%) of alcohol was found to be the more common impression

## ORIGINAL ARTICLE

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than Alcohol dependence syndrome (33.3%) and Alcohol abuse (14.3%). LFT was found to be abnormal in 7(33.3%) patients. No abnormality was found in serum electrolytes (Table-3).

**RTA:** Road traffic injuries (RTA) (71.9%) were found to be the most frequent cause of injury than accidental injuries (29.3%), including falls, crush, burns... and assaults (1.3%). RTA was the most common cause of injury both in BAC positive (80.1%) and negative (69.3%) (Table-4).

**Injuries:** More of Alcohol breath positive patients had injuries at multiple sites (47.6%) as compared to negatives that were more likely to have single injury in either upper (26%) or lower limbs (31.3%) than at multiple sites (19.8%).

Back, chest and abdomen were the least sites to be injured in negative groups whereas it was not involved at all in positive groups.

Only very fewer patients (5.2%) had head injury with intra cranial hemorrhage (ICH) among which nearly 60% (n=3) were found to be in positive group and 40% (n=2) in negative group.

Twelve (57%) of patients with alcohol use reported they had injury at least once under alcohol influence in the last or previous year (Table-4).

**Admission:** Forty (41.7%) patients out of 96 patients had problems serious enough to warrant admission among which 12 (30%) patients were positive for BAC and 28 (70%) were negative. More number of positives 57.1% (n=12) got admitted as compared to negatives were only 27.4% (n=28) admitted (Table-4).

**Amount of drink and Severity:** Among 21 patients, 10 (47.6%) patients reported consuming alcohol monthly or less and 28.6% reported 2-3times/week. On the day of drinking 47.6% (n=10) reported to be drinking not less than 3 drinks and on some occasion 47.6% (n=10) reported to be having 6 drinks or more at least once in a month or less.

On overall rating of AUDIT scale 28.6% (n=6) scored at level 1 (less than the score 8) and nearly 70% (n=15) scored 8 and above indicating hazardous level of drinking, in which 23.8% scored at level 2, 19% at level 3 and 28.6% at level 4 (Table-5).

47.6% of BAC positive and 65.2% of SMAST positive scored > 21 on QIAD indicating presence of alcoholism. 24% of alcohol positives were neglecting their personal responsibilities and 25% had faced legal problems due to alcohol use. Nearly 3/4<sup>th</sup> of the patients had at least small problem in their relationships and 25% had problem in their work with one person fired out of the job due to alcohol use. Drinking in an inappropriate situation on several occasions was reported by 29% of alcohol positives (Table-6).

**DISCUSSION:** The time duration between 6PM and 6AM was chosen as there were studies reporting that night time crashes were contributing for nearly 30-40% of RTA (Gururaj et al., 2004)(2) and in an analysis of police records, Mohan et al., (1985) found that 32% of pedestrian fatalities, 40% of motorized two wheeler occupant deaths and 30% of bicyclist deaths occurred between 6 PM and 6AM, and alcohol intoxication was found to be a major factor in a majority of these crashes.

Both SMAST and Breath analyzer were used for screening identify all the patients with alcohol use. In present study 6 patients who had negative alcohol breath scored positive in SMAST and 4 patients who were found to be breath alcohol positive were not positive on SMAST screening. Other Study found that 25% of the patients with zero blood alcohol levels reported two or more items on the SMAST test.<sup>(17)</sup>

## ORIGINAL ARTICLE

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Given the false negatives in identifying alcohol-abuse problems when blood alcohol levels are zero, they emphasized that it is judicious to screen all patients not only with blood alcohol testing but also with behavioral measures of alcohol such as the CAGE assay or the SMAST, which are simple and inexpensive.

21 (21.9%) patients were measured to be positive in Breath analyzer test and 23 (23.8%) patients were detected positive in the SMAST screening test. It was noted that 4 subjects out of 21 breaths positive for alcohol, did not have problem related alcohol use according to SMAST. Similarly WHO study done across 12 countries reported the prevalence of injuries related to alcohol positives were in the range between 6-45% with 21% in India.<sup>(1)</sup>

Transportation injuries are twice likely to be the cause for injuries due to alcohol than those with assaults, fall or burn related injuries<sup>(18)</sup> and also reported that patients intoxicated with alcohol had higher rates of road accidents injuries (35%) versus non-intoxicated (24%).<sup>(19)</sup> All these studies including the current study are only reflecting the fact that most of the patient attending Trauma center, the cause of injury is RTA and hence no significance can be attached to alcohol consumption in this respect. However one study has found almost at equal proportions with falls (19%), assaults (11%), motor vehicle crashes (9%), and bicycle accidents (6%).<sup>(20)</sup>

Though single injury site were seen more often in total number of the patient (77%), among breathe positives more number of patients (47.7%) were found to have injuries at multiple sites as compared to the negative patients (12%) who had injuries mostly at single site. Its reported that extent of body injuries have been higher in the alcohol group compared with the non-alcohol group and observed that impairment of judgment could result in more severe accident leading to multiple injuries. Person with no impairment of judgment could be able to take decision to minimize the impact of injury.<sup>(2)</sup>

Admission rates were found more for alcohol breath positive patients (57%)<sup>(2)</sup> but in contrast Alcohol-positive patients though got admitted more often they spent fewer days in a critical care unit, to be less likely to die and to be less likely to be transferred to another hospital than alcohol-negative patients.<sup>(21)</sup> This can be explained on the basis of hypothesis that alcohol intoxication can protect the cognitive health of some patients sustaining head injury while intoxicated.<sup>(22)</sup>

The present study hasn't gone into post admission details as we did only a cross sectional assessment. But the admission status itself could be taken into an account as pointing to the severity of injuries. Head injury with ICH was often associated with alcohol use <sup>(2,17)</sup> which also seen in the current study. In consistent with other studies strong association between blood alcohol level of 0.05 - 0.1g/100ml and trauma <sup>(23)</sup> was found.

Patient with occasional use of alcohol (social drink) were found to be more common among the injured patient in relation to other studies that participants who did not have "alcohol use disorders" were at greater risk of being injured when compared with participants who had alcohol use disorders.<sup>(24)</sup> Its explained that light drinkers have more likelihood of sustaining injury than heavy drinkers as they might have developed some tolerance to drinking which puts them at less risk of injury.<sup>(25)</sup>

Contrary to that, stated that an elevated Blood Alcohol Level (BAL) is not just having a glass before trauma and most patients admitted with positive BALs after trauma have an alcohol-use disorder (AUD), often severe.<sup>(26)</sup> Hazardous pattern of drinking was often seen among alcoholics, which was found in multilevel analysis that those who reported consuming five or more drinks on an

## ORIGINAL ARTICLE

occasion at least monthly have increased likelihood for sustaining injuries and drinking at this level on any occasion during the last year is associated with increased risk of injury mortality.<sup>(27,28)</sup>

An interesting finding that many patients had previous injuries and admissions due to alcohol use were also reported that alcohol use at the time of injury was shown to be more common among trauma recidivists<sup>(29)</sup> and patients who were intoxicated on the initial admission were 2.5-fold more likely to be readmitted than those not intoxicated.<sup>(11)</sup> Surprisingly only minor form of interpersonal issues and work related problems were reported by most of the alcohol patients which was correlated with findings that milder form of abuse of family members (spouse, parents...) were found to be more high (76%) and nearly two thirds had occupational problems.<sup>(3)</sup>

**CONCLUSIONS:** In agreement with findings of previous several studies of worldwide, the present study draws attention to recognizing the alcohol use as a significant contributory factor to trauma, especially RTA. Identification their association among patients attending trauma center would be worthwhile in terms of preventing recurrences as well as trauma related mortality and morbidity.

| Socio demographic variables |               | Total no. of patients<br>N=96 | Alcohol breath         |                        | X    | df | p    |
|-----------------------------|---------------|-------------------------------|------------------------|------------------------|------|----|------|
|                             |               |                               | Positive<br>21 (21.9%) | Negative<br>75 (78.1%) |      |    |      |
| Age (yrs)                   | 18-30         | 71(74%)                       | 16(76%)                | 55(73.3%)              | .712 | 3  | .870 |
|                             | 31-40         | 11(11.4%)                     | 3(14.2 %)              | 8(10.6%)               |      |    |      |
|                             | 41-50         | 8(8.3%)                       | 1(4.7%)                | 7(9.3%)                |      |    |      |
|                             | 51-60         | 6(5.2%)                       | 1(4.7%)                | 5(6.6%)                |      |    |      |
| Sex                         | Male          | 85(88.5%)                     | 20(95.2%)              | 65(86.7%)              | 1.18 | 1  | .276 |
|                             | Female        | 11(11.5%)                     | 1 (4.8%)               | 10(13.3%)              |      |    |      |
| Education                   | Illiterate    | 5(5.2%)                       | 0                      | 5(6.7%)                | 6.61 | 4  | .158 |
|                             | Primary       | 27(28.1%)                     | 6(28.6%)               | 21(28%)                |      |    |      |
|                             | U. primary    | 15(15.6%)                     | 5(23.8%)               | 10(13.3%)              |      |    |      |
|                             | Graduate      | 46(47.9%)                     | 8(38.1%)               | 38(50.7%)              |      |    |      |
|                             | PG            | 3(3.1%)                       | 2(9.5%)                | 1(1.33%)               |      |    |      |
| Family                      | Nuclear       | 76(79.2%)                     | 7(80.9%)               | 57(76%)                | 8.37 | 2  | .015 |
|                             | Extended      | 18(18.8%)                     | 2(9.5%)                | 18(24%)                |      |    |      |
|                             | Staying alone | 2(2.1%)                       | 2(9.5%)                | --                     |      |    |      |
| Residence                   | Rural         | 34(35.4%)                     | 8 (38.1%)              | 26(34.7%)              | .914 | 2  | .633 |
|                             | Semi urban    | 41(42.7%)                     | 10 (47.6%)             | 31(38.1%)              |      |    |      |
|                             | Urban         | 21(21.9%)                     | 3(14.3%)               | 18(24%)                |      |    |      |
| Marital Status              | Married       | 27(28.1%)                     | 16(76.2%)              | 50(66.7%)              | 5.56 | 2  | .062 |
|                             | Unmarried     | 66(68.8%)                     | 39(14.3%)              | 24(32%)                |      |    |      |
|                             | Living alone  | 3(3.1%)                       | 2(9.5%)                | 1(1.33%)               |      |    |      |
| SES                         | Higher        | 12(12.5%)                     | 3(14.3%)               | 9(12%)                 | 6.22 | 2  | .045 |
|                             | Middle        | 65 (67.7%)                    | 10(47.6%)              | 55(73.3%)              |      |    |      |
|                             | Lower         | 19(19.8%)                     | 8(38.1%)               | 11(14.7%)              |      |    |      |

**TABLE: 1 Socio Demographic Profile**

## ORIGINAL ARTICLE

|                |          | SMAST      |                  |                  |                  | Total     |
|----------------|----------|------------|------------------|------------------|------------------|-----------|
|                |          | No problem | Possible problem | Probable problem | Definite problem |           |
| Alcohol Breath | Negative | 69         | 1                | 1                | 4                | 75        |
|                | Positive | 4          | 7                | 0                | 10               | 21        |
| <b>Total</b>   |          | <b>73</b>  | <b>8</b>         | <b>1</b>         | <b>14</b>        | <b>96</b> |

**TABLE: 2 Comparison between Alcohol Breath Test and SMAST screening**

| Variables                           |                                   | Alcohol positives<br>N=21 (21.9%) | X     | df | P    |
|-------------------------------------|-----------------------------------|-----------------------------------|-------|----|------|
| Diagnosis                           | Occasional use                    | 11(52.4%)                         | 4.571 | 2  | .102 |
|                                     | Alcohol Abuse                     | 3(14.3%)                          |       |    |      |
|                                     | Alcohol Dependence Syndrome (ADS) | 7(33.3%)                          |       |    |      |
| Blood alcohol Conc. (BAC) (g/100ml) | 0.010 -0.059                      | 6(28.6)                           | 6.000 | 2  | .050 |
|                                     | 0.060 - 0.099                     | 12(52.4)                          |       |    |      |
|                                     | 0.100 - 0.199                     | 3(14.3)                           |       |    |      |
|                                     | 0.200 – 0.299                     | 0                                 |       |    |      |
| LFT                                 | Normal                            | 14 (66.7%)                        | 2.333 | 1  | .127 |
|                                     | Abnormal                          | 7 (33.3%)                         |       |    |      |
| Serum electrolytes                  | Normal                            | 21 (21.9%)                        |       |    |      |
|                                     | Abnormal                          | -                                 |       |    |      |

**TABLE: 3 Diagnosis and Blood Parameters among Alcohol Breath Positives**

| Variables        |                     | Total no. of patients<br>N=96 | Alcohol breath        |                       | X     | df | p     |
|------------------|---------------------|-------------------------------|-----------------------|-----------------------|-------|----|-------|
|                  |                     |                               | Positive<br>21(21.9%) | Negative<br>75(78.1%) |       |    |       |
| Causes of injury | RTA                 | 69(71.9%)                     | 17(80.1%)             | 52(69.3%)             | 6.405 | 2  | .041  |
|                  | Accidental injuries | 24(25%)                       | 2(9.5%)               | 22(29.3%)             |       |    |       |
|                  | Assault             | 3(3.1%)                       | 2(9.5%)               | 1(1.3%)               |       |    |       |
| Injury site      | Single              | 77(80%)                       | 11(52.3%)             | 66(88%)               | 13.11 | 1  | .0001 |
|                  | Multiple            | 19(20%)                       | 10(47.7%)             | 9 (12%)               |       |    |       |
| Head injury      | With ICH            | 5(5.2%)                       | 3(14.3%)              | 2(2.67%)              | --    | -- | --    |
| Admission        | Admitted            | 40(41.7%)                     | 12(57.1%)             | 28(27.3%)             | 2.649 | 1  | .104  |
|                  | Not admitted        | 56(58.3%)                     | 9(42.9%)              | 47(62.7%)             |       |    |       |

**TABLE: 4 Injury related variables among alcohol breath positive and negative groups**

## ORIGINAL ARTICLE

| AUDIT                                 |                               | Alcohol positives<br>N=21(21.9%) | x     | df | p     |
|---------------------------------------|-------------------------------|----------------------------------|-------|----|-------|
| Frequency of drinking<br>(AUDIT 1)    | Never                         | —                                | 7.381 | 3  | .061  |
|                                       | Monthly or less               | 10 (47.6%)                       |       |    |       |
|                                       | 2-3 times a month             | 3 (14.3%)                        |       |    |       |
|                                       | 2-3 times per week            | 6 (28.6%)                        |       |    |       |
|                                       | 4 or more times a week        | 2 (9.5%)                         |       |    |       |
| Amount of drink on a day<br>(AUDIT 2) | 1 or 2                        | 8(38.1%)                         | 3.714 | 2  | 0.156 |
|                                       | 3 or 4                        | 10(47.6%)                        |       |    |       |
|                                       | 5 or 6                        | 3(14.3%)                         |       |    |       |
|                                       | 7 to 9                        | —                                |       |    |       |
|                                       | 10 or more                    | —                                |       |    |       |
| More than six drinks (AUDIT 3)        | Never                         | 1(4.8%)                          | 14    | 4  | .007  |
|                                       | Monthly or less               | 10(47.6%)                        |       |    |       |
|                                       | Two to four times/month       | 6(28.6%)                         |       |    |       |
|                                       | Two to three times/ week      | 3(14.3%)                         |       |    |       |
|                                       | Four or more times/ week      | 1(4.8%)                          |       |    |       |
| Injury due to drink (AUDIT 9)         | No                            | 9(42.9%)                         | 1.143 | 2  | .565  |
|                                       | Yes, but not in the last year | 7(33.3%)                         |       |    |       |
|                                       | Yes, during the last year     | 5(23.6%)                         |       |    |       |
| RISK LEVEL                            | Level 1                       | 6 (28.6%)                        | .524  | 3  | .914  |
|                                       | Level 2                       | 5 (23.8%)                        |       |    |       |
|                                       | Level 3                       | 4 (19.0%)                        |       |    |       |
|                                       | Level 4                       | 6 (28.6%)                        |       |    |       |

**Table: 5 AUDIT Scale showing the severity and pattern of alcohol use**

## ORIGINAL ARTICLE

|   |  |            |            |            |
|---|--|------------|------------|------------|
| A   | Never neglected                        | 82(85.4%)  | 11 (52.4%) | 9 (39.1%)  |
| B   | Minimal neglect                        | 6 (6.3%)   | 4 (19.0%)  | 6 (26.1%)  |
| C   | Moderate                               | 7 (7.3%)   | 5 (23.8%)  | 7(30.4%)   |
| D   | Significant                            | 1(1%)      | 1 (4.8%)   | 1 (4.3%)   |
| E   | Severe                                 | -          | -          | -          |
| <b>LEGAL PROBLEM</b>  |  |            |            |            |
| A   | Had no legal problem                   | 86 (89.6%) | 16 (76.2%) | 14 (60.9%) |
| B   | Had legal problems                     | 10 (10.4%) | 5 (23.8%)  | 9 (39.1%)  |
| <b>PROBLEMS IN RELATIONSHIP</b>   |  |            |            |            |
| A   | No problems                            | 76 (79.2%) | 3(14.3%)   | 4 (17.4%)  |
| B   | Small number of arguments              | 9 (9.4%)   | 9 (42.9%)  | 9(39.1%)   |
| C   | Two or more serious arguments          | 7 (7.3%)   | 6 (28.6%)  | 6(26.1%)   |
| D   | Frequent serious arguments             | 1(1%)      | 2 (9.5%)   | 1(4.3%)    |
| E   | Most often serious arguments           | 3 (3.1%)   | 1 (4.8%)   | 3(13%)     |
| <b>WORK PROBLEMS</b>  |  |            |            |            |
| A   | Had no trouble.                        | 77 (80.2%) | 9 (42.9%)  | 5(21.7%)   |
| B   | Could not work well one or two days    | 10 (10.4%) | 6 (28.6%)  | 10(43.5%)  |
| C   | Missed one or more days from work.     | 8 (8.3%)   | 5 (23.8%)  | 7 (30.4%)  |
| D   | Fired in the past from 1 or more jobs  | 1(1%)      | 1 (4.8%)   | 1 (4.3%)   |
| E   | Not working due to my drinking problem | -          | -          |            |
| <b>QIAD TOTAL SCORE</b>   |  |            |            |            |
|   | < 20 non- alcoholics                   | 81 (84.4%) | 11(52.4%)  | 8 (34.8%)  |
|   | > 21 alcoholics                        | 15 (15.6%) | 10 (47.6%) | 15 (65.2%) |
| <b>TABLE: 6 QIAD scores among Breath positive and SMAST positive<br/>NEGLECT OF PERSONAL RESPONSIBILITIES</b> |  |            |            |            |

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## ORIGINAL ARTICLE

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