

# **Raising the Level of Awareness of Chemistry Teachers of the Effects on Organochlorine Compounds on Human Health in Nigeria**

<sup>1</sup>Associate Prof. Adesoji Olubunmi OMONIYI  
Department of Science Education, Adekunle Ajasin University, Akungba Akoko, Nigeria.  
Email: lasojibunmi@gmail.com

&  
<sup>2</sup>Dr Aarinola Musilmat AKINSETE  
Ondo State Ministry of Education, Akure, Nigeria

---

Date of Submission: 16-06-2021

Date of Acceptance: 01-07-2021

---

## **Abstract**

### **I. Introduction**

The term organochlorine refers to a wide range of chemicals that contain carbon, chlorine and sometimes, several other elements organochlorine were the first synthetic organic pesticides to be used in public health and in agriculture. A range of organochlorine compounds (OCPs) have been pronounced including many herbicides, insecticides, fungicides as well as industrial chemicals such as polychlorinated biphenyls (PCBs) and Dichlorodiphenyl trichloroethane (DDT).

Organochlorine compounds are potential endocrine disrupting compounds, which means that, they might interfere with the endocrine systems of animals including human beings. Chemicals which interfered with the endocrine system, disrupt the hormone balance of animals. This typically results in disruption of the reproductive processes in animals or causes immunodeficiency.

Organochlorine pesticides are forms of OCPs which are synthetic pesticides widely used all over the world. They belong to the group of chlorinated hydrocarbon derivatives, which have vast application in the chemical industry and in agriculture. These compounds are known for their high toxicity, show degradation and bioaccumulations, even though, many of the compounds which belong to organochlorine were banned in developed countries but the use of these compounds has been rising in many developing countries including Nigeria. The abuse of use of these chemicals by both literate and illiterate farmers is a thing of concern in this study. Though, pesticides have been developed with the concept of target organism, often, non-target species such as human beings are affected badly by their application and toxicity.

### **II. Literature**

Pesticides are a group of chemicals used for the destruction of insects, weeds, fungi, bacteria, etc. they are generally called insecticides, fungicides, bactericides, herbicides, or rodenticides. Most of the pesticides have the ability to combat a wide variety of pests of weeds, but some are developed against specific pests or pathogens. Most of these chemicals are designed in such a way as to disturb the physiological activities of the organisms. Leading to dysfunction and reduced vitality. Pesticides residues may constitute a significant source of contamination of environmental factors such as air, water and soil. This phenomenon could become a continuous threat to the co-existence of plants and animal communities of the ecosystem. Problems caused by pests could lead to loss of about one third of the world's agricultural production every year, and despite that fact, pesticide consumption comes up to more than 200,000 metric tons of pesticides which were being used every year in Nigeria. Records have shown that about 135 pesticide chemicals are imported annually into the country. Also, researchers such as have shown that they are major causes of cancer, cardiovascular diseases, dermatitis, birth defects, impaired immune function, neuro behavioural disorder and allergy sensitization reaction. In Nigeria, food test carried out on 217 different food items revealed the presence of DDT, Aldrin and Dieldrin. The detection of these pesticides in soil, drinking water and other animal is of great interest. Failure to establish data base from past incidents in order to avert future occurrences has posed a huge problem to the society at large. Organochlorine compounds causes cancer in people living and working in areas where it is widely used as pesticides. Mittal S, Kair G, Wishwakarme G. S. (2014) reported that in Malwa Village where organochlorine compound is used extensively as pesticides in Colton farming, reported 46% of the total 34,430 cancer deaths in the whole state of Punjab in India organochlorine compounds has also been associated with increased

incidences of pancreatic and liver cancer. It is also reported that workers working in organochlorine manufacturing companies and farms have four to five fold increased risk of getting pancreatic cancer and had also had a significant risk of liver cancer Eskenazi B, Rosas I. G. Anderson H. A and Bornman M. S. (2009)

**Table I: List of Organochlorine compounds**

No	Chemical Name
1	Dichlorodiphenyl Trichloroethane (DDT) $C_{14}H_9Cl_5$
2	Li 1 dicloro-2,2 bis (pinchrophenly) ethane (DDD)
3	Dichlorodiphenly dichroethane (DIDE)
4	Dicofol- $C_{14}H_9Cl_2O$
5	Eldrin
6	MethoxychloroAldrin
7	Trazines
8	Pohychlorinated Biphenyls
9	Dipyrids
10	Acetamide
11	Benzoic acid
12	Others

### Research Rationale

In Nigeria, food test carried out on 217 food items revealed the presence of DDT, Aldrin and Dieldrin to be above maximum allowable concentration level for human health (Erhunmwunse et al, 2002), thereby leading to high concentration of organochlorine residue on fruits, vegetables, cereals after spraying, which are the major causes of cancer, cardiovascular diseases, birth defects and others deadly diseases. Hence, the need to raise the level of awareness of chemistry teachers, students and inhabitants of Ondo of the hazardous effects of these organochlorine compounds.

### Research Questions

The following research questions were raised for the study;

1. What is the level of awareness of chemistry teachers and students of the effects of organochlorine compounds on human health?
2. What is the level of awareness of the inhabitants of Ondo State, Nigeria of the effects of organochlorine compounds on human health?

One hypotheses was generated to guide the study

- There is no significant relationship between the levels of awareness of chemistry. Teachers, students and inhabitants of Ondo State of the effects of organochlorine compounds and the diseases caused by these compounds on them.

### III. Method

The study adopted the descriptive survey design. The respondents were 320 chemistry teachers and 960 students which were randomly selected from 96 secondary schools in Ondo State, Nigeria. The selection of the schools was based on stratified random sampling method from 12 local government areas, that is 2/3 or two third (75%) out of the existing 18 local government areas in Ondo State, Nigeria.

An instrument, chemistry teachers level of awareness of Health Effects of Organochlorine compounds inventory (CTLAHEOCPS) comprising 30 items was used to collect data. The CTLAHEOCPS elicited information on different health hazards of organochlorine compounds and how they interfere with the endocrine systems of living organisms and disrupting the hormone balance.

Also, the instrument comprised of items that requires information on the level of awareness of chemistry teachers, students and inhabitants of Ondo State of the hazards of organochlorine compounds to human health in Nigeria.

The two research questions were answered using frequency counts and percentages while the hypothesis was tested for significance at  $P < 0.05$  probability level of significance using Pearson  $-r$ .

### IV. Results and Analysis of Findings

Tables 2 and 3 presents the results

**Table 2: Frequency Counts and Percentages of chemistry teachers, students and inhabitants of Ondo State and their level of awareness of the effects of organochlorine compounds on human beings.**

Variable(s)	N	Frequency counts	Percentages (%)
Teachers	320	250	78.125
Students	760	400	31.25
Inhabitants of Ondo State	2,000	268	13.40

Source : Researcher's Field Report, 2020

**Table 3: Relationship between the level of awareness of chemistry Teachers, Students and Inhabitant of Ondo State of the different diseases caused by Organochlorine compounds**

Variables	n	r	p
Teachers	320	0.653	<0.05
Students	960	0.55	<0.05
Inhabitants	2,000	0.14	<0.05

## V. Discussion of Results

Results from Table 2 revealed that 78.13% of chemistry were aware of the effects of organochlorine compounds on their health. also, 31.25% of chemistry students were of the adverse effects of organochlorine compounds on their health. this implies that greater percentage of chemistry students were ignorant of the hazards done by these organochlorine compounds. The level of awareness among the inhabitant of was the lowest (13.40%), meaning that majority (86.60%) of the inhabitants of Ondo State were not informed about the devastation / hazardous effect of organochlorine compounds on human health. no wonder, some of the diseases caused by these organochlorine compounds are common among the inhabitants of Nigeria. This finding is in agreements with the report of the WHO (1990) which stated that hazards arising during the application of pesticides are mainly due to lack of information, knowledge and poor level of information, knowledge and poor level of awareness among the citizenry. Furthermore, results from table 3 using Pearson –r showed that there was a significant relationship between chemistry teachers awareness of OCPs and diseases caused by them ( $r = 0.653$ ,  $P < 0.05$ , chemistry students ( $r = 0.55$ ),  $P < 0.05$ , and inhabitants ( $r = 0.14$ ,  $p < 0.05$ ) indicating that chemistry teachers have the strongest relationship of 0.55 of the three variables considered followed by chemistry students with 0.55. this is due to the literacy level of chemistry teachers based on the knowledge acquired through literature about the concept OCPs. This finding is in tandem with the WHO (1990) which posited in her report that hazards arising during the application of pesticides are mainly due to lack of information, knowledge and awareness, poor legislation, and sales of the open market of highly toxic pesticides. Furthermore, WHO, (1990) reported that the health status of individuals should be a thing of priority by considering how easily the pesticide is absorbed into human body, the type of effect of the pesticides and its metabolites, and accumulation in the body system should be considered. Examination of effects of different classes of pesticides reveals that many of them are responsible for hypertension, cardiovascular disorders and other health related problems in humans.

## VI. Conclusion

The use of organochlorine compounds in order to improve agriculture has not only affected the crop, it has also altered the food chain and the ecosystem. These chemicals not only affect the crop, animals and birds in a specific area but also badly affect the ecosystem balance. Organochlorine compounds are causes of high morbidity and mortality. Hence, the use of chemical pesticides should be controlled and more use of bio-pesticides should be employed.

## VII. Recommendations

It is obvious that pesticides contamination is on the increase in the country as a result of its usage for different activities. The absence of data on pesticides related poison on the population in Nigeria makes it difficult to ascertain the exact effect human health in the country. Effort should be geared towards establishing appropriate medical surveillance and record keeping of workers involved pesticides in Nigeria. Nigerian government should train specialist in the field of occupational health and safety management and establish research centres to carry out epidemiological and metabolic studies of the affect persons.

Manufacturers should develop and produce less toxic or hazardous pesticides, increase the awareness of users, teachers and students on the hazardous effects of organochlorine compounds on human health and to know the nature of damage caused by such compounds.

### References

- [1]. Mittal S, Kaur G, Vishwakarma G. S. (2014). Effects of Environmental pesticides on the health of rural communities in the Malwa Region of Punjab, India. A Review. Human and Ecological Risk Assessment. An International Journal 20 (2): 366-387.
- [2]. Eskenazi B, Chevrier J, Rosas L. G. Anderson H. A, Bornman MS (2009). The Pine River Statement human health consequences of DDT Use. Environmental health perspective 117(19); 1359-1367.
- [3]. Erhunwunse N. O., Divisu A, and Olumokoro, J. O. (2012). Implications of pesticide usage in Nigeria. Tropical freshwater Biology, 21 (1), 15-25.
- [4]. Adedeye, A & Osinbanjo, O. (1999). Residues of Organochlorine pesticides in fruit, vegetables and timber from Nigeria market. Science Total Environment 231-227.
- [5]. Baba, A. A. (2008). Dangers of unsound management of obsolete pesticides in Nigeria. A paper presented at Nigeria-Africa stopites program steering committee (Nigeria-ASP)
- [6]. International Agency for Research on Cancer (IARC) (1988). Overall evaluation of cacinegenicity: An update of IARC Monographs, Lyon JARC Evaluation of carcinogenic Risk to Human supply. 7, 1-42.
- [7]. Osinbanjo, O & Adeyeye, A (1995). Organochlorine pesticides in Nigeria Market. Bull. Environ toxicol. 54, 460-465.
- [8]. WHO (1990). Diet, nutrition and the prevention of chronic diseases. Report of a WHO study group. Technical Report series 797
- [9]. USEPA (2003). Health Effects Support Document for Aldrin / Diedrin, U. S. Environmental Protection Agency, Office of water (4304T) Washington, DC 20460. Health and Ecological Criteria Division.
- [10]. World Health Organisation (1979). Environmental Health Criteria. Vol. 9. Geneva, Switzerland. DDT and its derivatives.