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Journal of Clinical and Laboratory Research

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Research Article

Evaluation of Haematogical Parameters of Petroleum Attendants Based on Sex in Ondo

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Received Date: 08 November 2021 | **Accepted Date:** 20 November 2021 | **Published Date:** 29 November 2021

Citation: Emmanuel I Obeagu, Ifeoluwa O Owojori, AO Hassan. (2021). Evaluation of Haematogical Parameters of Petroleum Attendants Based on Sex in Ondo. *Journal of Clinical and Laboratory Research.* 4(1); DOI:10.31579/2768-0487/059

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Abstract

The study was done to evaluate changes in haematological parameters among petroleum attendants based on sex in Ondo. Fifty (50) petroleum attendants were randomly recruited for this study. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. The student t-test was used for analysis and level of significance set at $p<0.05$. The table above showed no significant difference in PCV(p=0.571) WBC(p=0.278), LYM(p=0.297), GRAN(p=0.135) MID (p=0.584), LYM (p=0.841),GRAN (p=0.986), RBC(p=0.339), HGB (p=0.986), MCV (p=0.135), MCH (p=0.896), MCHC (p=0.845), RDW_CV (p=0.795), RDW-SD (p=0.510), PLT(p=0.118), MPV (p=0.686) and P-LCR (p=0.172) but there was significant difference in PDW (21.66±30.88fL, 52.02±42.58fL, p=0.006) when compared between male and female respectively.

This study thus evaluated the need for laboratory investigation of all blood parameters of oil workers. In this study, there was no significant difference in the blood parameters of the attendants based on gender.

Keywords: haematological parameters; petroleum attendants; sex

Introduction

Petroleum consists of crude oils and a variety of refined oil products, and is also a significant source of polycyclic aromatic hydrocarbons (PAH). The industry of petroleum refining and distribution play an important role in terms of number of employees in the Nigerian production and overall economy. Petroleum refining has evolved continuously in response to changing consumer demands for better and different products, and involves processing of mainly oil to obtain mixtures of hydrocarbon compounds, the products of which are specified on the basis of aptitude for use [3].

Petroleum is a thick, flammable, yellow-to-black mixture of gaseous, liquid, and solid hydrocarbons that occurs naturally beneath the earth's surface and can be separated into fractions including natural gas, gasoline, naphtha, kerosene, fuel and lubricating oils, paraffin wax, and asphalt and is used as raw material for a wide variety of derivative products. Petroleum products have found its usage in our everyday life and hence the need for fuel attendants to dispense fuel from its reservoir [4].

Occupational exposure to petroleum products and fumes has been reported to have toxic effects on various organs and body systems with high impact on the human respiratory system. Organs such as the heart, lungs, skin and kidneys are affected by these toxic effects resulting in various diseases and different forms of genotoxic, mutagenic, immunotoxic, carcinogenic and neurotoxic manifestations. With the fumes from petroleum products and lead content in fuel having a negative impact on the organs of the body, there will be evident impact on haematological parameters [4].

Exposures to several chemicals are implicated in the derangement of hematological profile. The adverse health effects of gasoline exposure may be primarily related to impairment of the hemopoietic system with bone marrow depression, including pancytopenia, hence aplastic anemia and an increased risk of developing cancer (acute myeloblasticleukemia). Morphological effect on red blood cells (RBCs) like microcytosis also occurs. The above mentioned disorders are believed to be caused by toxic Benzene metabolites [8]. Benzene is metabolized in the liver to its primary metabolite phenol by cytochrome P4502E1 (CYP2E1) through the benzene oxide intermediate. It is subsequently metabolized by CYP2E1 to hydroquinone (HQ) it is then transported to the bone marrow and oxidized to benzochinones, which eventually releases reactive oxygen species (ROS) damaging hematopoietic cells, therefore chronic exposure to benzene is believed to be associated with many of bone marrow failure and hematological malignancies like, Acute Myeloid

Leukemia (AML), Aplastic anemia myelodydplastic syndrome, acute lymphoblastic leukemia and chronic myeloid leukemia [2, 5, 7].

The study was done to evaluate changes in haematological parameters among petroleum attendants based on sex in Ondo.

Materials and Methods

Subjects

The subjects for this study were petroleum attendants in Ondo Town, Ondo State. All adult male and female who work in petrol station at Ondo Town were accounted as source population for the study. However, all adult workers who work at the petrol station at Ondo Town with exposure of six months and above and fulfilling the eligibility criteria were accounted as study population. Fifty (50) petroleum attendants were randomly recruited for this study.

Inclusion Criteria

Adult males and females aged 18-60 years, who have worked as attendants at least six months and above at petrol station would participate in this study.

Exclusion Criteria

Participant with the following data would be excluded from the study

i. Subjects with any acute infection during blood collection
ii. Subjects with past history of chronic diseases
iii. Subjects on medication affecting blood cell count
iv. Subjects with already blood disorder
v. Oil workers and mechanics

Procedure for Data Collection

Data were collected over one month's through questionnaire interviews which would be conducted by the principal investigator. The questionnaire was mainly based on multiple-choice and yes or no questions focusing on socio-demographic data, age, gender, job duration (years), working time (hour/day) and knowledge on gasoline exposure, utilization of protective methods, and health status, smoking and getting any medications. Blood was collected from participants who complete the questionnaire and who agreed to give blood. After collection, laboratory blood analysis was done for the hematological parameters.

Method of Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. The student t-test was used for analysis and level of significance set at $p<0.05$.

Ethical Approval

Permission to collect data was obtained from the department and the ethical approval was obtained from the Health Research and Ethics Committee. Consents were obtained from subjects before enrolling them for the study. Subjects were assured of confidentiality and anonymity. Subjects were made to know that there are no incentives and that they can withdraw from the study at any time during the course of the research.

Results

Sex	15-30	31-45	Total
Male	16(32.0)	8(16.0)	24(48.0)
Female	23(46.0)	3(6.0)	26(52.0)
Total	39(78.0)	11(22.0)	50(100.0)

Table 1: *Demographic Profile of the Subject Group (n=50)*

The above table shows demographic profile of the selected petroleum attendant. Of the total attendants, 48% were male and 52% were female. Also, 78% were within age range 15-30years and 22% were within age range 31-45years.

Parameters	Male	Female	t-value	P –value
PCV(%)	37.33±12.35	38.81±4.42	-0.571	0.571
WBC(10^9/L)	43.33±15.94	48.87±19.4	-1.098	0.278
LYM(%)	29.91±40.90	40.03±25.98	-1.053	0.297
GRAN(%)	169.32±256.35	287.25±289.62	-1.519	0.135
MID(%)	18.77±23.46	14.45±30.94	0.552	0.584
RBC(10^{12}/L)	5.04±2.05	6.57±7.466	-0.966	0.339
HGB(g/dl)	13.70±20.36	13.80±20.83	-0.018	0.986
MCV(fL)	53.61±21.39	61.55±15.19	-1.521	0.135
MCH(Pg)	32.85±14.21	31.93±30.56	0.132	0.896
MCHC(g/dL)	35.90±12.20	36.48±8.37	-0.196	0.845
RDW-CV(%)	37.76±70.67	33.45±44.10	0.261	0.795
RDW-SD(fL)	129.33±121.42	111.03±58.90	0.664	0.510
PLT(10^9/L)	90.35±48.89	115.44±60.51	-1.592	0.118
MPV(fL)	15.65±18.05	18.05±23.20	-0.407	0.686
PDW(fL)	21.66±30.88	52.02±42.58	-2.865	0.006*
P-LCR(%)	62.38±28.15	51.73±26.20	1.385	0.172

Table 2: *Mean ± standard deviation of haematological parameters of subject group based on sex*

The table above showed no significant difference in PCV(37.33±12.35%, 38.81±4.42%, p=0.571) WBC(43.33±15.94x10^9/L, 48.87±19.4x10^9/L, p=0.278), LYM(29.91±40.90%, 40.03±25.98%, p=0.297), GRAN(7169.32±256.35%, 287.25±289.62%, p=0.135) MID (18.77±23.46%, 14.45±30.94%, p=0.584), LYM (26.92±14.91%, 27.85±17.41%, p=0.841),GRAN (66.24±16.55%, 66.15±20.56%, p=0.986), RBC(5.04±2.05 x10^{12}/L, 6.57±7.466 x10^{12}/L, p=0.339), HGB (13.70±20.36 g/dl, 13.80±20.83 g/dl, p=0.986), MCV (53.61±21.39fL, 61.55±15.19fL, p=0.135), MCH (32.85±14.21Pg, 31.93±30.56 Pg, p=0.896), MCHC (35.90±12.20g/dL, 36.48±8.37g/dL, p=0.845), RDW_CV (37.76±70.67%, 111.03±58.90%, p=0.795), RDW-SD (129.33±121.42fL, 111.03±58.90fL, p=0.510), PLT(90.35±48.89x10^9/L, 115.44±60.51x10^9/L, p=0.118), MPV (15.65±18.05fL, 18.05±23.20fL, p=0.686) and P-LCR (62.38±28.15%, 51.73±26.20%, p=0.172) but there was significant difference in PDW (21.66±30.88fL, 52.02±42.58fL, p=0.006) when compared between male and female respectively.

Discussion

This study had recruited 50 petroleum attendants working in Ondo Town, Ondo State. The demographic profile of the attendants showed 48% male and 52% female. Also, they were mostly within age range 15-30years. Petroleum exposure is one of the main health concerns for occupations with risk of exposure to volatile solvents such as in petrol pump workers. In this present study, no significant difference was observed in all the blood parameter of the attendants. This finding confirmed the study carried out by [1] in their comparative cross-sectional study (2015) which was conducted in Mansoura City Egypt on 102 petrol station attendants which showed no significant difference between the subject groups when compared with the control group. However, there was significant difference in the Platelet Distribution Width (PDW) based on sex in this current study. This has shown that Platelet Distribution Width may be a sensitive blood parameter for benzene exposure among petroleum attendants working in Ondo Town. The variation in PDW of the attendants was similar to the study carried out by [6] on hematological indicators of exposure to petroleum products in petroleum refining and distribution industry workers in Nigeria.

Conclusion

This study thus evaluated the need for laboratory investigation of all blood parameters of oil workers. In this study, there was no significant difference in the blood parameters of the attendants based on gender.

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DOI: 10.31579/2768-0487/059

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