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Research article

Evaluation of Haematogical Parameters of Petroleum Attendants based on Age Groups in Ondo

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Abstract:

The study was done to evaluate changes in haematological parameters among petroleum attendants based on age group 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($p=0.708$), LYM($p=0.923$), GRAN($p=0.721$) MID ($p=0.962$), LYM ($p=0.923$),GRAN ($p=0.721$), RBC($p=0.339$), HGB ($p=0.928$), MCV ($p=0.952$), MCH ($p=0.442$), MCHC (3$p=0.274$), RDW_CV ($p=0.905$), MPV($p=0.110$), P-LCR ($p=0.738$) and PDW ($p=0.386$) when compared between male and female respectively. There was significant difference in WBC ($p=0.020$), RDW-SD ($p=0.042$) and PLT ($p=0.040$).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; age group

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 age group 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

Parameters	15-30	31-45	t-value	P –value
PCV(%)	38.36±9.98	37.18±4.79	0.377	0.708
WBC(10^9/L)	49.30±17.81	35.27±13.73	2.410	0.020*
LYM(%)	34.92±31.46	36.06±43.58	-0.097	0.923
GRAN(%)	238.20±270.55	203.85±314.72	0.359	0.721
MID(%)	16.42±27.29	16.88±29.17	-0.049	0.962
RBC(10^{12}/L)	6.18±6.23	4.59±1.52	0.836	0.407
HGB(g/dl)	13.61±20.58	14.25±20.66	-0.090	0.928
MCV(fL)	57.82±17.73	57.44±22.65	0.060	0.952
MCH(Pg)	33.74±26.49	27.13±7.85	0.775	0.442
MCHC(g/dL)	37.04±11.21	33.01±4.48	1.107	0.274
RDW-CV(%)	36.05±62.64	33.65±38.17	0.120	0.905
RDW-SD(fL)	134.08±102.38	73.44±37.97	1.914	0.042*
PLT(10^9/L)	111.61±57.81	73.44±37.97	2.026	0.040*
MPV(fL)	14.40±17.80	25.74±28.06	-1.630	0.110
PDW(fL)	40.09±40.12	28.09±40.45	0.875	0.386
P-LCR(%)	57.54±26.82	54.36±30.62	0.336	0.738

Table 1: *Mean ± standard deviation of haematological parameters of subject group based on age group*

The table above showed no significant difference in PCV(38.36±9.98%, 37.18±4.79%, p=0.708), LYM(34.92±31.46%, 36.06±43.58%, p=0.923), GRAN(238.20±270.55%, 203.85±314.72%, p=0.721) MID (16.42±27.29%, 16.88±29.17%, p=0.962), LYM (34.92±31.46%, 36.06±43.58%, p=0.923),GRAN (238.20±270.55%, 203.85±314.72%, p=0.721), RBC(6.18±6.23x10^{12}/L, 4.59±1.52x10^{12}/L, p=0.339), HGB (13.61±20.58g/dl, 14.25±20.66g/dl, p=0.928), MCV (57.82±17.73fL, 57.44±22.65fL, p=0.952), MCH (57.82±17.73Pg, 27.13±7.85Pg, p=0.442), MCHC (37.04±11.21g/dL, 33.01±4.48g/dL, p=0.274), RDW_CV (36.05±62.64%, 33.65±38.17%, p=0.905), MPV(14.40±17.80fL, 25.74±28.06fL, p=0.110), P-LCR (57.54±26.82%, 54.36±30.62%, p=0.738) and PDW (40.09±40.12fL, 28.09±40.45fL, p=0.386) when compared between male and female respectively. There was significant difference in WBC (49.30±17.81x10^9/L, 35.27±13.73x10^9/L, p=0.020), RDW-SD (134.08±102.38fL, 73.44±37.97fL, p=0.042) and PLT (111.61±57.81x10^9/L, 73.44±37.97x10^9/L, p=0.040).

Discussion

The petroleum attendants were classified into two groups based on age (15-30years and 31-45years). However, no significant difference was observed in PCV, LYM, GRAN, MID LYM, GRAN, RBC, HGB, MCV, MCH, MCHC, RDW_CV, MPV, P-LCR and PDW ($p>(p<0.05)$ when compared between male and female respectively. However, consistent significant increment in WBC, RDW-SD and PLT ($p<0.05$) were observed indicating a possibility of functional aberration following haematopoietic toxicity in the oil workers. This is a strong indication that both age and exposure period have strong impacts in defining the patterns of variations observed in the haematological indices among the oil workers. An increment in hematological indices among oil workers was similarly observed in the study conducted by Ezejiofor (2014) on hematological indicators of exposure to petroleum products in petroleum refining and distribution industry workers in Nigeria. The study observed consistent significant increases in lymphocytes ($p<0.05$) and ESR ($P<0.05$) as against WBC, RDW-SD and PLT which were observed in this present study. Although, gender classification showed no appreciable impact in this study but age grouping had shown that the health effects indicated by the observed variations are likely to rear up from age 40 years and above.

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. However, the study could conclude that there could be variations in the hematological parameters of oil workers based on their age groups. It is necessary to take note of the fact that some laboratory parameters among petrol station attendants could show changes that could be attributed to duration of workplace exposure and age range and this should be given attention at pre-employment and periodic medical examination.

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