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Evaluation of Haematological Parameters on the Basis of Haemogram among the Workers of Filling Station

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Abstract
Background: *Biomonitoring of occupational health diseases has gained importance to evaluate health hazards of human. In Bangladesh, the employees of fuel stations are exposed regularly to toxic fuel vapors containing benzene, toluene, ethylbenzene and xylene (BTEX).*
Aim of the study: *The goal of this study is to assess the effect of fuel exposure on hematological parameters of filling station workers by hemogram.*
Methods: *A cross-sectional study was done from January 2022 to December 2022 in the Department of Physiology, Dhaka Medical College, Dhaka. A total number of 80 participants comprising 40 in study group and 40 in control group were recruited by purposive sampling technique after fulfilling the ethical aspect. The study parameters were total count of red blood cell (RBC), hemoglobin conc., hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), red cell distribution width-coefficient of variation (RDW-CV), total and differential count of white blood cell (WBC), platelet count and mean platelet volume (MPV). Statistical analysis was done by a computer based statistical program SPSS windows version 26.0 as applicable.*
Results: *In this study, total count of RBC ($p<0.001$), Hb concentration ($p<0.001$), HCT ($p<0.001$), MCV ($p=0.001$), MCH ($p<0.001$), MCHC ($p=0.044$), RDW-CV ($p=0.017$) and platelet count ($p< 0.001$) were lower in study group compared with control group which were statistically significant. TC of WBC ($p=0.363$), neutrophil ($p=0.266$), lymphocyte ($p=0.152$), monocyte ($p=0.640$), eosinophil ($p=0.332$) and MPV ($p=0.536$) were not statistically significant. MCV ($p=0.590$), MCH ($p=0.465$), MCHC ($p=0.069$), TC of WBC ($p=0.337$), concentration, HCT, MCV, MCH, MCHC, total count of WBC and platelet count showed negative correlation with duration of exposure while RDW-CV and neutrophil showed positive correlation.*
Conclusion: *Haematological parameters are altered by long term exposure to fuel.*
Keywords: *Fuel, filling station, filling station workers, hematological parameters.*

I. INTRODUCTION

Economic growth and development of our society is advancing day by day to earn a meaningful life. Engagement of human in this commercial field is also become necessary [1]. Health and safety risks of human in most of the occupations are increasing worldwide. Some occupations and occupational environment cause physical, chemical, biological and psychological illness [2]. Unhygienic conditions and lack of safety measures at workplaces can cause different health problems among workers. Fuel is one of the biggest commercial merchandises in the world [3]. Certain people have greater exposure to fuel including filling station workers, service station attendants, drivers of gasoline trucks and refinery workers [4]. Fuel is one of the biggest commercial merchandises in the world [3]. Certain people have greater exposure to fuel including filling station workers, service station attendants, drivers of gasoline trucks and refinery workers [4]. Station workers are exposed to petrol and diesel derivatives during refueling at filling stations [5]. A filling station is a facility where fuel and lubricants for automobiles are sold. Fuels include petrol (Premium Motor Spirit), Liquefied Natural Gas (LNG), diesel (Automated Gas Oil) and kerosene (Dual Purpose Kerosene) are within these facilities [6]. Fuel is

a material that stores potential energy and releases such energy to produce heat and power for work [1]. Fuels are derivatives of petroleum products containing different types of saturated and unsaturated hydrocarbon and other chemicals, obtained by fractional distillation of crude oil [7]. In filling stations, due to volatile nature of fuel there is easy emissions of various hydrocarbons in atmosphere. Thus, filling station workers are frequently exposed to fuel vapor [8]. Volume of vaporization of petrol depends on atmospheric temperature, it is more in tropical countries [9]. Petrol and diesel are composed of various hydrocarbons. Petrol is highly flammable liquid derived from petroleum consisting of different types of volatile hydrocarbons like benzene, toluene, ethylbenzene and xylene (together known as BTEX). There are also some heavy metal contaminants such as iron, nickel, copper, vanadium, cadmium and lead. There are also some heavy metal contaminants such as iron, nickel, copper, vanadium, cadmium and lead. According to International Agency for Research on Cancer, Benzene and ethylbenzene are classified as group 1 and group 2B [10] carcinogenic agent respectively, while others have harmful effect on central nervous system of our body. Diesel constitutes 75% saturated hydrocarbons and 25% aromatic hydrocarbon. Paraffin is the predominant component of diesel [11]. Occupational health hazards in filling station workers have been recognized for many decades. The workers suffer a lot in different ways with diseases in all parts of world. Work related diseases are much higher in developing countries [4]. To evaluate the changes in hematological profile, complete blood picture (CBP) is a convenient approach. CBP is quick, easy and attainable measure for screening any adverse effect regarding hematological disorders [12]. But as far as it is known, no data is available on hematological parameters of filling station workers who are routinely exposed to petroleum products and exhaust fumes in Bangladesh. This study will help to explore the hematological status of filling station workers in our country. Besides this, awareness of health hazards among these employees will be focused and safety measure can be taken to improve the health of filling station workers.

II. METHODOLOGY

A cross-sectional study was done from January 2022 to December 2022 in the Department of Physiology, Dhaka Medical College, Dhaka. A total number of 80 participants comprising 40 in study group and 40 in control group were recruited by purposive sampling technique after fulfilling the ethical aspect.

Inclusion criteria

For study group

1. Filling station workers of Dhaka City.
2. Between 20 to 55 years of age group.
3. Duration of exposure is at least 8 hours per day.
4. Working experience in filling station is minimum 1 year.
5. Non- smokers, non-alcoholics.

For control group

1. Not working or living nearby fuel stations.
2. Age between 20 to 55 years.
3. Non- smokers, non-alcoholics.

Exclusion criteria

For both groups

1. History of acute illness.
2. History of any pathological conditions like chronic obstructive pulmonary disease (COPD), asthma, musculoskeletal abnormality, diabetes mellitus, hypertension, heart disease, liver disease, kidney disease, TB, malignancy.
3. History of blood donation or received blood within last 3 months.
4. History of taking anticoagulant, cytotoxic chemotherapy, iron therapy and long-term corticosteroid medication (at least 3 months).

Study Variables

1. Total count of red blood corpuscles (RBC)
2. Hemoglobin concentration (Hb conc.)
3. Hematocrit (HCT) or packed cell volume (PCV)
4. Mean corpuscular volume (MCV)
5. Mean corpuscular hemoglobin (MCH)
6. Mean corpuscular hemoglobin concentration (MCHC)
7. Red cell distribution width-coefficient of variation (RDW- CV)
8. Total count of white blood corpuscles (WBC)
9. Platelet count

10. Mean platelet volume (MPV)

Statistical analysis

Statistical analysis was performed by using a computer based statistical program SPSS(statistical package for social science) version 26. Results were expressed as mean and standard deviation (mean ± SD). Unpaired student's t-test was used to compare the parameters among study and control group. p value <0.05 was considered as level of significance.

III. RESULT

Table-1 depicts that the mean (±SD) age of study group A and control group B were 39.32±8.80 and 36.55±8.32 years respectively. The mean (±SD) BMI of study group A and control group B were 24.40±3.13 and 24.10±3.14 Kg/m2 respectively. The mean (±SD) diastolic blood pressure of study group A and control group B was 80.0±4.53 and 78.9±5.0 mm of Hg respectively. In this table p value of all of the parameters were > 0.05, so no statistically significant differences were found in age, BMI, systolic pressure and diastolic pressure between study and control group.

Table-1: General characteristics of the subjects in study and control groups (N = 80)

Parameters	Group A (n=40) Mean±SD Range	Group B (n=40) Mean±SD Range	p-value
Age (years)	39.32±8.80 (21.0–55.0)	36.55±8.32 (21.0–55.0)	0.151
BMI (kg/m2)	24.40±3.13 (17.8–31.3)	24.10±3.14 (19.1–32.0)	0.664
Systolic blood pressure (mm of Hg)	122.0±8.76 (100–135)	122.5±9.06 (100–135)	0.802
Diastolic blood pressure (mm of Hg)	80.0±4.53 (60–85)	78.9±5.0 (65–85)	0.295

The mean (±SD) of HCT was 40.59±2.45 and 43.25±1.97% in group A and group B respectively. In this study, the mean (±SD) of HCT was lower in group A in comparison to that of group B which was statistically significant (p< 0.001). The mean (±SD) of MCV was 85.29±5.67 and 88.91±3.14 fl in group A and group B respectively. In this study, the mean (±SD) of MCV was lower in group A in comparison to that of group B which was statistically significant (p= 0.001). The mean (±SD) of MCH was 28.97±1.88 and 31.05±2.61 pg in group A and group B respectively. In this study, the mean (±SD) of MCH was lower in group A in comparison to that of group B which was statistically significant (p< 0.001). The mean (±SD) of MCHC was 33.53±1.11 and 33.99±0.90 g/dL in group A and group B respectively. In this study, the mean (±SD) of MCHC was lower in group A in comparison to that of group B which was statistically significant (p=0.044) [Table-2].

Table -2: Comparison of RBC profile between Study Group and Control Group (n=80)

Parameters	Group A (n=40) Mean±SD Range	Group B (n=40) Mean±SD Range	p-value
TC of RBC (×106/µl)	4.67±0.33	4.98±0.31	<0.001

	(4.1–5.3)	(4.3–5.6)	
Hb concentration (g/dL)	13.87±0.97	14.77±0.56	<0.001
	(10.5–15.3)	(13.9–16.5)	
HCT (%)	40.59±2.45	43.25±1.97	<0.001
	(31.4–45.1)	(39.3–48.4)	
MCV (fL)	85.29±5.67	88.91±3.14	0.001
	(69.9–95.5)	(81.5–99.1)	
MCH (pg)	28.97±1.88	31.05±2.61	<0.001
	(23.5–31.7)	(27.3–39.0)	
MCHC (g/dL)	33.53±1.11	33.99±0.90	0.044
	(31.5–35.9)	(32.5–36.2)	
RDW-CV (%)	13.90±1.53	13.22±0.83	0.017
	(12.4–19.3)	(11.9–14.9)	

In Table-3 the mean (±SD) total count of WBC was 7.78±1.39 and 8.05±1.29 $\times 10^3$ /µl in group A and group B respectively. In this study, the mean (±SD) total count of WBC was lower in group A in comparison to that of group B which was not statistically significant (p= 0.363). The mean (±SD) total count of platelets was 197.35±39.93 and 233.27±39.80$\times$ 10^3 /µl in group A and group B respectively. In this study, the mean (±SD) total count of platelet was lower in group A in comparison to that of group B which was statistically significant (p<0.05). The mean (±SD) of MPV was 11.05±0.85 and 10.94±0.77 fL in group A and group B respectively. In this study, the mean (±SD) of MPV was higher in group A in comparison to that of group B which was not statistically significant (p= 0.536).

Table-3: Comparison of WBC and Platelet Profile between Study Group and Control Group (N=80)

Parameters	Group A	Group B	p-value
	(n=40)	**(n=40)**	
	Mean±SD	**Mean±SD**	
	Range	**Range**	
TC of WBC ($\times 10^3$/µl)	7.78±1.39	8.05±1.29	0.363
	(3.7–10.8)	(4.8–11.2)	
Neutrophil (%)	58.51±8.28	60.52±7.75	0.266
	(33.6–78.4)	(48.4–71.4)	
Lymphocyte (%)	35.11±7.63	32.77±6.80	0.152
	(17.0–54.5)	(14.9–44.9)	
Monocyte (%)	3.04±0.90	2.94±1.00	0.64
	(1.8–5.6)	(0.3–4.9)	
Eosinophil (%)	3.34±1.99	3.76±1.86	0.332
	(0.4–9.2)	(0.8–9.4)	
Basophil (%)	0.00±0.00	0.01±0.05	0.206
	(0.0–0.0)	(0.0–0.3)	
Platelet count ($\times 10^3$/µl)	197.35±39.93	233.27±39.80	<0.001
	(120.0–290.0)	(158.0–322.0)	

MPV (fL)	11.05±0.85 (9.1–12.9)	10.94±0.77 (9.0–12.7)	0.536

Pearson's correlation coefficient test was done for this analysis. p value <0.05 was considered significant. TC of RBC, Hb concentration, HCT and MCHC showed significant negative correlation with duration of exposure. RDW CV found positive correlation with duration of exposure in group A and found statistically significant. MCV and MCH showed negative correlation with duration of exposure which were not statistically significant [Table-4].

Table-4: Correlation of duration of exposure with RBC profile in Group A

Parameters	r-value	p-value
TC of RBC (×106/µl)	-0.634	<0.001
Hb concentration (g/dL)	-0.718	<0.001
HCT (%)	-0.5	0.001
MCV (fL)	-0.129	0.428
MCH (pg)	-0.251	0.119
MCHC (g/dL)	-0.365	0.021
RDW-CV (%)	0.64	<0.001

In Table-5 neutrophil showed positive correlation (r=+0.121) with duration of exposure in group A which was not statistically significant (*p*=0.456). Lymphocyte, Monocyte and Eosinophil showed negative correlation (r=-0.101, -0.205 and -0.025 respectively) which were not statistically significant and p values were 0.535, 0.204 and 0.879 respectively. MPV showed negative correlation (r=-0.265) with duration of exposure in group A which was not statistically significant (*p*=0.126).

Table-5: Correlation of duration of exposure with WBC and Platelet profile in Group A (n=40)

Parameters	r-value	p-value
TC of WBC (×10^3/µl)	-0.232	0.149
Neutrophil (%)	+0.121	0.456
Lymphocyte (%)	-0.101	0.535
Monocyte (%)	-0.205	0.204
Eosinophil (%)	-0.025	0.879
Platelet count (×103/µl)	--0.246	0.126
MPV (fL)	-0.265	0.098

IV. DISCUSSION

The present study was undertaken to observe the hematological parameters (total count of RBC, total count of WBC, platelet count, Hb concentration, MCV, MCH, MCHC, RDW-CV, MPV). In this study, a total number of 40 filling station workers were considered as the study group and 40 age matched healthy subjects were considered as the control group for comparison. In this study, age, BMI and blood pressure of all the subjects in study and control groups were almost similar and statistically no significant differences were observed among them. The mean value of age of study group was 39.32±8.80 and control group was 36.55±8.32 with p value 0.151. This observation was in agreement with the studies carried out by several researchers of different countries. Elnabi et al. (2021) from Egypt and Teklu et al. (2021) from Ethiopia mentioned that there were no statistically significant differences in age between study group and control group in their study [13, 14]. In the present study, the mean total count of RBC was lower in study group than that of control group. The result was statistically significant ($p< 0.001$). Similar types of observations were found by some researchers of different countries [4, 14]. Their proposal for this finding was due to suppression of bone marrow by toxic metabolites of gasoline. On the contrary, Al Jothery and Al hassnwi (2017) found no significant differences in means of RBC count between filling workers and office workers [12]. This might be due to unequal number of subjects in both groups and inclusion of smokers in their study. Another possible reason may be due to exposure to benzene did not reach to the point that can trigger significant changes in different types of blood cells. In this study, mean hemoglobin concentration of study group was significantly decreased compared to control group ($p< 0.001$). This was in accordance with Abou-ElWafa et al. (2015) and Teklu et al. (2021), who also found significantly lower Hb concentration in their study group [4, 14]. This might be due to impairment of hemoglobin synthesis by the metabolic end product of free radicals of benzene and other aliphatic hydrocarbons. On contrary, Getu et al. (2020) reported that the mean Hb level was significantly higher in petrol filling workers as compared with the control group [15]. In the present study, the mean hematocrit level was lower in study group than that of control group. The result was statistically significant ($p< 0.001$). Similar types of observations were found by Abou-ElWafa et al. (2015), Hussain et al. (2019), Teklu et al. (2021) [4, 3, 14]. On the contrary, Al Jothery and Al hassnwi (2017) found no significant differences in HCT of study group and control group [12]. In the present study, MCV, MCH and MCHC were decreased in study group compared with that of control group. The results were statistically significant and were $p= 0.001$, $p< 0.001$ and $p=0.044$ respectively. Similar types of observations were found by Anyiam et al. (2020) in Nigeria, whereas Getu et al. (2020) found significant lower MCV and significant higher MCHC in study group in Ethiopia [15, 16]. In Pakistan, Hussain et al. (2019) also found that MCV and MCH were decreased significantly in study group [3]. On contrary, Abou-ElWafa et al. (2015) and Al Jothery and Al hassnwi (2017) found no significant differences in MCV, MCH and MCHC between study group and control group [4, 12]. In this study, mean RDW CV of study group was increased compared to control group. The result was statistically significant ($p=0.017$). Almost similar type of observation was found by Getu et al. (2020) in Ethiopia [16]. On the other hand, Al Jothery and Al hassnwi (2017) and Teklu et al. (2021) found no significant differences in RDW of study group and control group [12, 14]. In this study, no significant differences were found in the mean of WBC count and differential count of WBC between the study group and control group. This was in accordance with Al Jothery and Al hassnwi (2017), Getu et al. (2020), Teklu et al. (2021) [12, 3, 15, 14]. On the contrary, WBC count with its differentials were found increased by Zamanian et al. (2018), Hussain et al. (2019) [11, 3]. In the present study, mean platelet count of study group was decreased significantly compared with control group. Similar types of observations were found by some researchers of different countries as Anyiam et al. (2020), Teklu et al. (2021) [16, 14]. On the contrary, no significant differences were found by Tiu and Dubey (2017), Al Jothery and Al hassnwi (2017) [17, 12]. Again, significant higher mean platelet count of study group was observed by Hussain et al. (2019), Getu et al. (2020) [3, 15]. In this study, no significant differences were found in the means of mean platelet volume between study group and control group. This is in accordance with Anyiam et al. (2020), Teklu et al. (2021) [16, 14]. It was contrary with Hussain et al. (2019) who found higher MPV among study group [3]. In this study, total count of RBC, Hb concentration, HCT and MCHC showed significant negative correlation with duration of exposure while RDW-CV showed significant positive correlation. MCV and MCH showed negative correlation with duration of exposure which was not statistically significant. TC of WBC, Lymphocyte, Monocyte, Eosinophil, Platelet count and MPV showed negative correlations which was not statistically significant. Neutrophil showed positive correlation which was not statistically significant. These findings were almost similar with Hussain et al. (2019) and Teklu et al. (2021) [3, 14]. Teklu et al. found negative correlation in RBC count, hemoglobin, HCT and platelet with years of exposure [14]. They also found positive correlation in absolute number of neutrophils with duration of exposure.

Limitation of the study:

The study featured a single focus point and minimal sample sizes. As a result, the study's conclusions may not completely reflect the entire situation.

V. CONCLUSION & RECOMMENDATION

After analyzing the results of the study, it can be concluded that TC of RBC, Hb concentration, HCT, MCV, MCH, MCHC and platelet count were significantly decreased in study group compared with control group. Total count of WBC was also decreased in study group which was not statistically significant. RDW-CV was found increased significantly in study group compared with control group. MPV was also found increased in study group which was not statistically significant. TC of RBC, Hb concentration, HCT, MCV, MCH, MCHC, total count of WBC and platelet count showed negative correlation with duration of exposure while RDW-CV and neutrophil showed positive correlation. So, haematological parameters are altered by long term exposure to fuel.

References

[1]. Christian, S. G. and Eze, E. M., 2017. Effect of exposure to petroleum products on methaemoglobin levels of fuel station attendants in port harcourt, Nigeria. Sokoto Journal of Medical Laboratory Science, 2(3), 69–74.

[2]. Ekpenyong, C. E. and Asuquo, A. E., 2017. Recent advances in occupational and environmental health hazards of workers exposed to gasoline compounds. International Journal of Occupational Medicine and Environmental Health, 30(1), 1–26.

[3]. Hussain, S., Mehmood, R., Arshad, F. A., Khan, S. and Khan, A., 2019. Evaluation of comparative effects of the exposure of gasoline fumes/vapors on the blood and urine picture of gasoline filling workers of Multan City, a populous city of Southern Punjab, Pakistan. Journal of Environmental & Analytical Toxicology, 9(3), 1-7.

[4]. Abou-ElWafa, H. S., Albadry, A. A., El-Gilany, A. H. and Bazeed, F. B., 2015. Some biochemical and hematological parameters among petrol station attendants: a comparative study. BioMed Research International, 1-8.

[5]. Shaikh, A. & Chandel, D., 2017. Biomonitoring study on workers occupationally exposed to automobile fuels. International Journal of Human Genetics, 17(1), 31-37.

[6]. Afolabi, O.T., 2011. Assessment of safety practices in filling stations in Ile-Ife, South Western Nigeria. Journal of Community Medicine and primary Health care, 23(1-2), 9-15.

[7]. Eze, A. N., Eluke, B. C., Eluke, C. C., Ezigbo, E. and Uzoma, I., 2019. The effect of chronic occupational exposure to petroleum products on haematological and biochemical parameters of petrol attendants. Journal of Advances in Medicine and Medical Research, 28(6), 1-8.

[8]. Rekhadevi, P. V., Rahman, M. F., Mahboob, M., and Grover, P., 2010. Genotoxicity in filling station attendants exposed to petroleum hydrocarbons. Annals of Occupational Hygiene, 54(8), 944–954.

[9]. Qafisheh, N., Mohamed, O. H., Elhassan, A., Abdalla Ibrahim, A., and Hamdan, M., 2021. Effects of the occupational exposure on health status among petroleum station workers, Khartoum State, Sudan. Toxicology Reports, 8(1), 171-176.

[10]. IARC, 2018. Agents classified by IARC monographs, Volume 1-131. Lyon, France: WHO.

[11]. Zamanian, Z., Sedaghat, Z. and Mehrifar, Y., 2018. Harmful outcome of occupational exposure to petrol: Assessment of liver function and blood parameters among gas station workers in Kermanshah City, Iran. International Journal of Preventive Medicine, 9(100), 1-4.

[12]. AlJothery, A.H. and Al-hassnwi, A.T., 2017. Changes in the hematological profile among workers at patrol stations in Babli Province/Iraq. Mesopotemia Environmental journal, 3(4), 25-32.

[13]. Elnabi, M. A. H., Mohamed, S. A., Abo-El Wafa, H. A., Khalaf, H. H. and Allam, W. A., 2021. Assessment of hematological parameters, liver and kidney functions among fuel station workers in Sohag governorate, Egypt. Ain Shams Journal of Forensic Medicine and Clinical Toxicology, 37(2), 57-66.

[14]. Teklu, G., Negash, M., Asefaw, T., Tesfay, F., Gebremariam, G., Teklehaimanot, G., Wolde, M. and Tsegaye, A., 2021. Effect of gasoline exposure on hematological parameters of gas station workers in Mekelle City, Tigray Region, Northern Ethiopia. Journal of Blood Medicine, 12(1), 839-847.

[15]. Getu, S., Shiferaw, E. and Melku, M., 2020. Assessment of hematological parameters of petrol filling workers at petrol stations in Gondar town, Northwest Ethiopia: a comparative cross-sectional study. Environmental Health and Preventive Medicine, 25(44), 1-9.

[16]. Anyiam, A.F., Obi, E., Ifeanyichukwu, M.O. and Ilo Elochukwu, C., 2020. Effects of gasoline on haematological parameters of gasoline station workers in Onitsha, Anambra State, Nigeria. Sokoto Journal of Medical Laboratory Science, 5(3), 5 – 10.

[17]. Tiu, D.N. and Dubey, P., 2017. Study of WBC count and its association with blood pressure in petrol pump filling workers of Barabanki City, Uttar Pradesh. Journal of Advanced Medical and Dental Sciences Research, 5(4), 87-90.