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Impact of Pesticide Exposure on the Health of Agricultural Workers in Northern Region of Kwara State, Nigeria

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Abstract:- Pesticide exposure has been linked to negative health impacts, and farmers all around the world are thought to be harmed. This study aimed to verifyscientific findings which statesthat pesticide exposure causes health problems among farmers. A cross-sectional descriptive study was applied for the study. The study enlisted 310 farmers with contact with pesticides. A well-structured questionnaire was used ~~to~~for data collection ofrespondent's socio demographic factors, health of exposure to pesticides, pesticide knowledge and use.The data was analyzed using descriptive statistics. The Chi-square test was performed to determine the relationship between pesticide exposure and health damage. Findings indicates that 81.6 percent of the farmers utilize pesticidesfor agricultural purposes, while 89.4 percent uses pesticides at home. 81.9 percent have been engaged in agricultural activitiesfor over two years, 57.9% of respondents claim they have never had any health problems as a result of pesticide exposure, while 42.1 percent of respondents had at least one health problem as a result of pesticide exposure. The Chi square test of independence between pesticide exposure and health impairment yields a P-value of 0.000, indicating that pesticide exposure has a significant impact on the health of farmers. The study concludes that inappropriate use ofpesticide use by farmers results in one or more health problems. Farmers should read and follow the use and application of pesticides instructions on the containers carefully; use personal protective equipment (PPE); primary health care facilities should be equipped to treat pesticides related cases; and farm extension workers should engage in health education training to farmers about consequence of the health effect of pesticides exposure.

Keywords:- *pesticide; pesticides exposure; health; farmers.*

I. INTRODUCTION

Pesticides are widely acknowledged to play an important role in increasing crop output and eradicating vectors of human and livestock diseases. Pesticides are compounds used for preventing, eliminating, repelling, or reducing any pest (insects, mites, nematodes, weeds, rodents, and other pests), including insecticides, herbicides, fungicides, and several other agents used to manage pests [1]. According to the Environmental Protection Agency, the total estimated production of pesticides in 2012 was 5.8 billion pounds of active chemicals [2]. chemical pesticides are categorized into families, which include organochlorine pesticides (OCPs), organophosphates, and synthetic pyrethroids (SPs) [3].

Nigerian farmers have traditionally relied significantly on pesticides to control various weeds, insect pests, and illnesses, resulting in a high importation of these chemicals [11]. According to reference [9] and [10], certain type of workers such as greenhouse workers, farm and non-farm workers are more likely to be exposed to high pesticide concentration, which could have negative health repercussions.

Pesticide has been linked to a variety of health issues, including impaired reproduction, metabolic disorders, neurobehavioral disorders, macular degeneration, asthma and many more [4][5][6][7][8]. Farmers, gardeners, and those involved in the production, distribution, and sale of pesticides are among those who could be exposed to these chemicals and their consequences. References [12] and [13] in their study reported that farmers in Kwara State have suffered from short- and long-term health damage, in various degree depending on the type of crop, as a result of pesticide exposure. However, inKwara North, no research has conducted to examine the health effect of farmers exposure to pesticides and the people of Kwara north a predominantly farmers. As a result, the goal of this research is to see how pesticide exposure affects the health of agricultural workers in Kwara North, Nigeria.

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II. MATERIALS AND PROCEDURES

A. *Area of Research*

The study area is Kwara North Senatorial Districtof Kwara State covering five local government areas namely;Baruteen, Edu, Patigi, Kaiama and Moro.

B. *Study Design*

A cross-sectional designwas employed.It involved quantitative survey through administration of structured questionnaire and a face-to-face interview to assess agricultural workers' pesticide usage, pesticide exposure and health effect of pesticide exposure.

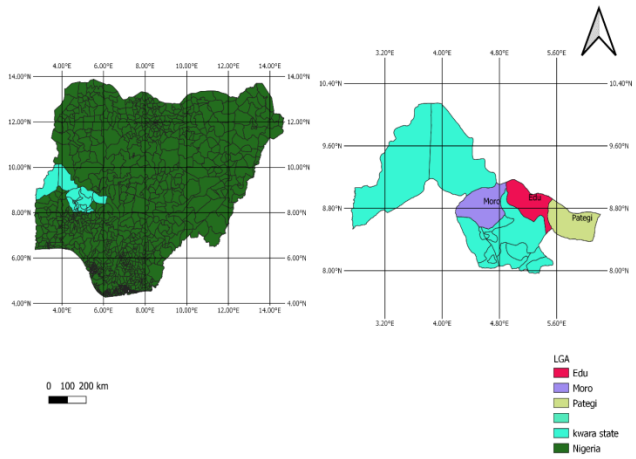

Fig. 1: Map of Kwara North Senatorial District

C. *Sampling*

A sample size of 384 people was adopted for the study, according to the Research Advisors table (2006). Convenience sampling was used to sample 310 consenting agricultural workers.

D. *Data Analysis*

The $SPSS_{22}$ was used to sort, code, and analysed the questionnaires collected from the field. The descriptive results were expressed as percentages and frequencies. At the 95 percent significance level, the Chi square test of independence was employed to test the independenceof pesticide exposure and health issues.

III. FINDINGS

A. *Socio-demographic characteristics of respondents*

DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENT
GENDER		
MALE	249	80.3
FEMALE	61	19.7
GEOGRAPHICAL LOCATION		
PATEGI	159	51.3
EDU	94	30.3
MORO	57	18.4
TRIBE		
YORUBA	35	11.3
HAUSA	7	2.3
IGBO	23	7.4
NUPE	225	72.6
TAPA	5	1.6
FULANI	4	1.3
IGALA	8	2.6
BORORO	2	.6
BARUBA	1	.3
EDUCATIONAL STATUS		
FORMAL	275	88.7
INFORMAL	35	11.3
MARITAL STATUS		
SINGLE	55	17.7
MARRIED	239	77.1
DIVORCED	3	1.0
WIDOW/WIDOWER	9	2.9
OTHERS	4	1.3
HOUSEHOLD ANNUAL INCOME		
< #50, 000	53	17.1
#50, 000 - #100, 000	88	28.4
#101, 000 - #200, 000	151	48.7
> #200, 000	18	5.8

Table 1: Demographic features of agricultural workers

The study indicates that majority, 80.3 percent, of respondents are males while the remaining 19.7% are females. Furthermore, in the region, 72.6% of the respondents are Nupe ethnicity, others are Yoruba (11.3%), Igbos (7.4%), Igala (2.6%), Hausas (2.3%), Tapas (1.6%), Fulanis (1.3%), Bororos (0.6%), and Baruba (0.3%). The majority, 88.7%, had formal education while 11.3%, had informal education.

In addition, 77.1% of the respondents are married, 17.7% single, 2.9% are either widows/widowers, 1.3% are in other categories, and1% are divorced. 48.7% of the respondents have householdaverage annual income between N101.000 and N200.000, 28.4% average household annual income of between N50.000 and N100.000, with 17.1% onannual household income of less than N50.000, while 5.8% have household annual income of more than N200,000.

B. *Knowledge of Agricultural workers on Pesticide*

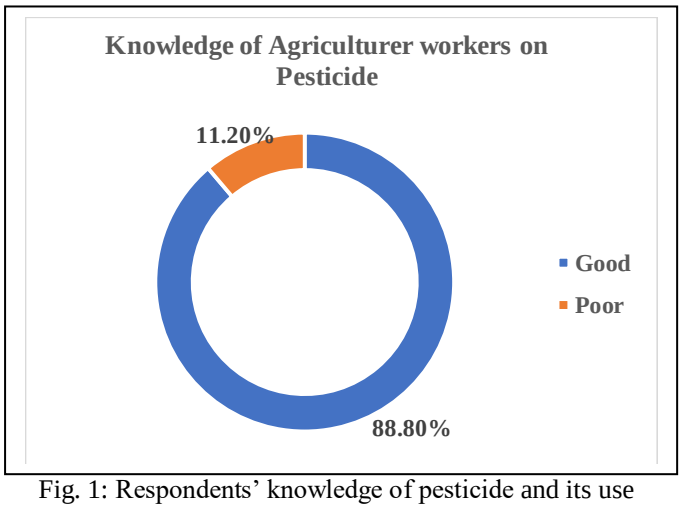

Fig. 1: Respondents' knowledge of pesticide and its use

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The knowledge respondents of pesticide, pesticide usage and health side effect to its exposure were assessed. The findings reveal, 88.8% have good knowledge about pesticide, its use and side effects.

C. Pesticide Usage

Respondents' usage of pesticide revealed that 84.5% have applied pesticide in their homes, 97.1% have applied pesticide on their field or gardens; 94.5% have mixed or handled pesticides before; 89% have treated animals with pesticide to kill parasites; 78.1% were actively involvedin vector control with the use of pesticides; 80% use pesticide to control lice, scabies and other parasites; 87.7% of the respondents have worked in a farm where pesticide have been applied; 88.4% have entered a sprayed farm at one time or the other; and 63.9% have repaired pesticide spraying or mixing equipment, while 84.5% of the agricultural workers used pesticides.

Pesticide usage	Responses	
	Yes	No
Ever use pesticide for fields, gardens or in your house.	84.5%	15.5%
Applied pesticides in field or gardens	97.1%	2.9%
Mixed or handled pesticides	94.5%	5.5%
Treated animals with pesticides to kill parasites	89%	11%
Household application of pesticides to kill insects	81.6%	18.4%
Involved in vector control using pesticides	78.1%	21.9%
To control lice, scabies or other parasites	80%	20.0%
Worked in fields where pesticides are used	87.7%	12.3%
Entered fields that have just been sprayed with pesticides	88.4%	11.6%
Ever repair pesticide spraying or mixing equipment	63.9%	36.1%

Table 2: Participants' Use Of Pesticide

D. Experience of side-effect of pesticide exposure

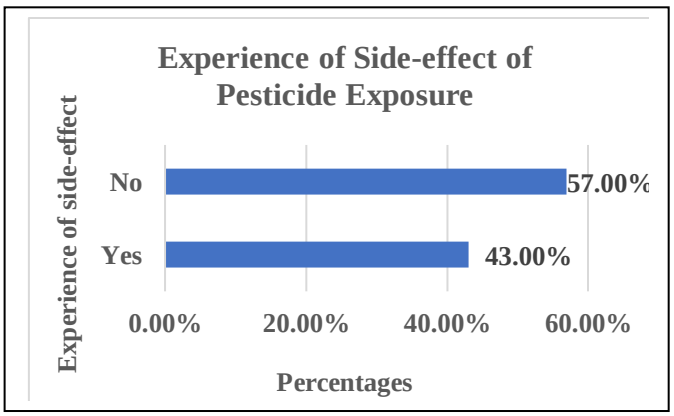

Fig. 3: Respondents' experience of side-effect of pesticide exposure

E. Test of independence of pesticide exposure and health impairment

The P-value of the Pearson Chi Square test is 0.000. This P-value is lesser than 0.05 alpha level of significance, which indicate the rejection of the null hypothesis. Theresult shows that respondent's exposure to pesticide significantly affected their health. In addition, the Phi and Crammer's V values shows a strength index of 0.504 and 0.291. this shows that the relationship between exposure to pesticide and its effect on respondents' health is moderately strong.

IV. DISCUSSION OF FINDINGS

The study found that the majority of agricultural workers are males. The study of [14] and [15] in consonance with this finding, affirming that most agricultural workers are males due to the stressful nature of the profession. Not only that, majority of the agricultural workers are formally educated, married and earn an average annual income between N101.000 and N200.000.

Finding indicates that 84.5% of the agricultural workers used pesticides in the home, field or gardens; mixed or handled before; used to treatanimals,vector control; to control lice, scabies and other parasites, worked in a farm where pesticide have been applied, have entered a sprayed farm before; and repaired pesticide spraying or mixing equipment before,thus means by which agricultural workers are exposed to pesticide. In agreement, reference [16], have reported that, an exposure to pesticides can be through the ingestion of food and water and studies has established that contact with farm some practices like pesticide residues on treated crops, unsafe handling, storage and disposal practices,engaged by farmers that are directly involved in the handling of pesticides are at a high risk of exposure to pesticides [17][18].To add to, Similarly, poor maintenance of spraying equipment and lack or improper use of protective equipment can lead to pesticide exposure [1]. Reference [11] summarily revealed that pesticide exposure can occur through the mouth, skin, inhalation and eyes.

The tested hypothesis revealed that experience of health impairment significantly depends on pesticide exposure. Evidently, there are a number of studies that are in consonance with the claim that an exposure to pesticides can produce detrimental effect on the health of those exposed. It has been reported that exposure to pesticide can affect the respiratory or reproductive system and bring about the development of chronic diseases or cancer [18]. WHO's report of about 3 million cases of pesticide poisoning with more than 2,50,000 deaths every year worldwide further affirms that pesticide exposure has negative effect on human health [19]. The study of [20][21] assert that Small-Scale Farmers (SSFs) may be exposed to pesticides through occupational exposure, formulation, storage, handling, transportation, and inappropriate application in the agricultural fields or through the food chain. Summarily, research has reported that pesticide exposure has side effect on those exposed to it, which include but not limited to headache, stomach cramps, muscle weakness, vomiting, dizziness, shortness of breath, blurred vision and eye irritation [22].

V. CONCLUSION

Pesticide use is on the increase in the Nigeria andits side effect on human health is alarming. While the study seeks to examine the side effect of pesticide exposure to the health of agricultural workers, the study findsthat agricultural workers use pesticide frequently and virtually all the farmers experience at least one health challenges due to exposure to pesticide use. It suffices therefore to conclude that pesticide exposure is detrimental to the health of agricultural workers in Kwara North Senatorial district;farmers should be encouraged to consciously read and adhere to instructions on pesticide containers; agricultural extension workers should engage in enlightenment campaign to reorient agricultural workers on use of PPE and pesticide application; primary health care center should be equipped with the facilities to treat farmers with pesticides exposure health problems while community health care centers should that are close to rural dwelling should be encourage on early report of related treatment of pesticide cases.

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