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Assessment of Contribution of Farmers' Working Conditions to Injuries and Diseases and their Awareness of Safety Precautions in Ogun State, Nigeria

Kasali Amofe Adelasoye[1], Gabriel Olulakin Adesina[2], Olubola Kehinde Oladipo[1]and Oluseyi Timothy Olaoye[2]
[1] Department of Crop and Environmental Protection,
[2] Department of Agricultural Extension and Rural Development,
Ladoke Akintola University of Technology, P. M. B. 4000, Ogbomoso, Nigeria
Corresponding author's: E-mail: kaadelasoye@lautech.edu.ng Telephone: +2348064389175

Abstract
This study examined the challenges of farmers' working conditions in relation to injuries and diseases within farming communities and level of awareness on safety precautions in agricultural productivity in Ogun State. Multistage sampling technique was employed in the selection of representative sample for the study. Three (3) local governments (Ijale-papa (IP), Ewekoro (EW), and Obafemi-Owode (OO)) and a total of one hundred and twenty (120) farmers were sampled from the Agricultural zone. Data collected from farmers were demographic, knowledge of personal protective wear, types of injuries and diseases. The data were analysed using descriptive statistics. The result revealed that 38, 28 and 50 years were the mean age of farmers from IP, EW and OO respectively. All the farmers have good knowledge of personal protective wear in the study areas, and 22.5%, 95% and 30% strongly agreed that the wear is necessary only for pesticide application in IP, EW and OO respectively. Killing of untargeted plants was reported by 60.6%, 83.3% and 94.1% of farmers in IP, EW and OO respectively as the highest hazard experienced from pesticides use amidst accidental oral ingestion of the herbicide, accidental pouring on the eye, and killing of farm animals. Higher number (27.5%) of farmers in Ijale-papa completed tertiary education while 37.5% and 67.5% of farmers only completed primary school in EW and OO respectively. This educational level in EW and OO may have contributed to their lack of awareness on safety precaution which may further aggravate determinant of reduction in agricultural productivity.

Keywords: Agricultural Zone, Ewekoro, Ijale-Papa, Multistage Sampling, Obafemi-Owode, Personal Protective Equipment

Introduction
According to Von Braun et al. (2008) World agricultural productivity, particularly in poor countries is key to global food security and the fight against hunger and poverty. United Nations Development Program, (UNDP, 2015) reported that about 75% of the World's poor live in rural areas and most of them dependent on farming. In Nigeria, especially in the rural populace which constitutes 70% of the population of the country, farming activity is the main occupation (Amodu et al., 2017). Workforce is a backbone of a country development. A healthy, well trained and motivated workforce increases productivity and generates wealth that is necessary for the good health of the community at large (Takele and Mengesha, 2006). International Labour Organization, (ILO, 2000) regarded occupational hazard as any working condition that can lead to illness or death. It has been postulated that occupational health and safety issues in agriculture exist not only because of the hazards present, but also because of ignorance, illiteracy, the lack of use or none availability of personal protective equipment, inadequate information on occupational hazards, and or non-existent or inadequate training (Ewete, 2011).

According to International Labour Organization (ILO) report in 2000, as cited by Oluwagbemi (2007), 170,000 (50.7%) agricultural workers are killed each year from the total of 335,000 in fatal workplace accidents worldwide. Nigeria has little or no data on workers' health and safety record in agriculture probably because the workers are peasant and rural dwellers coupled with the fact that they are insensitive to the role safety can play in the development and productivity of the sector (Owolagbon et al., 2013). Therefore, special attention is needed for the health and safety of agricultural workers, who constitute three quarters of the Nigerian working population (Owolagbon et al., 2013). The objectives of the study were to assess the working conditions of farmers and associated injuries and diseases; their awareness of safety precautions and the socio economic characteristics of the farmers in the study area.

Materials and Methods

This study was carried out in Obafemi-Owode, Ewekoro and Ijale-papa Local Government areas (LGA) of Abeokuta Agricultural Zone in Ogun State. Obafemi-Owode LGA had a population of about 228,851. Obafemi-Owode LGA is endowed with vast fertile land. Ewekoro Local Government Area had a population of 55,156 while Ijale Papa LGA had a population of 201,329 at the 2006 census. Multistage sampling technique was employed in the selection of representative sample for the study. The first stage involved the random selection of Abeokuta Zone from the three (3) Agricultural Zones in Ogun State. The second stage involved the simple random selection of three (3) local governments namely: Ijale-papa, Ewekoro, and Obafemi-Owode government areas. Farming communities were randomly selected from each of the local government areas. Forty Agricultural Development Program (ADP) farmers were selected from each local government, to make up one hundred and twenty (120) sampled farmers. Structured questionnaire and interview schedule were used to obtain information from farmers. Data collected were analysed using descriptive statistics: frequency distribution, percentages and bar charts.

Results

The oldest age range (50 years upwards) was recorded at Obafemi-Owode local govt. Over 30% of the farmers in Ijale-Papa were between 26-30 years while Ewekoro recorded 25% upwards for 36-40 years of age (Fig.1a). Majority (65% upwards) of the farmers in Obafemi-Owode completed only primary school followed by close to 40% in Ijale-papa. Ewekoro LG had the highest level (25% upwards) of tertiary education. No tertiary education was recorded in Obafemi-Owode (Fig. 1b).

Family and hired labour formed the major source of labour (50-75%) in Ewekoro and Obafemi-Owode LG but over 50% of the farmers in Ijale-papa were using hired labour (Fig. 1c).
The operations in which children were majorly involved in the three LGs were weeding (25%), harvesting (28%) and threshing (7% upwards). Animal tending and spraying were done by children in Obafemi-Owode LG (Fig. 1d).

Most children involved in labour operations in the three local governments were between 16 and 22 years of age. About 23% of children between 5-10 years were engaged in farm operations (Fig. 2a). Over 90% of the farmers in the three local governments involved between 1-5 children in farming operations (Fig. 2b).

Between 65% to over 90% of the children usually visit health center in the three local governments when due (Fig. 2c). Over 65% to 97% of the farmers usually visit clinic when due. Less than 20% of the respondents usually visit health center monthly and every 6 months in Ijale-Papa and Ewekoro respectively (Fig. 2d).
The use of spraying machines was highly prominent in the LGs except Obafemi-Owode where some respondents still use hand wetting. Few people also engaged watering can in applying pesticide in the three LGs (Fig. 3a). Pesticide was used depending on weed problem majorly across the local government areas and during land preparation in Obafemi-Owode local government (Fig. 3b).

Respondents from the three local governments usually visit the clinic after harvesting operation. Over 30% of the people in Ijale-papa and Ewekoro usually visit clinic after spraying while less than 23% visited clinic in Obafemi-Owode after spraying. Visitation to the clinic after weeding was highest in Obafemi-Owode, followed by Ijale-papa and the least was Ewekoro LG. Lower number of respondents usually visit clinic after threshing operation (Fig. 3c). Figure 3d showed the sources of information to the farmers about pesticides in the three local governments. In order of importance, Extension agents, Pesticide dealers, Farmers organizations and friends and neighbor formed the sources of information. Other sources were also useful but were of little value (Fig. 3d).

Table 1 showed the presence of medical doctors and the nearness to farmer's residence in the three LG. Over 70% of all the farmers disclosed that medical doctors were around to treat them in the hospital and the clinic was near to the farmers except in Ewekoro local government where about 75% of them confessed the clinic as being far away.
All the respondents (100%) in the three local governments were aware of pesticide use (Tables 2 and 3).

Majority of the respondents in the three LGs (100%) were aware of personal protective equipment (PPE). Most farmers in the three local governments used respirator, long rubber gloves and rubber boots. Goggles were used in Ijale-papa (85%) and Obafemi-Owode (67.5%) (Table 4).

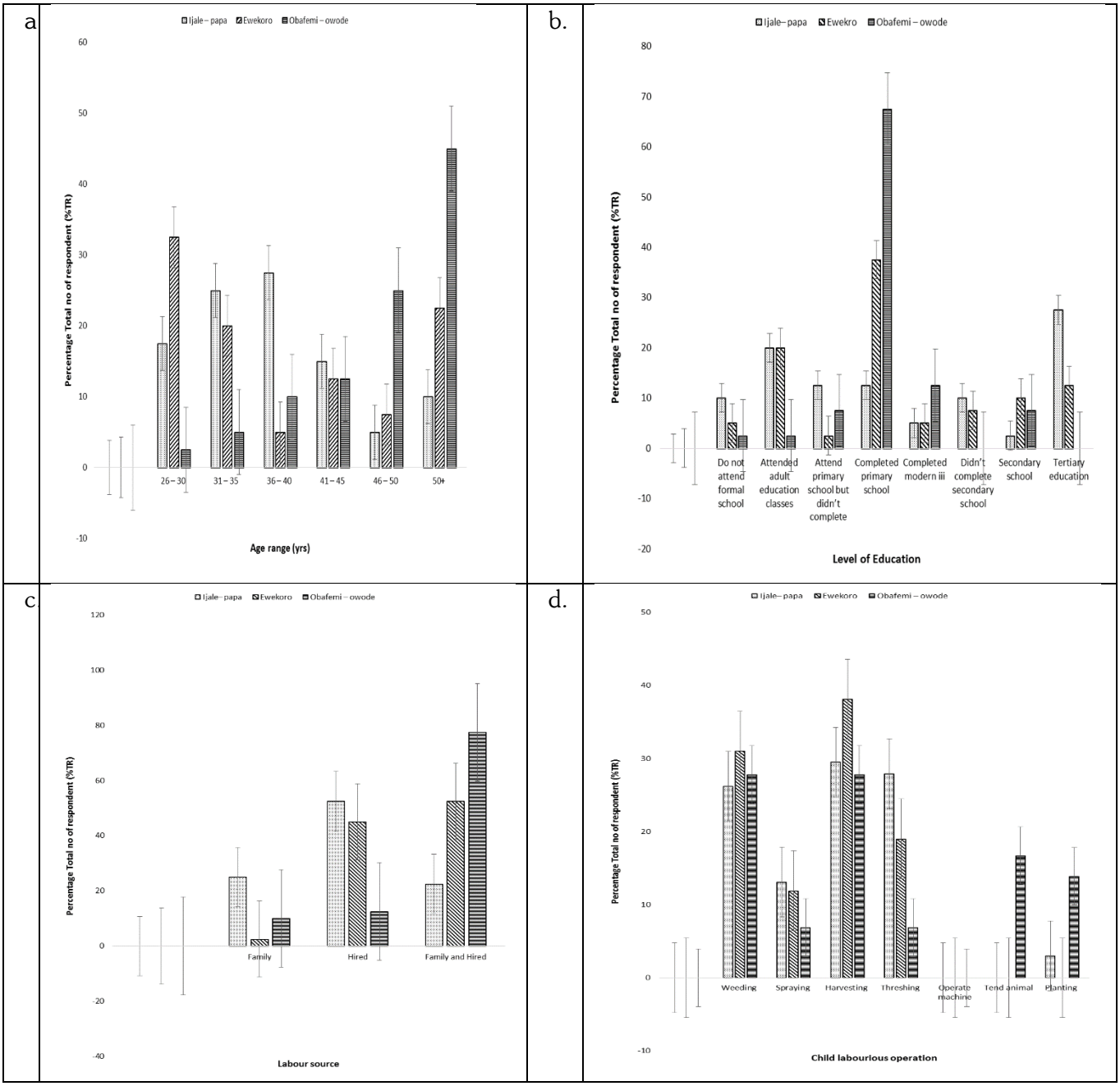

Figure 1: Age Range of Farmers (a), Level of Education (b), Labour Source(c) and Child Laborious Operations (d) in Ijale, Ewekoro and Obafemi-Owode Local Government Areas of Ogun State

The health effects of farm operations (weeding, spraying, harvesting, threshing etc.) on the children in the three local governments were shown in Figure 4. Wounds, Headache and other body pains accompanied all the operations apart from machine operation in which children were not involved in Ijale-papa local government. Exposure to dust, itching, skin rashes, headache and other body pains were experienced from all the other farm operations except machine operation in Ewekoro local government. All the health effects investigated except poisoning, eye irritation, vomiting and stomach cramps were experienced by the children as a result of all the operations except machine operation in Obafemi-Owode local government (Fig. 4).

Figure 5 showed the health effect of hazardous operations on adults in the three LGs. Wounds from operating machine, and other body pains from tending animals were the two prominent health effects in Ijale-Papa local government. Wounds, headache and other operations were at a lower level (less than 30%).

Threshing was associated more with wounds, exposure to dust, headache and other body pain in Ewekoro local government. Also, itching of skin, headache and other body pain were associated

commonly with weeding. Operating machine, did not have any link with the ailments in this local government (Fig. 5)

Weeding and harvesting were mostly accompanied by wounds, exposure to dust, skin rashes, headache and other body pains in Obafemi-Owode local govt. Lower levels of other ailments were also experienced with other operations except machine operation (Fig. 5). The hazard commonly experienced by majority (60% upwards) of the farmers in the three LGs was killing of untargeted plants. Few respondents (37.5%) experienced killing of animals. All the mechanical injuries assessed were experienced by all the respondents (100%) in the three LGs (Table 5).

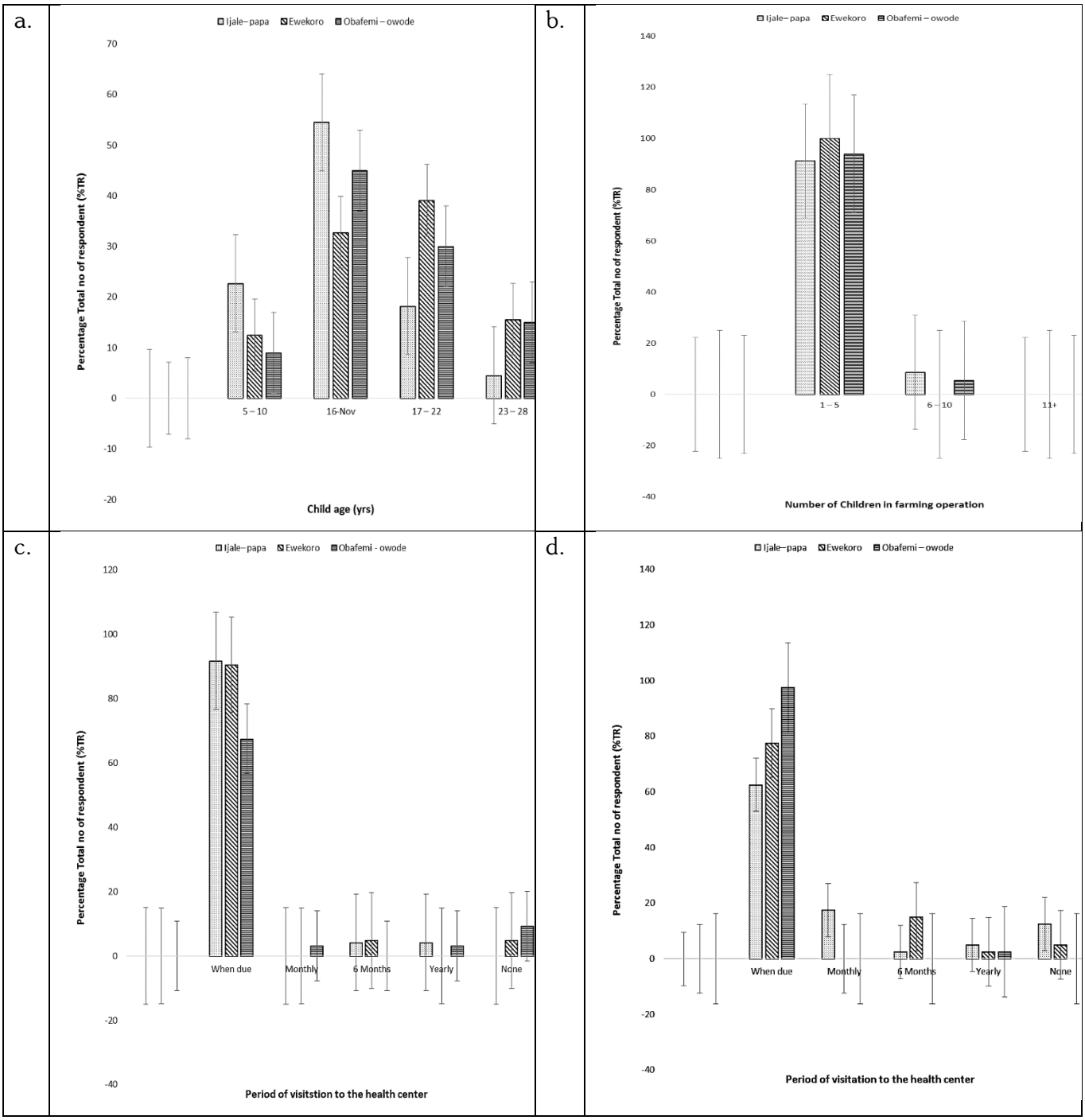

Figure. 2: Age (a) and Number of Children in Farm Operations (b) Child (c) And Farmers' (d) Visitation to Health Center in Ijale, Ewekoro and Obafemi-Owode Local Government Areas of Ogun State

Discussion

Age and level of education appear to have much to do with the effect of farm operations on the total health condition of farm workers. Child Labor is a common factor causing a high number of injuries in the agriculture/forestry/fishing sector (Kumar et al., 2000). According to Cole (2006), Park (2011), and Idio and Adejare (2013), occupational hazard

in agricultural sector could be classified into seven: (i) Climate: dehydration, heat cramps, heat exhaustion, heat stroke, and skin cancer; (ii) Snakes and insects: injurious bites and stings; (iii) Tools and farm equipment: Injuries, cuts, and hearing impairment; (iv) Physical labour: musculoskeletal disorders, e.g. pain and fatigue; (v) Pesticides: poisonings, neurotoxicity, reproductive effects, and cancer; (vi) Dusts, fumes, gases, particulates: Irritation, respiratory tract, allergic reactions, respiratory diseases such as asthma, chronic obstructive pulmonary disease, and hypersensitivity pneumonitis, and (vii) Biological agents and vectors of disease: skin diseases, fungal infections, allergic reactions, malaria, schistosomiasis, sleeping sickness, leishmaniasis, ascariasis, and hookworm. Among these occupational hazards, all that were assessed were being experienced at different levels by both the farmers and their children involved in farm operation at the three local government areas.

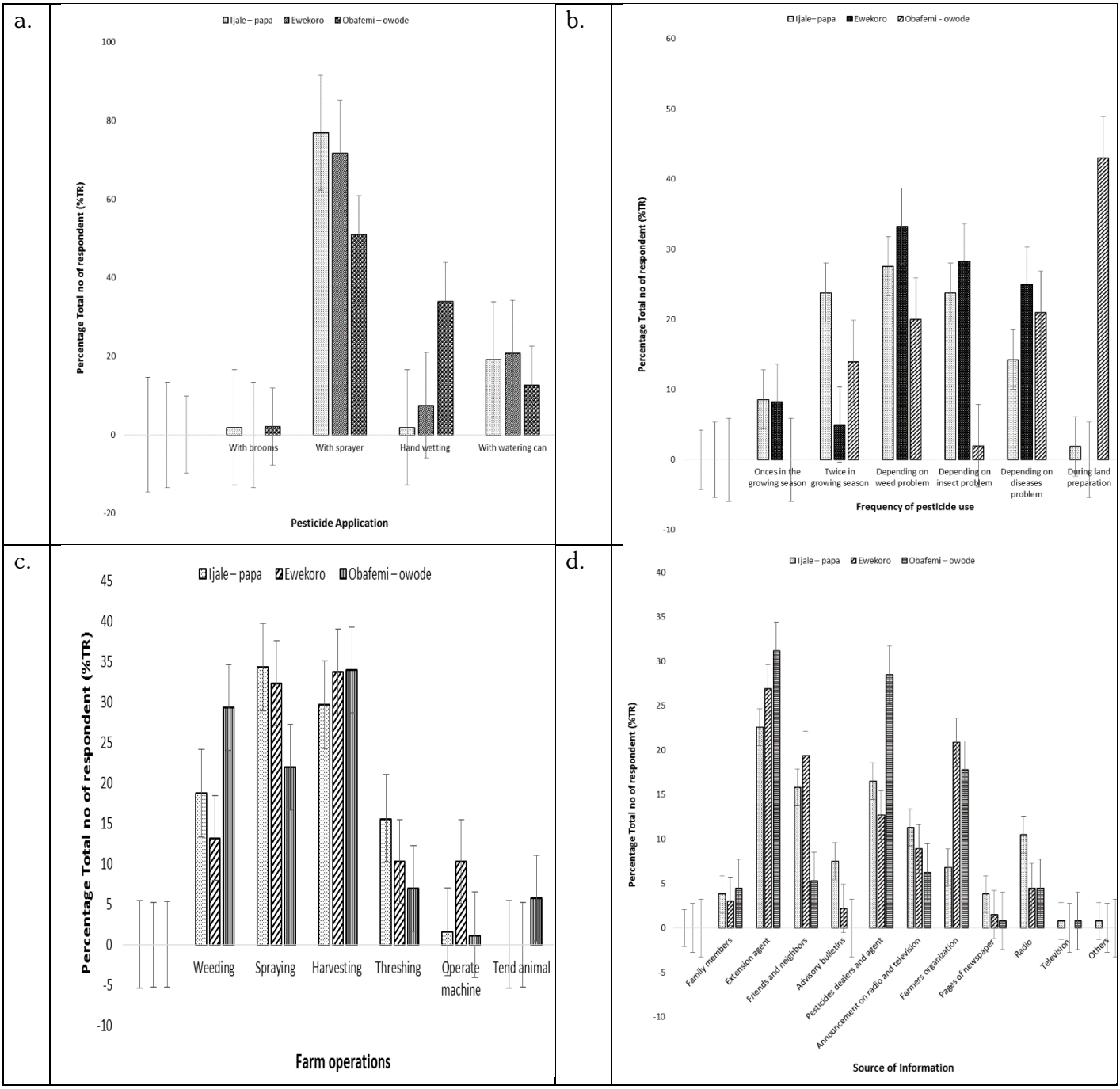

Figure. 3: Pesticides' Application Methods (A), Frequency of Use (B), Visitation to Clinic After Farm Operation (C) and Source of Information About Pesticides (D) in Ijale, Ewekoro and Obafemi-Owode Local Government Areas of Ogun State.

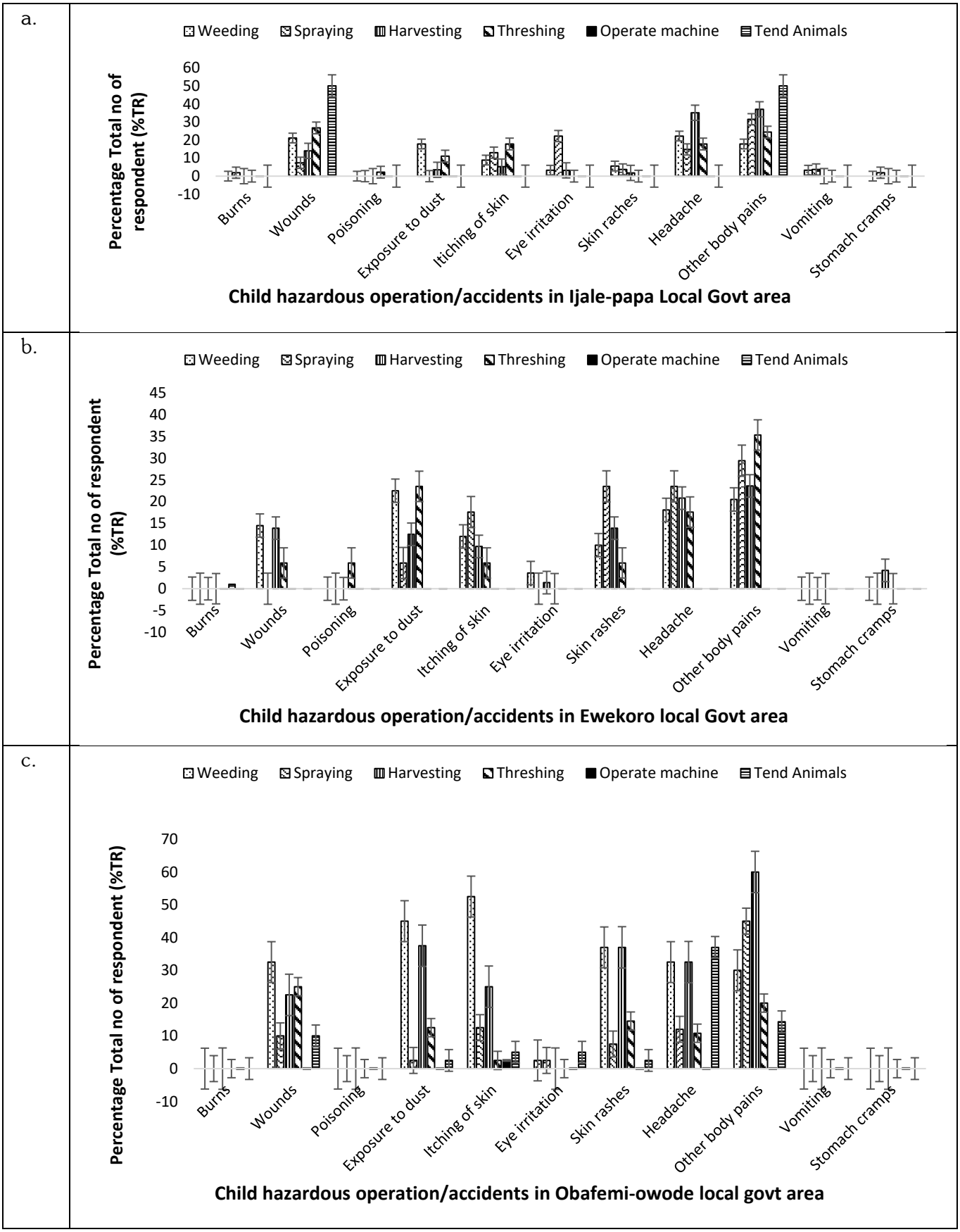

Figure 4: Child hazardous operations in Ijale-papa, Ewekoro and Obafemi-Owode Local Government areas

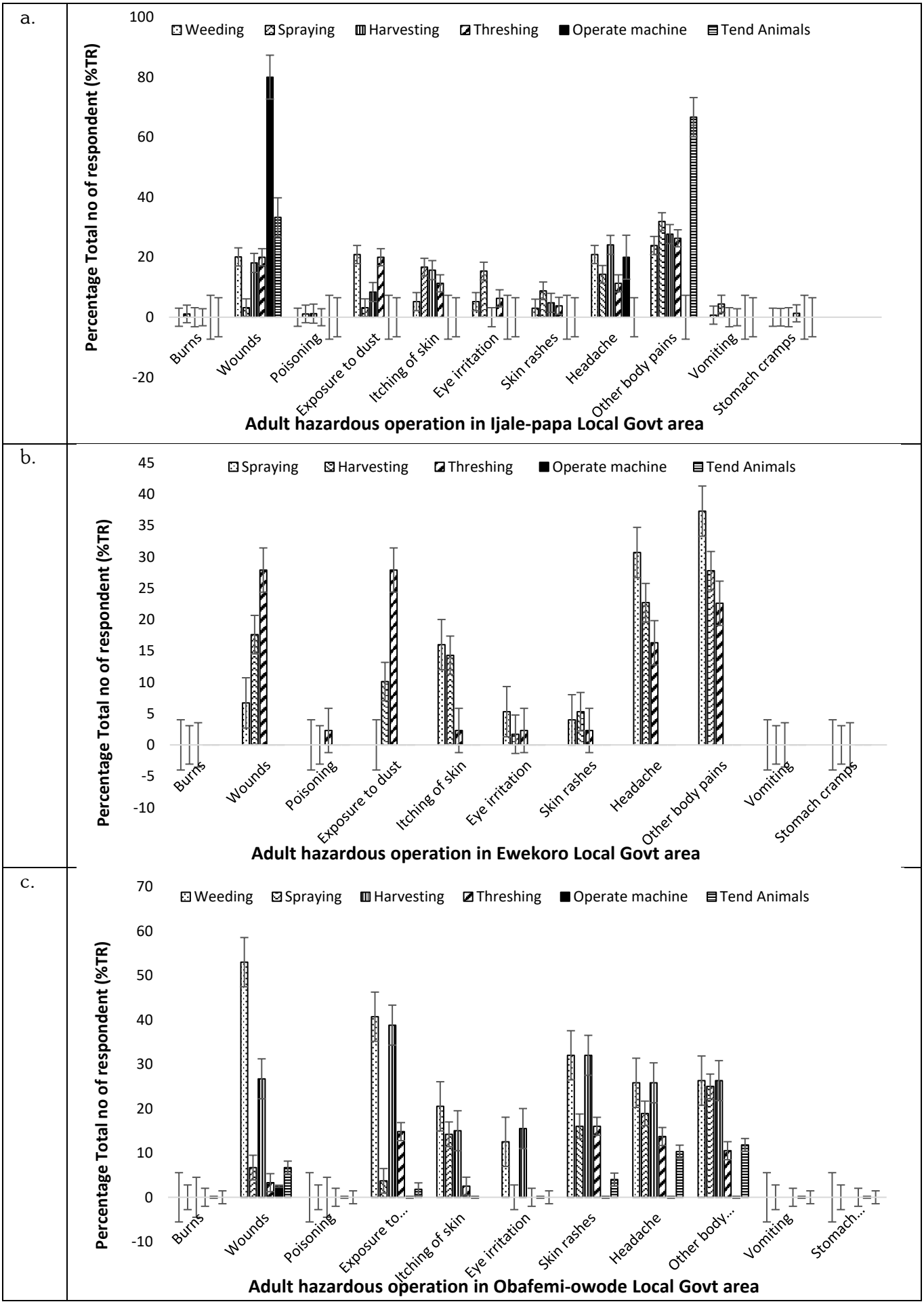

Figure 5: Adult Hazardous Operations in Ijale-Papa, Ewekoro and Obafemi-Owode Local Government Areas

Table 1: Closeness of Clinic to Farmers and Presence of Medical Doctors in Ijale-Papa, Ewekoro and Obafemi-Owode Local Government Areas

	Ijale– papa	Ewekoro	Obafemi – owode
Closeness of Clinic	%TR	%TR	%TR
Near	67.5	25	60
Far	32.5	75	40
Presence of Medical Doctor			
Yes	77.5	85	72.5
No	22.5	15	27.5

Keys: NR = Number of Respondents
%TR = Total number of Respondent percentage

Table 2: Awareness of Pesticide in Ijale-papa, Ewekoro and Obafemi-Owode Local Government Areas

	Ijale – papa	Ewekoro	Obafemi – owode
Awareness of pesticide	%TR	%TR	%TR
Yes	100	100	100
No	-	-	-

Keys: NR = Number of Respondents
%TR = Total number of Respondent percentage

Table 3: Equipment for Pesticide Application in Ijale-Papa, Ewekoro and Obafemi-Owode Local Government Areas

	Ijale – papa	Ewekoro	Obafemi – owode
Pesticide Application method	**%TR**	**%TR**	**%TR**
With brooms	1.9	-	2.12
With sprayer	76.9	71.7	51.06
Hand wetting	1.9	7.5	34.04
Reason for the application method			
No knowledge of better means	10.2	22.7	-
It is more convenient	67.3	77.3	83.3
Sprayers are too costly	-	-	-
It is cheap	20.4	-	16.7
Accessible	2.0	-	-

Keys: NR = Number of Respondents
%TR = Total number of Respondent percentage

Table 4: Farmers' Knowledge of Common Personal Protective Equipment (PPE) In Ijale-Papa, Ewekoro and Obafemi-Owode Local Government Areas

	Ijale – papa	Ewekoro	Obafemi – owode
Knowledge of PPE	%TR	%TR	%TR
Yes	100	100	100
No	-	-	-
Equipment			
Respirator	100	62.5	55
Water proof hat	52.5	5	32.5
Googles	85	12.5	67.5
Long rubber gloves	67.5	70	70
Rubber boot	60	70	65
Water proof over all	25	50	-

Keys: NR = Number of Respondents
%TR = Percentage Total number of Respondent, PPE = Personal protective equipment
**Multiple response*

Table 5: Hazard Experienced and Mechanical Injuries in Ijale-Papa, Ewekoro, Obafemi-Owode Local Government Areas

Hazard experienced	Ijale– papa %TR	Ewekoro %TR	Obafemi – owode %TR
Accidental oral ingestion of the herbicide	1.5	-	-
Accidental pouring on the skin or eye	15.1	8.3	-
Killing of untargeted plant	60.6	83.3	94.1
Killing of animals	37.5	8.3	5.8
Others	-	-	-
Mechanical injuries Protection method			
Cut by implements	100	-	100
Bite by snakes and other poisonous animals	100	-	100
Stings by bees, wasps etc.	100	-	100

Keys: NR = Number of Respondents
%TR = Percentage Total number of Respondent

The respondents from the three local governments were all aware of personal protective equipment and poisoning; eye irritation, vomiting and stomach cramps were not seriously experienced. Pesticide users are the largest occupational group at risk for pesticide poisoning, with an estimated 25 million poisoned farmers in developing countries each year (Kuye et al., 2008). In Nigeria, pesticides pose serious potential health hazards because of many reasons, some of which are; illiteracy of farmers and labourers, lack of awareness of negative tendencies in the misuse of pesticides, lack of attention to safety precautions, not wearing protective gear and appropriate clothing during the handling of pesticides (Raksanam et al., 2012; Kainga et al., 2016). Henry and Feola (2013) reported that farmers were using pieces of PPE incorrectly, thus reducing their protective potentials.

Non-target effects formed the major hazard experienced by the respondents from all the three local governments. Pesticides are toxic in nature and do not differentiate between target and non-target species of plants and animals, and hence should essentially be subject to safe and judicious use (Ugwu et al., 2015).

Headache and other body pains were common at the three local government areas and were experienced from all the operations except machine operation. This could be due to the nature of farm work as reported by different authors. Typical farm work activities such as stooping/bending, driving farm equipment, kneeling, crawling, and performing repetitive motions may also contribute to chronic musculoskeletal problems, which develop from repeated exposure to a stressor (Davis et al., 2007).

Farmers' health is very important because too frequent visitation to the clinic and hospitalization will reduce productivity. This statement derived from the EU strategy on health and safety at work confirms the interaction between health and safety at work on the one hand and productivity on the other hand. Investing in health and safety at work has to be looked upon as an investment rather than a cost (Reinie and Nathan, 2013). Egbetokun et al. (2012) found that one percent improvement in the health condition of the farmers will increase efficiency by 21 percent. According to Hawkes and Ruel (2006), poor health of farmers reduces their income, efficiency, and productivity.

Conclusion and Recommendation

The socio-economic situation of the people at the study areas contributed to their working conditions to some extent and their health is thus affected accordingly.

Our government has a lot to do to improve farmers' socio-economic status and improve health facilities of the rural farming communities in Nigeria. The statement by Ogbonna et al. (2016) that Occupational health services in Nigeria when well-regulated will among other benefits; reduce mortality and fatality thereby increasing life expectancy; reduce negative trends (occupational diseases/injuries) improve overall health index; and boost economy through massive job production, is very relevant here.

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