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The Health Implications of Oil Paint Usage On the Studio Artist

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ABSTRACT

Scholarly attention to hazards of oil paint usage in studio context is lacking, especially in Nigeria and similar contexts where climate and inadequate water and diet qualities may combine with exposure to oil paints to produce results different from those established outside studio contexts. This study thus examined health hazards of oil paint on the studio artist with the aim of indicating appropriate preventive measures against its hazards. The study used thirty albino rats assigned into five groups, acclimatized to studio environment for two weeks, their baseline hematology recorded, and exposed to oil paints in varying degrees for four weeks after which their blood and organs were harvested for histological and hematological examinations. Findings indicate that exposure to the high concentration of heavy metals, hydrocarbons and volatile organic compounds (VOCs) in oil paints caused severe damages to the blood, lungs and liver of the samples and implicatively portend cancer, blood, liver, kidney, heart, skin and neuro diseases to the studio artist. It is recommended that: studios should be purpose-built with high ventilation capacity; oil packages should mandatorily indicate levels of VOCs; artists should use gloves and nose mask and oil paint production should explore non-hazardous material.

Keywords: Artist, Oil paints, Health Hazard, Heavy Metals, Studio Art, Nigeria.

Aims Research Journal Reference Format:
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1. INTRODUCTION

Over the years, occupational health hazards have been a serious issue and matter of complaint in different fields. In studio art practice, the question of the components of the materials/media used mostly in the production of an art piece is yet to be well attended to. Essential media of expression of the studio artist engaged in painting are paints. These paints are grouped into two major classes: oil-based paints and water-based paints. Paint is typically composed of pigments, solvents, resins and various additives. They are made either of naturally or synthetic materials. Evidence from the Paleolithic times up to the beginning of the industrial revolution period indicate that artists used a variety of naturally occurring materials such as natural iron oxides and charcoal used in producing a range of colours before the introduction of synthetic pigments (Zuskin *et al*, 2007:167-177).

Oil paint was remarkably first used for Buddhist paintings in western Afghanistan between the fifth and the tenth centuries (Barry and Carolyn, 2017), but it did not gain wide reputation until the fifteenth century. It however, quickly surpassed egg tempera in popularity because of greater versatility, longer working time and subtler rendering. Oil paint is synthetically made and usually dispersed into a liquid called vehicle (binder and the solvent) of linseed oil and in some cases, Safflower oil to produce oil paints (Pyle, Pearce, Winsor and Newton, 2001). The liquid is volatile to allow for easy application. The resins aid fast drying process, and the additives help to retain the freshness of the paint. Oil paints have been consequently associated with the release of potentially harmful solvents and volatile organic compounds (VOCs) that can lead to free radical generation and oxidative stress that often led to such minor or severe disease conditions (Jarup, 2003:167). The diversity of these materials and the techniques used suggest that, from the beginning, creating art was a potentially dangerous enterprise (Zuskin *et al*, 2007:167-177).

The industrial and scientific revolutions brought about a huge expansion in the range of synthetic pigments that are manufactured or refined from naturally occurring materials, available for and artistic expression (Pyle and Pearce, 2001:6-8). The studio artist's effective use of colour rendition has been the utmost priority while easily ignoring the damages the constant usage of such materials may bring on the long run. Literature materials on paint materials, compositions of paint, products and some other by products of paint are rich. Laurie *et al* (1926) mentioned the origin of the use of drying oils. Burgess (1981) emphasized the presence of hydrocarbons, which appears to be the primary poisonous ingredient, in oil paint but with no scientific experiment to validate his claim. Zuskin *et al* (2007) provided an explanation that many classic artworks as well artists' self-portraits provided us with physical clues about past artist's diseases. Such Visual Arts clues are informal health records lacking for most other professions.

Arnold (1988), McCann (1992), Vargas (1995) Espinel (1999) variously observed that some artists suffered illnesses related to heavy metal poisoning such as Van Gogh's madness, Rembrandt progressive depression and Francis Goya neurologic illness. Hoffman *et al* (1993) reported a case study of a pregnant 28-year-old lady with exposure to Toluene diisocyanate (TDI) which can result in cardiovascular, respiratory and liver diseases. Damon (2012) also highlighted the case of a 76-year-old artist, who painted all day with oil-based paints throughout her lifetime causing high blood pressure and other related diseases.

Shih (2002) classified paint into water based and oil based while HSENI and CITB (2003) established that all solvents are potential health hazards. Sharma and Agrawal, Janine (2005), McCann (2008) and Abdullahi (2013) study core tissues targeted by heavy metals and highlight the toxic metals used in art paints as well as the main problem with heavy metals in human bodies is their ability to bio-accumulate; implying that the metals do not leave the body by their own accord and accumulate in certain tissues. Odoh (2012) claimed that the toxicity of hydrocarbons is directly related to their physical properties, specifically the viscosity, volatility, surface tension, and lipophilicity. Similarly, Kameti (2013) revealed that the oxidation state of metals also affects the electrons and determine colour.

It is noteworthy from the foregoing, that general information about heavy metals, hydrocarbons and solvents are from scholarly studies but comprehensive and direct investigation of effect of oil paint usage in laboratory and studio contexts are lacking, especially in developing economy like Nigeria where climate, inadequate quality water or poor diet may combine with exposure to such chemicals to produce results different from established ones. Furthermore, there is, in Nigeria inadequate scholarly attention to oil paint usage, its chemical composition and health implications on the human health. Despite this however, there has been continual increase in the number of art schools in Nigeria. This means more people are coming into art practice and more artists are being exposed to the hazards of using oil paint with undefined warning on the high risk of exposure. All these make this study necessary and expedient.

This study, therefore, is an examination of the health implications of oil paint usage on studio artists. The study specifically analyzed the presence of heavy metals in oil paints and the influence of the oil paint on the studio artist's health. In scope, the study is restricted to studio art practice in Nigeria. The aim of the study is to analyze oil paint used by studio painters with a view to determining its health implications on the artists and indicating appropriate preventive measures against high intake of heavy metals in the process of producing artwork. The specific objectives of this study are: to examine the chemical composition (pigments, solvents and binder) used in production of oil paints; to ascertain the presence and level of heavy metals such as lead, mercury and cadmium in the oil paints: to determine the environmental effect and health implications of the paints on studio artists using mammalian laboratory albino rats as samples; to analyze the significant difference between oil based and water based paints; and to know whether a high intake of oil paint through either inhalation or ingestion may causes humans to develop scleroderma or obstructive nephropathy and or any other disease that relates to effect of heavy metals in human body system.

2. STUDIO ART PRACTICE AND EXPOSURE TO HEALTH HAZARDS

There are different ways the studio artist is exposed to hazard of oil paint. One such way is the use of paint soiled hand. For example, due to the long period spent in the studio, the artist may sometimes settle for quick packaged meals or snacks that involve the use of hands to eat. These hands, mostly with paint and other chemical stains, if unwashed may lead to ingestion of chemicals into the system. Cumulative occurrence of this intake over a significant period may leave a large quantity of heavy metals in the body system. Ingestion is just one of the channels of exposure, whereas these metals may already be present in the body system due to exposures to the painting environment. All these factors increase the studio artist risk of diseases caused by the high percentage of these metals in the blood. Painting as a process or enterprise as well as the studio environment constitute exposure points. *Ewu n be loko* Longe, Longe *fun ra e ewu ni,* there is danger in Longe's farm, Longe himself is hazardous, as a Yoruba proverb goes.

Oil-based paint poisoning has been described as large amounts of paint getting into the stomach (ingestion) or lungs (inhalation) (Drugs.com, 2019). Paint also can enter the studio artist's system through the skin or eyes. The primary risk is however from the hydrocarbons in the paint and the solvents used in painting and symptoms include respiratory difficulty or coughing, confusion, rapid heartbeat, skin irritation and blistering and irritated or watering eyes and sinuses.

Solvents are key source of environmental distress because at normal temperatures and pressures they can volatilize (Voutsas, 2007). There are different types of solvents used in painting, an example is Turpentine, which is highly effective for cleaning brushes and mixing oil paints. Nonetheless, all the solvents are caustic. They emit vapours and fumes and as a result can be harmful through direct skin contact and inhalation. Their fumes emit volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) into the atmosphere (Odoh, 2012). In the case of oil paint, the total base is made up of VOCs. As the paint dries the quantity of VOCs are released into the air. As the quantity of VOCs in paint rises, the paint gets more vibrant in colour. Shih (2002) has rightly observed that some people may be particularly sensitive to oil-based paint and will feel dizzy or nauseated, have trouble breathing, develop a rash or have some other adverse reaction with very little exposure, while some may take a longer period before any sign or symptoms is revealed.

Another major health risk when using oil paint is flammable fire hazard regardless of the type of solvent. All the solvents are flammable (Boyler, 2011). Solvents and whatsoever it is exposed to become combustible. This includes the painting surface, the solvent itself and any spillages, and most importantly saturated rags or paper towels normally used in the studios. Furthermore, oil and solvent-soaked rags can ignite extemporaneously, that is, they can burst into flames from chemical reaction only with little or no influence of an outside source.

Also, there is a limited variety of raw pigments derived from earth minerals, which contain heavy metals. These heavy metals cannot be metabolized by the body and consequently they bio-accumulate (Odoh, 2012). These metals have, however, been used in paint since the Middle Ages. For example, tempera, a popular form of paint used in the Byzantine world and the Middle Ages in Europe, contained mercury ore as one of its components (Zuber and Newman, 2008). The tradition of using heavy metals in paints continues to the present time. Paints, pigments, colorants, and glazes may therefore contain toxic metals.

In addition, all oil-based painting media and petroleum-based products have health risks; prolonged contact with skin can cause irritation and over time may produce a carcinogenic effect. It is noteworthy that the International Agency for Research on Cancer (IARC, 2002) states that some classified VOCs, which includes biological or chemical agents, are known to cause cancer in both humans and animals, depending on the extent and duration of exposure. For example, the pigments listed in tables 1 and 2 below are considered carcinogenic (Driscoll *et al,* 2004).

Table 1: Identified Probable Carcinogens and Extremely Toxic Pigments

White	Antimony white, lead or flake white
Reds	cadmium red, lithol red
Browns	burnt umber or raw umber
Yellows	cadmium yellow, cadmium barium yellow, barium yellow, chrome yellow, cobalt yellow, Naples yellow, strontium yellow, zinc yellow and zinc sulfide
Orange	chrome orange, cadmium orange, molybdate orange, vermilion
Green	chrome green
Violets	manganese violet, cobalt violet
Silver	cadmium barium colors

(Source: World Health Organization, 2004)

Table 2: Identified Moderately Toxic Pigments

White	zinc white
Reds	alizarin crimson, toluidine red
Yellows	toluidine yellow
Blue	cerulean blue, cobalt blue, manganese blue, Prussian blue
Green	cobalt green, chromium oxide green, viridian
Blacks	carbon black

(Source: World Health Organization, 2004)

Oil, watercolor, and acrylic paints may contain heavy metals such as cadmium, lead, and chromium. Cadmium occurs naturally in ores together with zinc, lead and copper. Cadmium compounds are used as stabilizers in colour pigment, among several others such products. Inhalation of cadmium fumes or particles can be life threatening. In this regard, acute pulmonary effects and deaths are unusual, but sporadic cases still occur (Jarup, 2003). Exposure to cadmium may cause kidney damage. It has been suggested that the tubular damage is rescindable, but there is overwhelming evidence that the cadmium induced tubular damage is indeed irreparable unless detected early (Genchi *et al*, 2020). Long-term high cadmium exposure may cause skeletal damage, this was first recorded in Japan, where the itai-itai (ouch-ouch) disease (a combination of osteomalacia and osteoporosis) was discovered in the 1950s (Ferrante *et al*, 2013). The exposure was caused by cadmium-contaminated water used for irrigation of local rice fields. Some studies outside Japan have reported similar findings (Ferrante *et al*, 2013).

Research has further shown also that relatively low cadmium exposure may cause skeletal damage, evidenced by low bone mineral density (osteoporosis) and fractures (Ying *et al,* 2021). Experiments with animals have also suggested that cadmium may be a high-risk factor for cardiovascular (heart related) disease, but studies of humans have not been able to confirm this (Jarup *et al*, 1998). However, a Japanese study showed an excess risk of cardiovascular mortality in cadmium-exposed persons with signs of tubular kidney damage compared to individuals without kidney damage (Nishijio *et al*, 1995). The International Agency for Research on Cancer has categorized cadmium as a human carcinogen (group I) based on clear evidence in both humans and experimental animals (IARC, 1993). Cadmium has also been associated with prostate cancer, but both positive and negative studies have been published. Some research also indicated an association between cadmium exposure and kidney cancer (Kolonel, 1976).

Lead, which is a common metal known to be found in paints interferes with the activity of an essential enzyme, delta-acid dehydratase (ALAD), and which is important in the biosynthesis of heme, the cofactor in haemoglobin (Patrick, 2006). The effects of lead poisoning vary depending on the age of the individual and the amount of exposure (Kwong, Friello and Semba, 2004). In some cases, symptoms include headaches, vomiting, abdominal pain, lack of appetite (anorexia), constipation, slurred speech (dysarthria), changes in kidney function, unusually high amounts of protein in the blood (hyperproteinemia), and unusually pale skin (pallor) resulting from a low level of iron in the red blood cells (anemia) (Eicher and Avery, 2005). Neurological symptoms associated with lead overexposure include an impaired ability to coordinate voluntary movements (ataxia), brain damage (encephalopathy), seizures, convulsions, swelling of the optic nerve (papilledema), and/or impaired consciousness, decreased muscle strength (Eicher and Avery, 2005), high blood pressure and damage to the reproductive organs, irritability,altered consciousness, hallucinations (Beers and Berkow, 1999) and depression (Kwong, Frielle and Senba, 2002). For children the effects may include several learning or behavioural problems. (Menkes *et al*, 1995).

Arsenic is also used in paint varnishes. Overexposure to arsenic may perhaps cause headaches, drowsiness, confusion, seizures (Tokar, 2013), brain damage (encephalopathy), nerve disease of the extremities (peripheral neuropathy), precapillary hemorrhages within the white matter, loss or deficiency of the fatty coverings (myelin) around these nerve fibers (demyelination) (Eicher and Avery, 2005), skin problems, gastroenteritis, hyperpigmentation, hemolysis, anemia and hypotension (Beers and Berkow, 1999). Some individuals may experience a garlic-like odor that may be detectable on the breath. In cases of chronic poisoning, weakness, muscle aches, chills, and fever may develop. The onset of symptoms in chronic white bands on the fingernails (mees' lines), and a scale like inflammation of the skin (exfoliative dermatitis). Severe inorganic arsenic poisoning may experience heart problems (cardiomyopathy); renal tubular acidosis, ventricular arrhythmias, coma, seizures, intestinal hemorrhage and jaundice. Other metals used in paint production that may cause poisoning include antimony, aluminum, barium, bismuth, copper, gold, iron, lithium, platinum, silver, tin, and zinc (Rowland, 2000).

Generally, the paint pigments cause the greatest harm when used in powder form. However, Oil colours, unlike other forms of paint, are made from raw pigments bound in oil. The oil makes the paint more easily absorbed into the skin, and then into the bloodstream. Evidence showed that in the past, the artist studios were generally not as safe as the present day (Ouimet, 2000). For example, Peter Paul Rubens, Auguste Renoir and Raoul Dufy suffered from rheumatoid arthritis and Paul Klee was afflicted by scleroderma. Both illnesses are linked to the toxic heavy metals, like cadmiums, found in the paints they used to enhance the brightness of their colours (Phillips, 2016). In the contemporary time,

David Hubert Dale, born on November 22, 1947, to a Scottish Father and Nigerian mother started his art career at a tender age with easy access to different art media. He was a draughtsman, painter, sculptor and printmaker. He was considered to have used twenty-three different media, which included oil, beads, glass, watercolour, gouache, stained glass, wrought iron, plastic tiles and lino print and among other media (Sowole, 2019). David Dale suffered and survived a stroke in 2017 but later died of complications of it on August 6, 2019 (Ukudolo, 2017) aged 72 years. The frequent exposure to chemicals, like resins and glues, which he deployed in glass and beaded works, and considerably pigments used in printmaking over the years, might have contributed to the ailments.

3. EXPERIMENT, RESULT AND CONCLUSION

An empirical study was done to have concrete evidence of the effect of oil paint on the health of the studio artist especially in Nigeria knowing that climate change, water or diet may pose a different result/effect of such exposure. In achieving a comprehensive and direct investigation of laboratory and studio analysis of oil paint direct field research and laboratory experimental approach was employed using thirty albino rats of both sexes randomly assigned into five (5) groups; A, B, C, D and E (control group). Albino rats are taken to be the closest mammalian sample to the human.

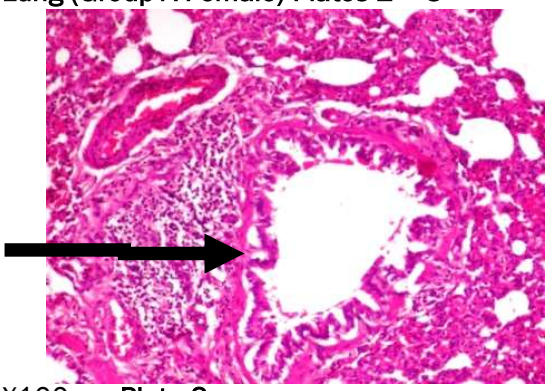
Prior to acclimatization the animals were weighed after which they were supplied food and water *ad libitum* for a period of two (2) weeks for acclimatization and four (4) weeks for exposure, giving a total of six (6) weeks with free access to food and clean water *ad libitum*. Each group of rats was housed in assigned name-tagged wooden battery cages corresponding to the names of the groups A, B, C, D and E. Each cage housed six (6) albino rats (three (3) males and three (3) females) separated from each other to avoid reproduction (Plate 1). The baseline hematology was recorded before the administration of the oil paints. The exposure lasted for twenty-eight (28) days. The albino rats were sacrificed at the end of the sixth week by dissecting and cardiac puncture quickly.

Plate 1. Wooden battery cages for housing the samples albino rats during experiment.
Photographed by Sade Adebowale 2018.

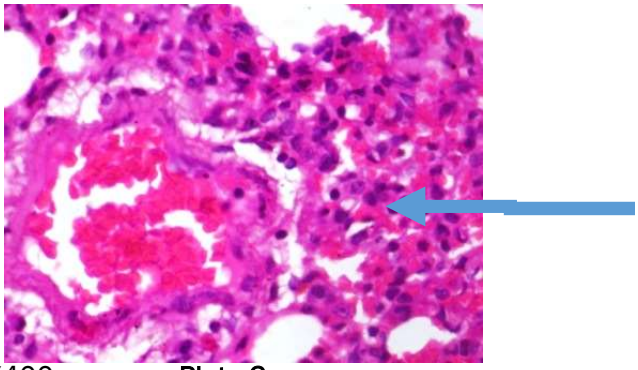
The organs of the rats were harvested and sent to histology laboratory of Ladoke Akintola University of Technology Ogbomoso, Nigeria for histological analysis. Blood samples of the rats were also collected and sent to hematology laboratory of Ladoke Akintola University of Teaching Hospital, Ogbomoso, Nigeria for hematological analysis.

A summary of the histological report showed the organs of the samples, most especially lung and liver of the exposed group were severely damaged- Group A Female Lung show alveolar hyperplasia, disseminated congestion area of thrombosis and focal area of infiltration by inflammatory cells. Liver plates show congestion and mild disseminated micro vesicular steatosis. Group B Female Lung also show alveolar hyperplasia, desquamation and sloughing of the bronchiolar epithelium into the lumen focal area of inflammation. Group C Female Lung similarly show disseminated alveolar hyperplasia focal area of bronchiolar hyperplasia, congestion, focal area of bronchiolar infiltration by inflammatory cells and hemorrhagic lesion. Group D Female Lung show marked disseminated alveolar hyperplasia, disseminated congestion, thickening of the vein and focal area of bronchiolar infiltration by inflammatory cells. Correspondingly Group B Male Liver show marked disseminated congestion (blue arrows) and marked disseminated microvesicular steatosis with necrosis (plates 2 to 11).

Lung (Group A Female) Plates 2 – 3

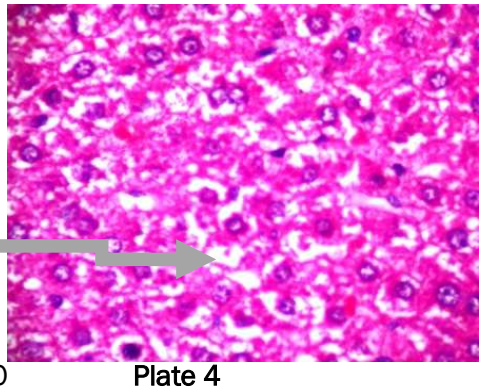


X100 Plate 2

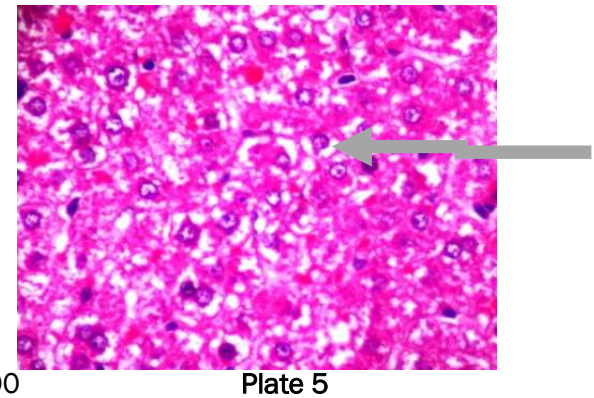


X400 Plate 3

Liver (Group B Female) Plates 4 - 5

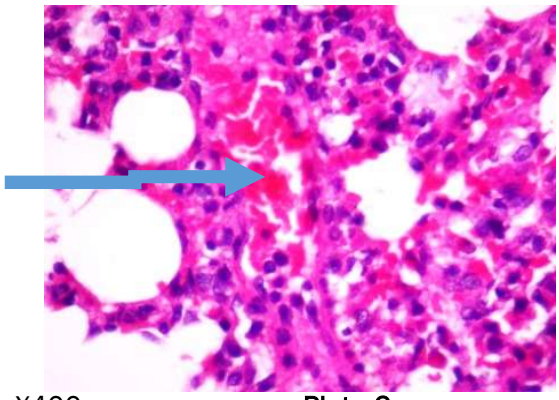


X400 Plate 4

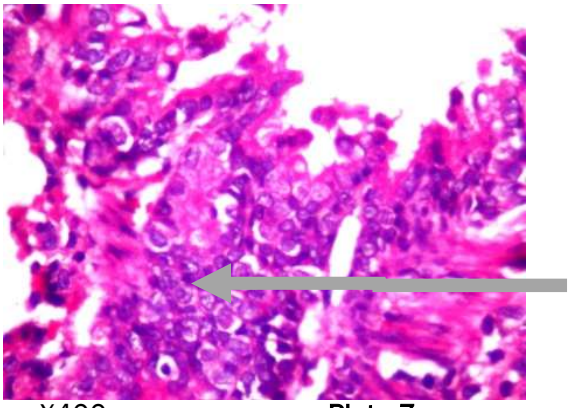


X400 Plate 5

Lung (Group C Female) Plates 6 - 7

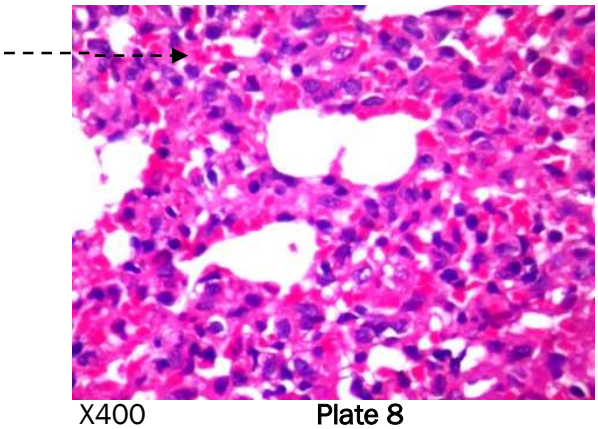


X400 Plate 6

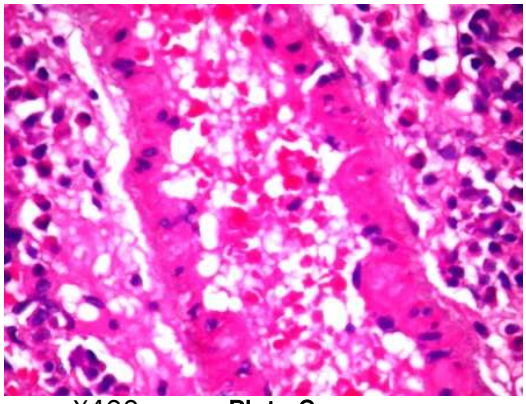


X400 Plate 7

Lung (Group D Female) Plates 8 - 9

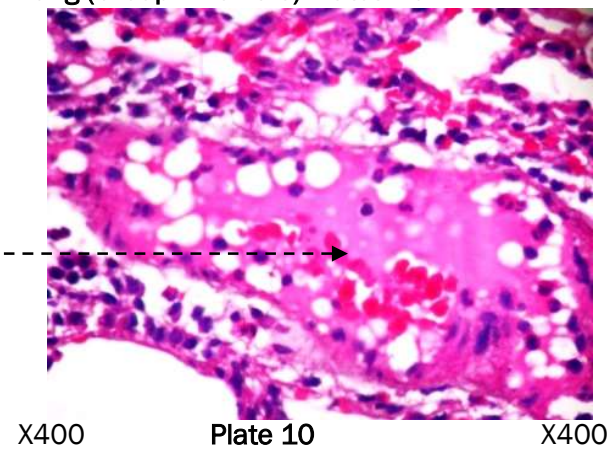


X400 Plate 8

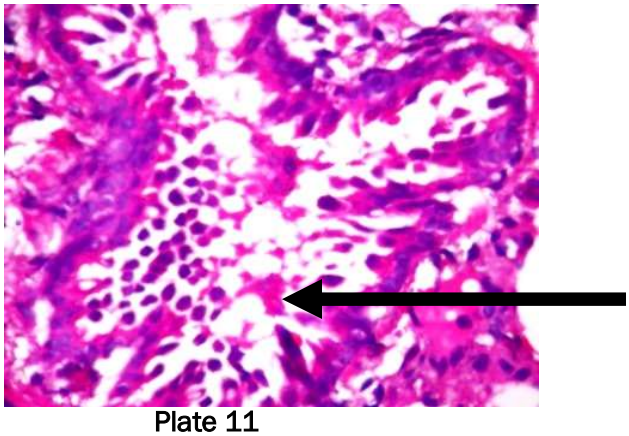


X400 Plate 9

Lung (Group E Female) Plates 10 - 11



X400 Plate 10



X400 Plate 11

Haematology laboratory indicates abnormalities with blood film indicating presence of Target Cells TC (+) because of diseases like thalassaemia (a genetic blood disorder that can cause anaemia or death if not treated). Haemoglobin C and D disease (an abnormal type of haemoglobin), Cholestasis (obstructive jaundice Liver disease), Iron deficiency anaemia, Poikilocytosis, Hypochromia, Microcytosis, Nucleated Red Blood Cells, Sickle cell disease etc. Another may also cause these medical conditions such as alcoholism (this may affect the specimen because of solvent used during the process of oil painting), anaemia, liver disease, kidney disease, lung disease, heart disease, skin disease, lead disease, severe infections, neuro diseases (encelopathy), cancer or an inherited blood disorder etc.

The morbidity rate of 13.3% generally recorded during acclimatization for fourteen (14) days and twenty-eight (28) days of exposure to the paint reveals that the artist's state of health should be questioned. However, the ventilated environment some members (Group C and D) enjoyed contributed to a reduction in risk of severe disease or morbidity rate.

The table below shows the protein count report from the hematology Laboratory of the Ladoke Akintola University of Technology Teaching Hospital, Ogbomoso.

Table 1: Protein Count Report (From Haematology Department LAUTECH Teaching Hospital, Ogbomoso, Nigeria)

S/N	GROUP	Total Protein	Album in	Alkaline (ALP) Phosphatase	ALT	AST	Total Bilirubin	Conjugated Bilirubin
1	AM1	74.2	35.8	234	87	365	6.7	5.9
2	AM2	76.5	43.6	221	107	200	12.3	3.0
3	AF1	72.0	35.9	185	129	181	7.9	4.5
4	AF2	78.9	40.0	158	123	206	5.2	2.8
5	BMI	72.1	44.0	222	128	240	5.0	0.7
6	BM2	76.1	40.4	253	214	227	14.5	9.6
7	BF1	73.0	40.0	229	195	121	7.6	1.5
8	BF2	75.9	46.4	290	63	116	5.9	2.0
9	CM1	77.5	43.9	141	56	146	7.8	2.0
10	CM2	71.1	38.5	202	319	255	7.4	3.2
11	CF1	80.8	37.3	309	127	221	3.2	1.3
12	CF2	81.5	35.7	174	123	220	3.8	1.4
13	DM1	74.0	40.0	155	190	202	7.8	2.7
14	DM2	75.0	46.0	162	160	184	6.5	5.4
15	DF1	89.2	48.0	165	142	154	10.2	3.8
16	DF2	71.3	38.5	166	375	205	12.5	2.8
17	EM1	95.0	43.2	144	95	205	15.7	7.2
18	EM2	80.0	41.0	151	102	200	11.2	2.4
19	EF1	88.6	42.0	145	207	124	16.0	6.8
20	EF2	71.7	32.6	186	98	165	7.9	2.7

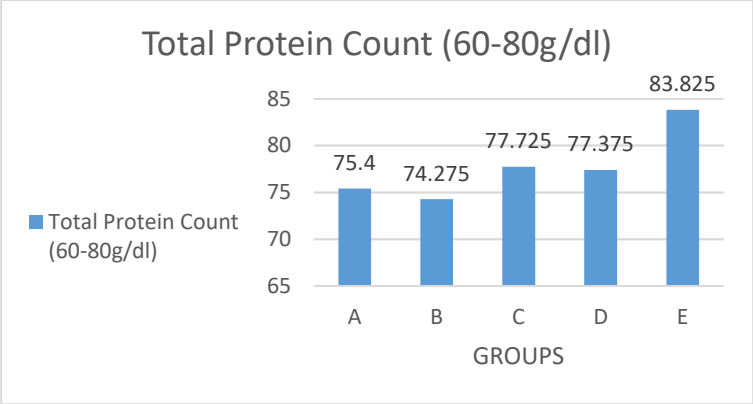


Figure 1.
Effect of paint fumes on total protein count in relation with rat groups under different environmental conditions

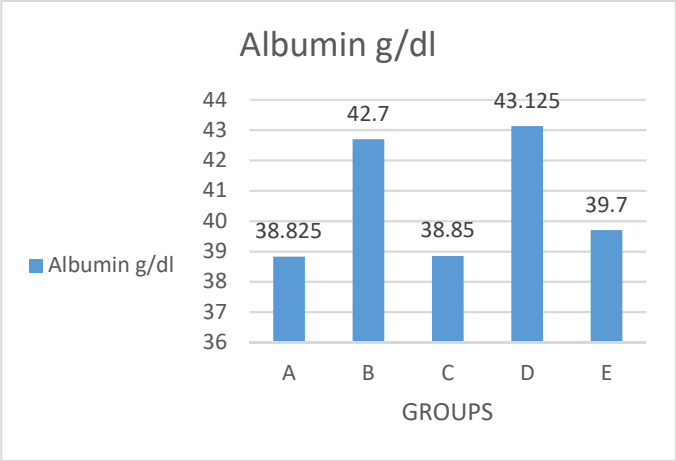


Figure 2.

Effect of paint fumes on albumin in relation with rat groups under different environmental conditions

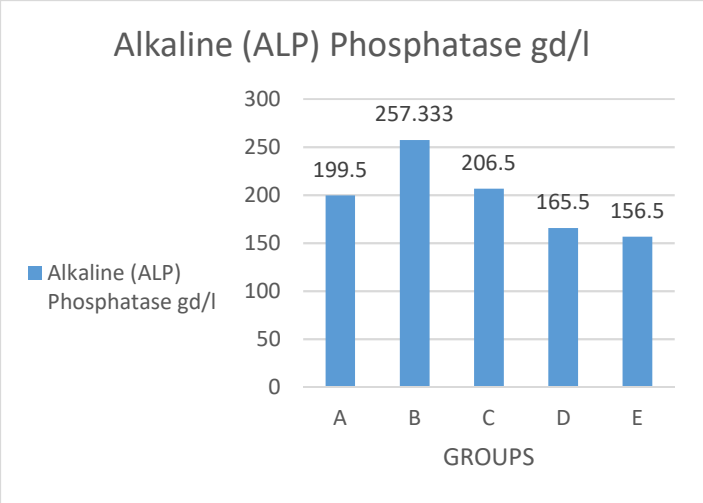


Figure 3.

Effect of paint fumes on Alkaline (ALP) Phosphatase in relation with rat groups under different environmental conditions

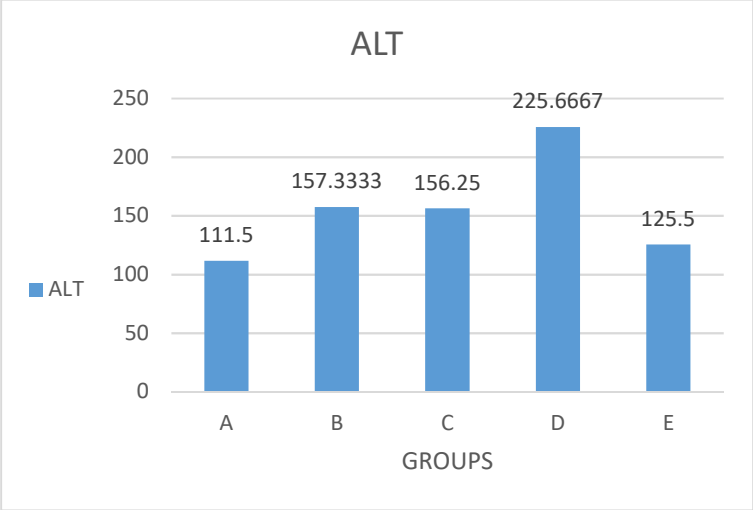


Figure 4.

Effect of paint fumes on ALT in relation with rat groups under different environmental conditions

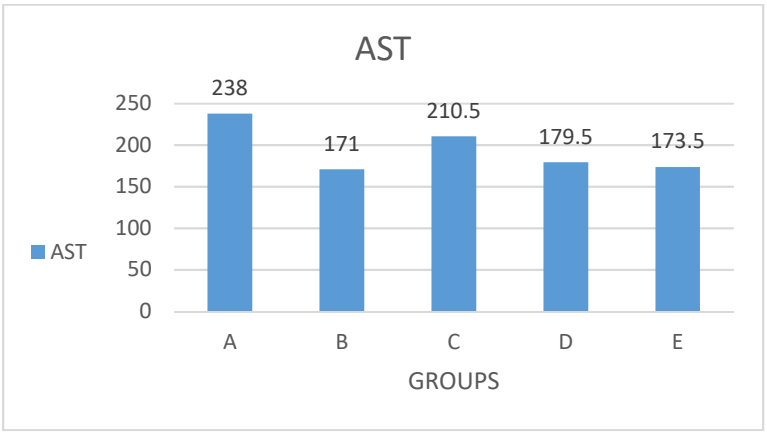


Figure 5.

Effect of paint fumes on AST in relation with rat groups under different environmental conditions
The observed higher increase in the level of ALT and AST may be due to leakage of cytoplasmic enzymes into circulation as a result of inflammation of the liver cells. These diseases could be linked to the presence of heavy metals such as Arsenic(As), Cadmium(Cd), Lead(Pb) and Mercury(Hg). However, the control group (Group E) shows that in achieving normal result in blood film picture and lesser, minimum or no chances of acute diseases of death it is best to maintain zero exposure. One could link up the health challenges and causes of death of some artists.

Finally, this study therefore shows that oil paint has a negative effect on the studio artist through inhalation, ingestion and dermal contact. This may be attributed to the rate of vaporization of the paints, and the presence of volatile organic compounds (VOCs) in the paints composition.

4. CONCLUSION

Heavy metal poisoning is a result of the toxic accumulation of certain metals. Such metals compete with and replace certain essential minerals in the course of which any of several of the body's organ systems may be affected. Artists are often quite knowledgeable about what they can achieve with oil paints, but they are usually not always aware of what their paints are made from and what health hazards the paints can cause.

Based on our findings and observations, the following recommendations are put forward. Inhalation being the major route of exposure makes ventilation the primary solution. Studios should be purpose designed and with very high ventilation capacity. Where high-capacity ventilation is compromised or hindered, it is therefore recommended that extractor fans should be installed in studios because of people who may not comply with regulations. Volatile Organic Compounds VOCs level should be visibly stated on the paint tube/jar label for easy identification and there should be policies and regulations to ensure this. Soaked rags/napkins should be well kept in a flame proof, airtight sealed container or disposed immediately to hinder further emission. Also, flammable solvents can be kept safe to avoid fire outbreak. Studio artist should develop habits of the use of studio accessories like protective latex gloves, face mask, goggles and wash hands thoroughly with clean water after painting sessions.

Material Science should take cognizance of the hazards attendant to the use of oil paint and evolve alternative materials that are not harmful. Research interests in Nigeria should also explore natural materials that are in abundance to produce oil paints using different materials with non-volatile organic compounds (non-VOCs), which are non-toxic and not hazardous. Studio Artists are advised to register for regular medical checkups. An occupational hazard health insurance scheme should be designed for the studio artist who makes use of oil paints. Significantly, there is a need for an awareness campaign on the presence of heavy metals in oil paint. This could serve as an effort to reduce daily risk of exposure and morbidity rate.

This research has shown the health implications of oil paint usage on studio artists. The study has provided good information on elemental components of oil paint used in Nigeria art studio practice and identify diseases associated with acute exposure of the studio artist to heavy metals present in oil paints.

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