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Evaluation of Hematological Changes in Illicit Drug Abuser Of Peshawar Region

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ABSTRACT
Illicit drugs are associated with changes of various hematological parameters that may lead to host tissues organ dysfunction. The goal of the present study was to find out the impacts of several psychotropic drugs on hematological parameters of study subjects.Comparative cross sectional study was conducted out at Institute of Paramedical Sciences, Peshawar. The study included 400 participants comprising of 200 drug abuser and 200 non-drug users male. All participants were examined using hematological tests to evaluate the impacts of psychotropic stuff use. These subjects were categorized by sort of drug they misuse. An alteration in hematological parameters was assessed for statistical significance. Findings from the current study unfolded significant difference between certain hematological parameters of non-drug users (NDU), drug abusers and specific groups of drug abusers. All the hematological indices of drug abusers revealed higher significance except MCH, MCHC which showed low significance (<0.05) while neutrophil %, Hb and Platelet count were not significant (>0.05) compared to non-drug abusers. There was also a significant difference observed between specific groups of substance abusers (<0.05). According to the result, mostly drug abuser used snuff with 20%, followed by cannabis 18%, cigarette 17%, heroine and shesha 11% each. Almost all hematological parameter were reported abnormal in current studies. There is a need to promote awareness of the health related effects associated with illicit drug abuse.
Key words: *Psychotropic Drugs; Hematological Parameters, Illicit drug abuser*

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INTRODUCTION

Drug abuse is a serious concern in all over the world especially in developing countries including Pakistan. American Psychiatric Association define the drug abuse that repeated use of such substance with inauspicious outcomes or create a high risk status while world health organization defined as the substance as the harmful use of psychoactive substance such as alcohol, cigarette and other illicit drugs and further leads to certain anomalies ranging from disturb personnel and family relationships, problem in school activities to physical and mental health problems (1, 2). Certain chronic diseases including the human immunodeficiency (HIV), liver cirrhosis, hepatitis B and C are associated with high morbidity and mortality in drug abuser (3, 4). Report from Indonesia revealed that the number of drug abuse is continuously increasing each year. About 4 million cases were reported from Indonesia in 2014 (5). The easy availability of narcotics and circulating in community leads to persistent increased in drug abuse activity (5). Report shows that marijuana is most frequently used narcotics, followed by amphetamine, ecstasy and heroin (5, 6).

Various ways of drug administered are reported i.e. injecting, swallowing and inhaling. After administered of drugs can affect human body functions by changing the endogenous environment of body (7). These drugs entered into bloodstream by finding way and transported to different parts of the body which is affected by these drugs. These substance may affect the brain function either depress or stimulate its activity (8).

Drug abuse have many negative consequences on human health such as mental issues, systemic problems and may leads to even death (9). Using certain types of addictive materials which may be oral, intravenous (IV), inhalation, intra-nasal or tropical use has been observed to cause certain infectious and

non-infectious diseases including hepatitis, human immune deficiency virus (HIV), tuberculosis, heart diseases, hypertension and others (10). Drug abusers frequently used cigarettes and alcohol, which have known bad consequences on health (9).

Drug abuse such as smoking, excessive consumption of alcohol, marijuana and volatile drugs have affect both the quantity and quality of different hematological and chemical parameters (blood cells and others) (9). Heavy alcohol drinkers have malfunction bone marrow whereas volatile substances (leads etc.) have impact on basophils and eosinophils Study reported that a red blood cell was high among smokers as compared to non-smokers (11). Illegal drug misuses are commonly linked with aplastic anemia, bone marrow repression and raised level of swelling may cause a broad variety of systemic disorders which demand vigilant medical consideration (12).

Less reported studies are available on drug abuser and drugs effect on hematological parameters inour population. Therefore, current study was conducted to study the various hematological parameters in drug abusers in Khyber Pakhtunkhwa, Pakistan.

MATERIAL AND METHODS

This comparative cross sectional study was conducted from September to December 2017 in Peshawar with collaboration of Dost Welfare Foundation, Peshawar. Male patients with age more than 15 years and individuals addicted of certain drugs were included in study while patients having age less than 15 years were not included in present study. The participants were categorized on the basis of number of drug abused including single drug users (SDU), double drug users (DDU), triple drug users (TDU) and more than three drugs known multiple drug users (MDU) while control were also included in study for comparison of different hematological parameters.

Written inform consent was obtained from the participant before the commencement of study. All the information was kept confidential and analyzed data anonymously throughout the study.Three milliliter whole blood was aseptically collected in ethylene di-amine tetra-acetic acid (EDTA) tubes from all the participants and gently dispensed the EDTA tubes. The EDTA tubes were then labeled appropriately with Identification number (ID) of participants. The anti-coagulated blood was stored at -4°C until the analysis was carried out. The blood samples were used to perform complete blood count and differential leucocytes cells on automatic KX-21 hematological analyzers (Sysmex diagnostics products).

Data were primary entered in Microsoft Excel 2007 and further analyzed by statistical package for social sciences (SPSS) IBM 21.0 version.

RESULTS

A total of 400 participants were included in which 200 individuals was drug abusers while the remaining 200 participants were included in control group. Out of total drug abusers, Multiple Drugs Users (MDU) were found 42.5% (n=85), followed by Double Drugs Users (DDU) 23.5% (n=47), Single Drug users (SDU) 21.0% (n=39) and least were observed in Triple Drugs Users (TDU) 14.5% (n=29) as shown in table no. 1.

Table 1: Categories of drug abusers according to the number of drugs used

Participants	Drug Abusers (n=200)			
Category of Drug Abuser	SDU	DDU	TDU	MDU
Number (n)	39	47	29	85
Percentage (%)	21.0	23.5	14.5	42.5

Note: SDU=Single drug users, DDU= Double drugs users, TDU= Triple drugs users, MDU= Multi-Drugs users

Highly used of snuff was observed with 20% (n=40), followed by cannabis 18% (n=36), cigarette 17% (n=34), Heroine and Shesha 11% (n=22) each, alcohol 9% (n=18), opium and IV drugs 5% (n=10) each and oral drugs 4% (n=8) were least used by drug abuser as shown in Figure 1.

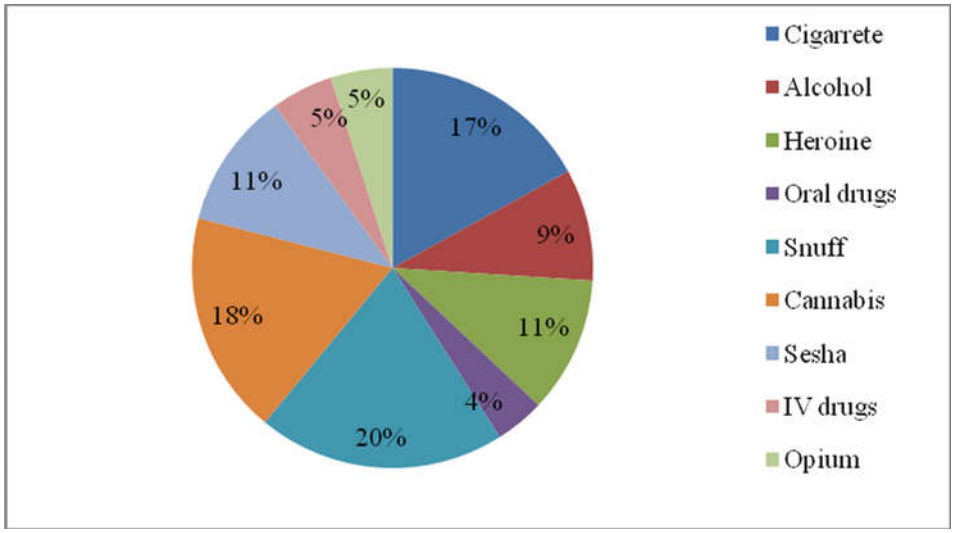

Figure 1: Proportion of drug types used by drug abusers

The variations were observed in hematological parameters of drug abuser after comparing with control healthy group (Non-drug Abusers). The result of present shows that white blood cells, lymphocytes, basophil, hematocrit and mean cell volume were found significantly high among drug abuser as compared to healthy control group whereas red blood cell, monocytes and eosinophil increase non-significantly in drug abuser. The mean cell hemoglobin decrease with P>0.005 and mean cell hemoglobin concentration were observed decreased in level but non-significantly among drug abuser than control group (Non-drug Abusers). On the other side, level of hemoglobin, neutrophil and platelets count show no significant change in both drug abuser and control group (Non-drug Abusers) as shown in table no. 2.

Table No.2: Comparison of hematological parameters of drug abusers with control group

Parameters	Drug Abusers(n= 200)	Non-drug Abusers (n=200)	P.value
	Mean±SD	Mean±SD	
TLC (103/µl)	**09.1± 2.5**	**07.3 ± 1.3**	<0.001*
NEU	**54.7 ± 9.7**	**60.4 ± 8.4**	0.350
LYM	**32.6 ± 8.7**	**31.8 ± 6.2**	<0.001*
MONO	**06.9 ± 2.2**	**04.3 ± 2.4**	0.014*
EOS	**04.5 ± 3.6**	**02.3 ± 1.5**	0.014*
BASO	**01.3 ± 0.7**	**01.2 ± 1.1**	<0.001*
TRBC (10^3/µl)	**05.0 ± 0.5**	**04.8 ± 0.4**	0.016*
Hb (g/dl)	**13.4 ± 1.8**	**12.8 ± 1.8**	0.239
HCT	**43.2 ± 5.7**	**37.7 ± 3.0**	<0.001*
MCV(fl)	**86.7 ± 8.2**	**77.4 ± 5.5**	<0.001*
MCH (pg)	**26.9 ± 3.6**	**27.1 ± 1.6**	<0.001*
MCHC(g/dl)	**30.8± 2.9**	**33.9 ± 1.5**	0.002*
PLT (103/µl)	**273.2 ± 92.4**	**276.8 ± 72.8**	0.192

Note: WBC= Total Leukocytes count, NEU= Neutrophils, LYM= Lymphocytes, Monocytes, EOS= Eosinophils. BASO= Basophils,TRBC= Totalred blood cells count, Hb= Hemoglobin, HCT= Hematocrit, MCV= Mean cell volume, MCH= Mean hemoglobin Concentration.

Table No.3: Comparison among drug abuser categories

Type of drugs used	Drug Abusers(n= 200)	Non-drug Abusers (n=200)	P. Value
	Mean SD	Mean SD	
SDU vs DDU	0.80 ± 0.4	0.79 ± 0.4	<0.001*
SDU vs TDU	0.80 ± 0.4	0.84 ± 0.4	0.011*
SDU vs MDU	0.80 ± 0.4	0.61 ± 0.5	< 0 .001*
DDU vs TDU	0.79 ± 0.4	0.84 ± 0.4	< 0 .001*
DDU vs MDU	0.79 ± 0.4	0.61 ± 0.5	<0 .001*
TDU vs MDU	0.84 ± 0.4	0.61 ± 0.5	<0 .001*

Note: SDU=Single drug users, DDU= Double drugs users, TDU= Triple drugs users, MDU= Multi-Drugs users

This study was conducted on 200 drug abusers in order to study the hematological parameters. The parameters of complete blood count were study in drug abusers and compared with control group (non-drug abuser). The results of current study showed variation in hematological parameters among drug

abusers and non-drug abusers groups significantly. However, some hematological parameters were high while others were low in drug abusers than healthy control group.

Current study revealed that white blood cells were high in drug abuser significantly, which support the findings of other researchers (12-14) whereas some studies found no variation (15). The dissimilarity between results might be due to difference in study designs and statistical tools applied. However, the elevation of white blood cells could be due to inflammatory activation of bronchial regions whereas the exact mechanism is still unclear. This leukocytosis may indicator of tissue damage by drugs especially smoking, the high count leads to atherosclerosis and cardiovascular diseases (swelling, block the microvasculature, stimulate hypercoagulability and advance infarct development) (11, 16, 17). Nicotine causes release of catecholamine which can enhance the WBC count (18).

No difference was found in our study for neutrophil level among drug abusers and control group with a p-value of 0.35 which is similar to the world drug report (19). Some reports shows minor decline in smokers than non-smokers but non-significantly (14) whereas other reported high count of neutrophil significantly (p=0.005) (20, 21). Significant increases in neutrophil counts were found among IDUs (22).

Present study report showed that lymphocytes are increased significantly in drug abuser as compared to non-drug abuser with p=<0.005. Similar reportswere found in other studies (13, 14). The glycoprotein from the tobacco leaf which can stimulate lymphocyte proliferation and differentiation by interacting with a specific membrane component, as occurs in antigenic response (23).

Our study showed higher monocytes count in drug abusers non-significantly than non-drug abuser with p-value 0.014.In contrast to our report, other studies shows decrease monocytes percentage in both smokers and Gutka users (22, 24) whereas other studies revealed raised monocytes significantly with a p-value of <0.005 (13). No considerable alteration is also recorded in monocyte among smokers and Gutka consumers (14, 20).

The results of present study revealed non-significant higher eosinophils level among drug abuser than non-abuser with a p-value of 0.014. Similar report revealed by various researchers significant increased (12, 22). The incidence of elevated eosinophil count increase in a cannabis users, whereas the readings in all non-cannabis users recorded were normal (25).

Significant increase in relative basophils level was observed in current study with a p-value of <0.005. In contrast to the present study, basophil level were recorded unchanged between abuser of drugs and un-abuser (14, 20).

RBC and its index are varying in current study. In our study, RBCs were found non-significantly higher in drug abusers than non-drug abusers with a p-value of 0.016, which is consistent with previous studies on smokers and gutka consumers (26, 27).

Hemoglobin concentration were non-significantly raised in drug abusers than control group with a p-value of <0.239. This recorded data were similar to the other studies(14, 26). While in contrast to other studies, in which Hb was found significantly higher in smokers and Gutka consumers (20, 28), whereas some reported low level of Hb(22).

There is increased significant difference in hematocrit (HCT %) between drug users and non-drug users (p-value=<0.001). Difference were observed in between present study report and other previous conducted studies (11, 12).

In the present study, high significant difference in MCV (p= 0.001) is observed between drug abuser and control group. Varying reports were noted between abusers and normal individuals with decrease MCV count (p-value of 0.035) (29). Non-significant MCV value with p-value 0.265, 0.404 and >0.005 were found in certain studies (11, 14, 28).

Both MCH and MCHC demonstrate significant lower level in drug abuser than non-abuser with a p-value of <0.001 and 0.002 respectively. Non-significant MCH and MCHC demonstrate by previous conducted studies (11, 14).

Our study reveals no significant variance on platelets count (p value 0.192) between drug users and their control. Similar reported data revealed by other researchers (11, 13, 25, 27). The platelets counts of heavy alcoholics were considerably decrease (p=0.0001) than those of non- alcoholics (30).

Limitations of current study were that no gender differentiation among drug abusers was studied because no female drug abusers were available. Secondly, no enough data was available that when the drug abusers started the use of drugs in case of more than one drug users.

CONCLUSION

These results confirmed that drug abusers have abnormal hematological parameters after comparing with control group (Non-drug abuser). Further future studies are necessary to evaluate the epidemiology of gender drug abuser within different age groups including the teen age children.

RECOMMENDATIONS

Comprehensive study is needed at molecular basis and hormonal changes should also be determined. Additionally, awareness about risks and other outcomes of drugs are required among our population. Health education seminars and workshops at community levels should be convey for these individuals.

CONFLICT

Authors have no conflict of interest.

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