

# Detection of Alcohol in Alleged Users:A 5 Year Study

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## Abstract

**Background:** To access the frequency of drinking reported cases and positive cases of alleged drinking.

**Methods:** In this Observational study all persons who presented with suspicion of alcohol intake, in the department of Chemical Examiner Govt of Punjab, Rawalpindi, were included. During five years, total specimens from 2655 persons were received for detection of alcohol. Total data was scrutinized with reference to year wise cases, total number of cases, number of positive/negative cases and age wise analysis.

**Results:** During the tenure of 5 years, samples of total 2655 persons of alleged alcohol intake were received for detection of alcohol. Alcohol was detected in majority (98.31%) of the cases. Most common age group was 30-40 years (40.19%). 2<sup>nd</sup> most consumer age group was 40-50 years with total 661 (24.9%) persons involved. Only 398 (14.99%) persons of age above 50 years were referred for detection of alcohol.

**Conclusion:** There is dire need to introduce breathalyzer test in our country to reduce the number of drinking related accidents. There is also need to use most modern techniques and apparatus to know the BAC (blood alcohol concentration).

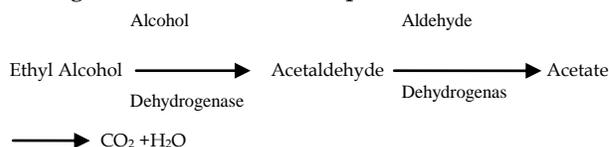
**Key Words:** Drinking, Chemical Examiner, Alcohol.

## Introduction

Alcohol declared as the "Ummul Khabias" (mother of evils) in our religion Islam plays a pivotal role in many offences like murders, roadside accidents, rapes, clashes and medical negligence. The word 'alcohol' comes from the Arabic 'Alkohol' means "something subtle".<sup>1</sup> The abuse of alcohol is more common than any other form of drug abuse throughout the world.<sup>2</sup> Any drink containing from 0.5 to 95 % alcohol is considered as alcoholic beverage.<sup>3,4</sup> In Pakistan alcohol consumption is unlawful and punishable with 80 strips at public place, even then it is available and consumed by many people. <sup>5</sup> It is a common scene that people handcuffed are brought to a government hospital for medico-legal certification about whether

this person has consumed the alcohol or otherwise. These persons with allegation of alcohol intake are usually caught by the police when they become violent at a public place, involved in an accident or crime. However the persons consuming the alcohol indoors are protected from the eyes of law enforcement agencies. The Authorized Medical Officer (AMO) performs certain clinical tests on the person, issue the initial medico-legal report. In addition the AMO takes samples of stomach wash, blood, and urine, sends these samples to Chemical Examiner for detection of alcohol in laboratory.

In most of the countries of the world alcohol intake is itself not a crime, but if he is so much under the effect of alcohol that he has lost some of his mental/physical abilities to such an extent that he is not able to do his work safely or he may become a source of danger not only for himself but also for the safety of others, then law comes into action. In addition to crimes alcohol abuse is one of the most common causes of acute and chronic liver diseases worldwide <sup>6</sup>. WHO estimates that the harmful use of alcohol is responsible for around 2.3 million deaths worldwide each year.<sup>7</sup> About 90 minutes after ethanol ingestion is the approximate time to achieve peak blood concentration of alcohol.<sup>8</sup> It is converted to water and carbon dioxide through following metabolic process.<sup>9</sup>



Alcohol is mainly eliminated through kidneys, respiratory system, sweat and saliva. 85% alcohol is oxidized to acetaldehyde and finally to acetate, remainder excreted unchanged in Urine, breath and sweating.<sup>10</sup> Alcohol is associated with physical, psychiatric, social, moral, domestic and legal issues. The signs and symptoms caused by the alcohol intake resemble with many other conditions as head injury, hypoglycemia, carbon monoxide poisoning and many drugs like antihistamines and narcotics. So in addition to clinical diagnosis, the intake of alcohol must be

confirmed by laboratory diagnosis, to prove the case beyond doubt before the court.

The Govt. of Punjab established Office of Chemical Examiner in Rawalpindi in 1983. Among the other functions, detection of alcohol from the specimens sent by CMOs with allegation of consuming alcohol, came under the domain of this office. In addition to Rawalpindi/Islamabad this office also cater for districts like Attock, Chakwal, Jhelum, Sargodha, Mianwali, Bhakkhar, Khushab and Azad Jammu & Kashmir also. The office of Chemical Examiner Rawalpindi was closed by the Govt. of Punjab from 30<sup>th</sup> June 2014.

### Patients and Methods

In this Observational study all persons who presented with suspicion of alcohol intake, in the department of Chemical Examiner Govt of Punjab, Rawalpindi, were included. During five years total specimens from 2655 persons were received for detection of alcohol. Total data was scrutinized with reference to year wise cases, total number of cases, number of positive/negative cases and age wise analysis. In the lab of Chemical Examiner Rawalpindi two types of tests were performed for the detection of alcohol, first was Sulphomolybdic acid test and Potassium dichromate test.

### Results

During the 5 years period from 2009 to 2013, specimens from total 2655 persons were received at the office of Chemical Examiner. Out of 2655 2610 (98.1%) were positive for alcohol (Table1) . Among total 2655 cases of alleged drinking, maximum cases referred during 2010 as total 598 (22.52%) while minimum number of cases were reported as

**Table-1: Alcohol detection - yearly data**

Year	Total Case	Positive Cases	%age	Negative Cases	%age
2009	530	520	98.11	10	1.89
2010	598	579	96.82	19	3.18
2011	512	505	98.63	07	1.37
2012	529	523	98.87	06	1.13
2013	486	483	99.38	03	0.62
Total	2655	2610	98.31	45	1.69

486(18.31%) occurred in 2013. Out of total 2655 cases alcohol was detected in 2610 (98.31%) cases. Maximum cases of alleged drinking reported at age between 30-40 years as 1067 (40.19%), while minimum 398

(14.99%) cases occurred above 50 years of age (table 2).

**Table 2:Alcohol detection-Age distribution**

Year	20-30 years	30-40 years	40-50 years	Above 50 years	Total
2009	97	231	137	65	530
2010	105	229	116	148	598
2011	101	198	103	110	512
2012	112	164	187	66	529
2013	114	245	118	09	486
Total	529	1067	661	398	2655

### Discussion

This study is consistent with study conducted at Lahore with 2% negative reports<sup>1</sup> and inconsistent with a study conducted at Jordan with 87.4% negative reports.<sup>11,12</sup> In a study conducted at Karachi, 70% (182) of 260 persons brought by police with suspected alcohol intake, disposed off on clinical grounds only.<sup>13</sup> It has been well known that many of the positive reports are issued on basis of what police says rather than clinical and laboratory evaluation.<sup>14,15</sup>

In most countries of the world including some Muslim countries, the use of alcohol is legally allowed. It is the behavior of the drunken person which invites legal action. The persons regularly taking the alcohol shows less signs and symptoms as compared with non habitual drinkers. Alcohol acts differently on different individuals and also on the same individual at different times.<sup>16</sup> It is the blood alcohol concentration (BAC) which is more important legally.

Different countries have set statutory limits for charge of drunkenness. Statutory limit for charge of drunken driving in most of the European countries is 80mg% but in US it is 100mg%, in Sweden and Poland 20mg%.<sup>17</sup> Medicolegally the most important BAC is 100-150 mg%, when offences are committed.<sup>18</sup>

Use of alcohol is usually associated with crimes as abuses, fights, assaults, sexual offences, reckless driving and medical negligence. They may lead to injuries and deaths. In general the effect of alcohol or any drug on a person is no excuse for his criminal actions, however if he can prove that these were not taken voluntarily, there is possible defense.<sup>19</sup> Rape is commonly associated with use of alcohol, approximately one third of rapists were found drunken with alcoholic beverages.<sup>20</sup>

Driving while intoxicated may increase the risk of accidents, serious injuries and deaths. Even in the countries where alcohol is freely available and drinking itself is not a crime, driving while under the

influence of alcohol is taken as serious crime. By taking alcohol there is deterioration in driving ability as it increases reaction time, creates false confidence, impairs concentration, produces muscular incoordination and decreases visual and auditory acuity.<sup>21</sup> Alcohol dependant patients are responsible for 2/3 of motor vehicle crashes.<sup>22</sup> 1-2% alcohol is eliminated through expired air is the basis of breathalyzer test, one of the most commonly used test for alcohol intoxication among drivers. The driver is asked to exhale into breathalyzer, in case of intoxication, green colour appears in the spectrum of breathalyzer.<sup>23</sup> It is notable that breath alcohol analyzer facility is not available with Pakistani traffic police and hospitals, conducting such examinations.<sup>24</sup> In living persons samples of gastric lavage, blood and urine are collected by Medico Legal Officer and sent to Chemical Examiner for detection of alcohol. After laboratory tests the Chemical Examiner issue the report whether the said person has consumed the alcohol or otherwise. Aside from blood the best material to analyze for alcohol is vitreous.<sup>25</sup> In the lab of Chemical Examiner Rawalpindi two types of tests were performed for the detection of alcohol, first was Sulphomolybdic acid test and Potassium dichromate test. However any laboratory analysis to know the concentration of alcohol in the given sample was not performed. Chromatography is completely specific for ethyl alcohol is a method of choice for detection of alcohol.<sup>26</sup> Alcohol is the constituent of many drugs and may be taken by a patient for the purpose of treatment. This detected alcohol may be may become a source of litigation against an innocent person.

### **Conclusion**

1. There is a dire need to introduce the most modern techniques for detection and knowing the concentration of alcohol in the samples provided.
2. Alcohol is and probably will remain at the top among the drugs of abuse worldwide.
3. The services of Forensic Experts may continue to be sought regarding detection, concentration, interpretation and legal implications of alcohol abuse in future also.

### **References**

1. Joel G Hardman & Lee Limbird. Goodman & Gilman's The Pharmacological basis of Therapeutics. 11<sup>th</sup> ed. 2006. McGraw Hill NY US. 591
2. Wallace RB. Public Health and Preventive Medicine. 15<sup>th</sup> ed. 2008. Westford printers Newyork. 999.
3. McAnalley BH. Chemistry of alcoholic beverages. Garriott JC. Medicolegal aspects of lcohol. 3<sup>rd</sup> ed. Lawyers and judges Pub Co; TucsonAZ.1996.
4. Al-Quran Surah Baqarah; 2: 219.
5. Khan TM. Prohibition (enforcement of Haddood 1979) 2005. Affsari printers; Lahore. 511
6. Julian IB, Gavin EA, Craig JM. Advances in Alcoholic Liver Disease. *Curr Gastroenterol Rep* 2011; 13: 56-64
7. [http://www.who.int/dg/speeches/2013/global\\_alcohol\\_policy\\_symposium\\_20130426/en/](http://www.who.int/dg/speeches/2013/global_alcohol_policy_symposium_20130426/en/)
8. James Stuart H, Nordby JJ. Forensic Science. 2<sup>nd</sup> ed. 2005. CRC press NY US;67
9. Agarwal DP and HW Goedde HW. Alcohol metabolism, alcohol intolerance, and alcoholism: Biochemical and pharmacogenetic approaches- 2012- Springer Science & Business Media,
10. Shankar Avinash. Hand book of poisoning. 2<sup>nd</sup> ed. 2005. Bhalani publishing house. Mumbai India. 473.
11. Din ZU, Mughal M, Muddasir HS. Medicolegal Examination of alcoholics. *Pak PG Med J* 2008;19(2):59-62
12. Rehman HA, Hadidi KA, Battah AH. Reliability of clinical decisions regarding alcohol influence. *J Clinical Forensic Medicine* 1999;6(3):141-44.
13. Mirza F and Arif K. Acute alcohol intoxication: prevalence, recognition and medicolegal importance. *J Pak Med Assoc* 1999; 49(9): 220-21
14. Bravo Pakistani Police. *Weekly Pulse (Islamabad)*. 2007 Sept 21-27; 119(XI): 18.
15. Harold V. Detecting malingering and deception. 2<sup>nd</sup> ed. 2001 CRC press Florida US. P-111
16. Modi NJ. Medical Jurisprudence & Toxicology. 13<sup>th</sup> ed. 2010. Zahid Bashir Printers, Lahore. 640
17. Payne JJ. Encyclopedia of Forensic and legal medicine. 1<sup>st</sup> ed. 2005. Elsevier Academic press Oxford UK.27
18. Parikh's text book of Medical Jurisprudence. Parikh CK. 6<sup>th</sup> ed. CBS Publishers. New Delhi, India. P.10.16.
19. Shepherd R. Simpson's Forensic Medicine. 12<sup>th</sup> ed. 2003. Oxford University Press NY Us. P-25
20. Robert R. Practical aspects of rape investigation. 3<sup>rd</sup> ed. 2001. CRC press NY US.p-459
21. Dikshit PC. Forensic Medicine & Toxicology. 1<sup>st</sup> ed. 2007. Lordson printers Delhi. P-529
22. Gomez-telegon MT, Alvarez F. Road traffic accidents among alcohol-dependant patients: the effect of treatment. *Accid Anal Prev*. 2006; 38 (1): 201-7.
23. Karen E. Principles of toxicology. 2<sup>nd</sup> ed. 2006. CRC press NY US. P-297
24. Chaudhry A. Muslims more prone to liquor consumption. *Daily Nation (Lahore edition)*. 2007 December 10.
25. DiMaio Vincent J and Dominick D. Forensic Pathology. 2<sup>nd</sup> ed. 2001. CRC press NY US. P-516
26. Awan Nasib R. Principles & Practice of Forensic medicine. 1<sup>st</sup> ed. 2002. Yamani Printers Lahore. 39