Original Research Paper

ANALYSIS OF OCCUPATIONAL HAZARDS AND POVERTY PROFILE AMONG CASSAVA PROCESSORS IN OYO STATE, NIGERIA

ABSTRACT

The study examined effect of occupational hazards on poverty status of cassava processors in the study area. Specifically, the study profiled the cassava processors based on their poverty status and determined the factors influencing it. It identifies the general processing activities, the occupational hazard associated with cassava processing and safety measures used. A multi stage sampling technique was use in selection of 215 cassava processors from two LGA in Oyo state. Data obtained were analyzed using descriptive statistics and Ordinary least square regression analysis. The result showed that the mean age of the cassava processors is 48 years. It also revealed that majority of the cassava processor in the study area were women (86.51%) and married (77.21%). The mean household size in the study area was 7 persons and it implies that the cassava processors had fairly large household size. The average years spent in school was 7 years. The regression analysis result revealed that poverty status of the cassava processors is influenced by household size (5%), work experience (10%), cost of treatment for eye irritation (5%) and general cut (1%). Inhalation of smoke ranked highest among the occupation hazard identified while the least rank in this category was damage done to the lungs due to inhaled smoke. The use of sun hats/ caps to prevent excessive heat ranked highest amongst the safety measure adopted to combat the occupational hazard. It was recommended that extension agent should further enlighten and orientate the processors on the importance of using safety guards such as foot wear so as to prevent snake bite, use of modern methods of processing cassava that will minimize or eradicate the identified hazards in the study area.

Key Words: *Occupational hazard, Cassava processing, Poverty profile, Oyo state Nigeria*

1. INTRODUCTION

Agriculture continues to be one of the most important drivers of poverty reduction and the bedrock for economic growth, especially for the billions of people in developing countries. In agriculture-based countries, the sector generates, on average 29% of the gross domestic product (GDP) and employs 65% of the labor force [1]**.** Three-quarters of the world's poor live in rural areas, particularly in Asia and Africa [2], and depend on agriculture as their primary source of livelihood. Studies based on cross country estimates found that agricultural growth contributes significantly to reducing poverty and hunger. Nigeria agriculture contributes more than 30% of the total annual Gross Domestic Products (GDP), employs about 60% of labour force, account for over 70% of the non-oil exports and provides over 80% of the food needs of the country especially cassava production where Nigeria is known to have comparative advantage [3].

As a food crop, cassava fits well into the farming systems of the smallholder farmers in Nigeria because it is available all year round, thus providing household food security. Cassava tubers can be kept in the ground prior to harvesting for up to two years, but once harvested, they begin to deteriorate. To forestall early deterioration, and also due to its bulky nature, cassava is usually traded in some processed form. The bulky roots contain much moisture (60 – 65%), making their transportation from rural areas difficult and expensive. Processing the tubers into a dry form reduces the moisture content and converts it into a more durable and stable product with less volume, which makes it more transportable (IITA, 1990; Ugwu, 1996). Over the years, cassava has been transformed into a number of products for both domestic based on local customs and preferences and industrial uses [4].

Cassava is considered as the most widely cultivated crop in Nigeria and it is predominantly grown by smallholder farmers who depend on seasonal rainfall. It is also a known and accepted fact that rural and urban communities use cassava mainly as food in both fresh and processed forms. According to [5] cassava can be processed into local foods like *gari*, a dry cereal that can be consumed raw, *fufu*, a cassava paste which requires cooking before consumption, *pupuru*(fermented smoked dried balls), *lafun* (fermented, sun dried flour) and other processed products like cassava chips and pellets that can be used in feeding livestock. They reported that cassava production transformation gives rise to high yielding cassava varieties, increase yields and improve processing technologies, in addition, it increases the cost

of producing and processing cassava, causing it to complete with wheat, rice, maize and sorghum for urban consumers [6].

Cassava is a staple food for over 600 million people in large parts of sub-Saharan Africa, South America and Asia. More than half of the world's cassava is produced in Africa, where it is a cheap and major source of calories for over 40% of the population [7]. The crop is preferred by most resource-constrained farmers because of its low input requirements, tolerance to low rainfall and poor soils and ease of propagation by use of vegetative stem cuttings compared to most other crops. Cassava can be planted any time of the year and harvesting can also be done all year round. Cassava as a crop has been found to be a great giant that fights hunger and provides earnings for the farmer. Thus, in terms of food security for Nigeria and other African countries cassava has its place. It is then obvious that cassava processing must be given high consideration because of its inseparability from man and animals especially in the developing countries where it is the cheapest food used to combat hunger.

The processing of cassava into these products mentioned above comes with a lot of environmental as well as occupational hazards to the processors and even the consumers. The safety of the processors, the food producers and the environment should be considered in its processing activities. Cassava processing activities have both positive and negative effect on the environment [8]. However, agricultural activities have a strong link with other fields of development practice and research, including health and nutrition. The success of agricultural livelihoods depends on the health of its workforce. At the same time, different agricultural production systems have different impacts on health, nutrition, and well-being of the people. Households can use income from agricultural production for improved access to health products and services. This is regardless of the fact that agriculture provides food and nutrients for energy and maintenance of good health. On the other hand, agriculture is associated with occupational and environmental hazards which affect nutrient absorption and people's nutritional status. Hence, knowledge and understanding of these interactions and their consequences will be useful in policy and development planning in agriculture and health.

According to [9] good health is an asset for agriculture, as healthy people can produce more and good nutrition contributes to it. Conversely, agriculture is an asset which contributes to good health and

nutrition, and resilience. When both health and agriculture thrive, a reinforcing cycle of health can result, but when either suffers, the cycle becomes one of lowered agricultural productivity and lowered health. Agricultural development and practice can exacerbate the incidence of disease through an interaction with disease vectors and parasites. When disease afflicts farmers, their productivity is reduced and they remain in poverty. Beyond the direct impacts due to loss of labor, illness undermines long-term agricultural productivity in a number of ways: when illness leads to long-term incapacitation, households may respond through withdrawal of savings, the sale of important assets (such as jewelry, textiles, breeding animals, farm equipment, and land), withdrawing children from school, or reducing the nutritional value of their food consumption. All of these responses can have adverse effects on the long-term labor productivity of household members, hence their poverty status. In view of this, the study examined the effect of occupational hazards on poverty status of cassava processors in the study area. Specifically, it

i. identifies the general processing activities of cassava processing
ii. identified the occupational hazard associated with cassava processing
iii. examine the safety measures adopted by the processors
iv. classified the cassava processors into poverty profiles
v. determined factors influencing poverty among the processors.

The study also tested the hypothesis that there is no significant difference in the health treatment expenditure between the poverty categories identified.

2. LITERATURE REVIEW

According to [10] a hazard is a situation or condition that threatens life, health, property, or environment. Most hazards are dominant or potential, with only a theoretical risk of harm. However, once a hazard becomes active, it can create an emergency situation. A hazard does not exist when it is not happening. Any hazardous situation which has come to pass is referred as an incident. Hazards can present themselves in various media. The influence they can exert on human health is very complex and may be modulated by individuals' psychological factors and perceptions of the risk that they present. [11] described occupational hazards as a condition surrounding a work environment that increases the

probability of death, illness or disability to a worker while hazard is defined as the inherent property of a substance or process that could cause injury or damage

Occupational injuries are a major source of morbidity and mortality among all workers [12] many animal workers are exposed to hazardous situations in their daily practice and these exposures vary depending on the work type. However, the right to health is the most basic of all human rights. The burden of occupational disease and injury in agriculture is of concern to those working in the agricultural sector as well as to researchers, policy makers, community interest groups and government alike. Whilst it is known that agricultural workers and their families are vulnerable to high rates of injury as well as occupationally related diseases, effective prevention and the reduction of these disproportionate levels of ill-health have to date remained elusive [13]. Additionally, exposure to noise and resultant hearing loss has emerged as a significant burden affecting predominantly middle aged and older men [14, 15]

Report from [8] found that processing of some agricultural produces such cassava into “garri” causes exposure to cyanide, heat and burns which will considerably affect the health of the processors thereby influencing the output. The prolonged exposure to cyanide fumes, fire and smoke during processing were considered responsible for respiratory diseases, migraine and heat exhaustion. In a study of women farmers in Edo state, [16] discovered that the most common occupational hazards of women who engaged in crop production and other activities were heat related sicknesses such as heat exhaustion and heat stroke. Besides, it was noted that carrying of heavy loads of firewood and raw farm produce can cause serious muscle and skeletal disorder such as chronic back pain, chest pain and miscarriages. Poor health is a common consequence of poverty. Only healthy people can work more and easily earn an income and contribute to increased economic growth. Hence, the nexus existing between poverty, health and rural labor because studying one leads to the other.

The study by [9] reported that there are various occupational hazards in cassava processing these are: physical/environmental hazards which include excessive noise from machines that can cause permanent noise-induced hearing loss or deafness; excessive cold can lead to hypothermia, frostbite and chilblains while excessive heat can generate heat cramps, heat exhaustion, heat stroke and heat dermatomes. Vibration from machines can lead to hand-arm vibration syndrome (HAVS), which according to [17] is four times more prevalent among farm workers. Secondly, chemical hazards, major sources for

this in agriculture are pesticides, herbicides and fertilizers, vapours, fumes, organic dusts from grains and poultry dusts. The health effects of these chemicals are carcinogenicity, mutagenicity), teratogenicity, psychiatric disorders and delayed neuropathy, [17, 18 19].

Thirdly are economic and biological hazards; for the economical hazard, the man-machine relationship and other working conditions put cumulative strain on the musculoskeletal system causing back pain and osteoarthritis of the knee common among agricultural workers. The biological hazards occur as a result of contact with animals with transmittable diseases, such as schistosomias is contracted from snails, ascarias is infections endemic among rural populations, rabies, among others. It can also occur as a result of water taken from contaminated sources and milk products which are not properly pasteurized which may lead to food poisoning. Farmers are also vulnerable to epidemic fevers, cholera, diarrhoea and dysentery [18;19]. In addition are psychosocial hazards, this deals with man to man relationship, worker to management relationship or boss –subordinate relationship. This relationship if not properly handled could lead to emotional and psychological stress that could affect job satisfaction, efficiency and productivity. Lastly is the environmental implications of agriculture now recognized as both contributing to and suffering from the negative effects of climate change. Report by [20] reveals that farming accounts for as much as 32% of greenhouse gas emissions deforestation inclusive. Climate-driven water scarcity and increased droughts severity and floods affect food production, especially in the subsistence sectors [21].

Empirically, studies in time past have revealed common occupational hazards emanating from agricultural production. According to [20] occupational hazard comprises of cuts or injury sustained from farm tools, malaria due to mosquito bite, and general body pain which reduces productive activities. Different factors that lead to hazards in the processing activities of cassava as a crop as identified by [22] encompasses lack of water, lack of effective channel for cassava effluent, lack of labour and unstable price of cassava products. [23] opined that exposure to occupational health hazard damage many lives and livelihoods and this impedes economic growth. Poor and unsafe work conditions are both a cause and consequence of poverty in any profession. This is because they reinforce each other negatively. Report from the study reveals that extreme poor people are not only disproportionately drawn into high

risk and unhealthy jobs but also the accidents and health problems that arise from these jobs worsen poverty situations.

Study conducted by [24 and 25] also discovered farmers experienced income loss due to existing occupational health hazard. The victims lost considerable incomes and man-day to treatment of injuries and unavailability to attend to work. Lastly, [26] equally discovered in their study that women processors were exposed to chemical, physical and psychosocial hazards during cassava processing activities. They further expressed that lower back pain and other musculoskeletal disorder were the most recurring health issues faced by the processors. These conditions according to them often result in fatigue due to work load and long period spent while working.

3. MATERIALS AND METHODS

This study was conducted in Oyo state Nigeria. Oyo state covers a total of 28,454 sqr kilometers of land mass. Oyo is an inland state in south western Nigeria. Its bounded in the south by Ogun state, in the north Kwara state, in the west it is partly bounded by Ogun state and partly Republic of Benin while in the east it is bounded by by Osun state. Oyo State has 33 local government areas (LGAs). By 2006 census, the population of oyo state is 6,617,720 with the capital located in Ibadan [27]. Agriculture is the main occupation of the people pf Oyo state. The climate is equatorial, notably with dry and wet seasons with relatively high humidity. The dry season last from November to March while wet season starts from april and ends in October. Average daily temperatures ranges between 25^0C (77^{0F}) and 35^0(95^0), almost throughout the year. The climate is suitable for cultivation of crops like maize, yam, cassava, millet, rice, plantain, cocoa palm produce, cashew etc. There are a number of farm settlements in some part of the state. There is abundance of clay, kaolin and aquamarine. Cattle ranches are also available in Saki, Fasola and Ibadan as well as dairy farm at Monatan Ibadan.

A multistage sampling technique was used to select the respondents for the study. Three local governments areas were purposively selected due to Lrge number of cassava producers and processors in the area. Second stage involved the use of random sampling technique to select two wards each from the LGAs, while cluster sampling was used to select the processors. In all data from 215 processors were used for the study. Descriptive statistics such as frequency distribution and percentage tables was used

to analyse the socio-economic characteristic of cassava processors, their major occupational hazards and the preventive measures adopted in cassava processing activities. Ordinary Least Squares (OLS) regression analysis was used to examine the influence of occupational hazards on poverty status of the cassava processors. The regression model is implicitly stated as:

$$ln\ E_i = \alpha + \beta TC_i + \gamma HC_i + \delta I_i + \sum_{i=1} x_i + \mu_i \quad \ldots 1$$

Where E_i is *per capita* expenditure of household i

TC_i is a measure of the household payment for treatment of various occupational hazards encountered during processing

HC_i is the household human capital; (education in years)

I_i represent household income from processing activity (₦);

X_i is a vector of household characteristics: (age in years, sex (dummy), household size (actual number), processing experience (years) and

μ_i represent unobserved disturbances and potential measurement errors.

The *per capita* expenditure for the households was obtained by the sum of all household monthly expenditure on food and non-food items and then divided by the household size. It is used to measure household poverty which is hypothesized to be influenced by independent variables such as age, sex, education, household size, processing experience.

4. RESULTS AND DISCUSSION

4.1 Socio-economic characteristics of the processors

The results socio-economic characteristics of the processors are presented in Table 1. About 35 percent of the processors which represents the majority of the respondents were between the age of 41-50 years, the mean age of the respondents was 48 years. This implies that most of the respondents were still in their active age which makes them to be actively involved in the cassava processing activities. Majority of the respondents were married (77%), while only 9.3 percent of them were never married. This is an indication of responsibility towards their various households. About 77.21% of the respondents were female. This may be due to the general belief that agricultural processing activities especially cassava are

feminine inclined. About 40.93% of the respondents have between 4-6 persons in their houses and this accounted for the highest value, the least however are households with more than 12 members which accounted for only 1.4 percent of the processors. The mean of household size is 6 members, which is moderate.

About 37 percent of the respondents have less than 10 years of Cassava processing experience with while those with over 30 years of experience accounted for 2.33 percent. The mean of years of experience was 18.87 years. This is an indication that an average processor has a better knowledge of the occupational hazards inherent in cassava processing. Majority of the respondents (70.23%) are members of one society or the other where training or information may be shared. Hence, acquiring new techniques and training on safety measures to occupational hazards in processing cassava is possible. Almost all the respondents were education except only 18 percent who indicated that they had no formal education. The average years spent in school was about 8 years which is a year less than the 9 years required basic education according to the Nigeria Universal Basic Education (UBE) policy. Being enlightened may give processing households the opportunity to embrace changes and technological innovations for modern cassava processing activities. A good number of the respondents realized between ₦60,001- ₦80,000 as their income monthly (27.91%). It is noteworthy that none of the processors realized less than ₦20,000 monthly in their processing activities. The mean of average monthly income is ₦37,976 an indication that processing cassava is relatively lucrative in the study area.

Table 1: Socio economic characteristics of the respondents

Socio-eco characteristics	Freq	Percentage	Mean ± Std dev.	Socio-eco characteristics	Freq	Percentage
Age				**Marital status**		
<=30	30	13.96		Single	20	9.30
31-40	34	15.81	48.29±14.18	Married	166	77.21
41-50	75	34.88		Divorced	13	6.06
51-60	43	20.00		Widowed	16	7.44
>60	33	15.35				
Household size				**Sex**		
<=3	6	2.80	7.13±2.04	Male	29	13.49
4- 6	88	40.93		Female	186	86.51

7- 9	83	38.60				
10-12	35	16.27				
>12	3	1.40				
Processing experience				**Membership in Organisation**		
<=10	79	36.74	18.87±9.14	No	64	29.77
11-20	100	46.51		Yes	151	70.23
21-30	31	14.42		**Total**	**215**	**100.00**
31-40	5	2.33				
Education						
<=0	39	18.14	7.8±4.71			
1 -6	78	36.28				
7 -12	59	27.44				
>12	39	18.14				
Monthly income						
<= 20,000	0	0.00	37,976±			
20,000- 40,000	51	23.72	15,043.02			
40,001- 60,000	50	23.26				
60,001- 80, 000	60	27.91				
>80,000	54	25.11				
Total	**215**	**100.00**				

Source: Field survey 2017

4.2. Poverty status of the processing households

Table 2 presents the poverty profile for the cassava processors. The result revealed that 21 percent of the processors were core poor with the mean per capita expenditure of ₦3,249.86 which is only 16 percent of the expenditure distribution among all households considered. About 46 percent of the respondents were moderately poor with expenditure distribution of about 31%. This implies that poverty was prevalent among the cassava processors. The non-poor processing households have a representation of 32.56 percent. Their per capita expenditure of ₦10,210.47 almost doubled that of the moderately poor and more than triple per capita expenditure for the core poor households. This is an indication that there a large margin exist between the poverty categories considered in the area of study.

Table 2: Poverty status and *Per capita* Expenditure (PCE) distribution

Poverty status	Frequency	Percentage	Mean per capita expenditure	Percentage Expenditure distribution
Core poor	47	21.86	3,249.86	16.03
Moderately poor	98	45.48	5,984.14	30.76
Non- poor	70	32.56	10,210.47	52.51
Total	**215**	**100.00**	**19,444.47**	**100.00**

Source: Field survey 2017

4.3. Cassava processing activities and its occupational hazards

The results in Table 3 presents the processing activities, awareness of the hazards involved, roles detested in the processing activities among others. Cassava can be processed into various commodities for home consumption. In the study area the identified commodities include Gari, Fufu, Starch, Abacha, Lafun and Tapioca. Almost all the cassava processors were involved in gari processing activities(97.67%). About 28 percent of them which is second to gari processing were involved in lafun production. Production of this two commodities may be high because consumption of the food type made from them are prominent local diet in the study area. The least of the commodity made in the study area was Abacha (4.6%) which is commonly eaten by another tribe hence, the reason for its low production.

Majority of the processors (92.09%) indicated that they were aware of the various occupational hazards involved in cassava processing while 94.41 percent of those aware indicated that they know the health implication of these hazards in terms of the need to treat themselves medically and other wise should hazard occur. About 86 percent of them testified that at one point or the other, they have received training on the various hazard involved in processing cassava, while 84.65 percent of the processors attested that they were well trained on different preventive measures that can be used while processing is on-going. The processing activities with occurrence of injury according to the processors are peeling, grinding and roasting of cassava. Majority of them (92.09% 59.53% and 92.02%) indicated that they have experienced these forms of injuries respectively.

On roles detested in cassava processing, 77 percent of them which accounted for the highest percent indicated that they dislike cassava peeling which of course is a necessity for processing of cassava. Twelve percent of them also do not like the planting of cassava, this may be due to the fact that

majority of the processors were women and it is a common feature in Nigeria particularly in the study area for small holder cassava farmers to process cassava tubers harvest on the farm into processed goods. Hence the reason for involvement in farming activities. The least of the detested role in cassava processing is dewatering (1.4%) because it required less effort in the chain of cassava processing.

The reasons given for detesting some processing activities in cassava include having body cuts while peeling (72.56%), fatigue experienced after peeling cassava (28.84%), injuriny during cassava grinding (25.12%) and stress encountered while mounting processed cassava to jack (22.79%) among others reasons. This implies outside the processors people may not feel encourage to be involved in the processing activities when the injury sustained from such activity is enormous. However, all occupations has their own hazards embedded in them.

Table 3. Respondents' distribution based on cassava processing activities, occupational hazard awareness and roles detested in cassava processing activities.

Variables	*Frequency	Percentage
Cassava processing activities		
Garri processing	210	97.67
Fufu processing	33	15.35
Starch processing	23	10.70
Abacha processing	1	0.46
Cassava flower processing	60	27.91
Tapioca processing	24	11.16
Awareness of hazards		
Occupational hazards	202	92.09
Health implication	203	94.41
Training on hazards	184	85.58
Protective strategy	182	84.65
Processing activities with occurrence of injury		
Peeling cassava	198	92.09
Grinding cassava	128	59.53
Roasting cassava	200	93.02
Roles detested in Cassava processing		
Planting/farming	37	12.21
Harvesting/transport	33	15.35

Peeling	167	77.67
Grinding	31	14.42
Dewatering	3	1.40
Roasting/frying	181	84.19
Reasons for detested cassava processing activities		
Insect bite while planting	40	18.61
Cut while harvesting Cassava	42	19.53
Cut while peeling cassava	156	72.56
Fatigue while peeling cassava	92	28.84
Injury while grinding cassava	54	25.12
Noise while grinding cassava	31	14.42
Injury while dewatering	3	1.40
Stressful while mounting to jack	49	22.79
Eye Irritation	180	83.72

*Multiple Responses

Source: Field survey 2017

4.4. Occupational hazards associated with cassava processing

The identified occupational hazards in cassava processing activities in the study are as presented in Table 4. The result revealed that majority of the respondents (98.15%, 94.88% and 94.42%) claimed to be faced often with problems of inhalation of smoke while frying gari, cuts while peeling and episodes of malaria and typhoid fever due to insect infestation while planting, harvesting and processing of cassava. It is therefore ranked first, second and third respectively. About 92%, 76.27% and 66.51% of the processors indicated that they experienced the problem of insect bite, headache due to strenuous work while processing cassava and Catarrh while sieving yam flower. These also ranked fourth, fifth and sixth respectively. Over 80 percent of the processors indicated that they often had problem of joint pain during the stirring / pounding of fufu, while 72.09 and 47.44 percent of them attested that they often had fatigue as a result of strenuous nature of processing and eye irritation respectively. This also ranked eighth and ninth respectively.

Furthermore, 33 percent of the processor indicated they never experience snake bite while harvesting and peeling cassava while 49.3 percent of them often had this experience. More than half of the respondents (53.95%) experienced reduction in hearing ability due to excessive noise

generated from grinding machine during grinding of cassava, 0.93 percent of them rarely have this problem. This may be so if the processing activity does not involve the use of a grinder. Forty-six percent of them indicated they often had skin irritation due to excessive heat while 47 percent of them never had it. The least of the ranking are exposure to the hazardous cyanide content during dewatering of cassava (15th) and poisoning of food due to cyanide content in the cassava if not properly dewatered (16th). About 48.37 percent and 50.70 percent of the processors respectively claimed they never had experience.

It is worthy to note that the highest average households' expenditure on hazards experienced from cassava processing is on eye irritation due to smoke from frying gari (₦797.08). This is closely followed by malaria treatment (₦678.93). The average cost of treatment for snake bite while harvesting and peeling cassava accounted for (₦486.67). The least costs however are treatment cost for cuts sustained while harvesting and peeling cassava ₦267.41 and joint pain treatment which was ₦261.93. The results on the table revealed that each of the occupational hazard experienced in the study area had its cost implication for treatment which consequently may reduce income thereby affecting household poverty status.

Table 4: Identified occupational hazards associated with Cassava processing

Occupational hazards	Never	Rarely	Sometimes	Often	Average weighted mean	Rank	Cost of treatment (N)
Snake bite while harvesting and peeling Cassava	71(33.02)	12(5.58)	26(12.09)	106(49.30)	1.78	11th	486.67
Insect bite while planting, processing Cassava	5(2.32)	0(0.00)	13(6.05)	197(91.62)	2.88	4th	341.80
Cuts while peeling Cassava	0(0.00)	4(1.86)	7(3.36)	204(94.88)	2.93	2nd	418.30
Cut while harvesting and peeling cassava	83(38.60)	24(11.16)	9(4.19)	98(45.50)	1.71	14th	267.41
Sustained injury while transporting Cassava to the processing unit	103(49.90)	7(3.26)	4(1.86)	101(46.98)	1.41	12th	270.80
Joint pain while stirring/pounding fufu	43(20.00)	2(0.93)	5(2.33)	174(80.93)	2.32	7th	261.93
Fatigue as a result of strenuous nature of processing Cassava	51(23.72)	4(1.86)	5(2.33)	155(72.09)	2.23	8th	271.19
Inhalation of smoke while frying garri	0(0.00)	1(0.46)	3(1.39)	211(98.15)	2.98	1th	436.59

Exposure to the hazardous cyanide content during dewatering of cassava	104(48.37)	7(3.26)	14(6.51)	90(41.86)	1.35	15th	325.00
Skin irritation due to excessive heat while frying garri	103(47.91)	1(0.46)	12(5.58)	99(46.05)	1.42	13th	285.71
Eye irritation due to smoking during garri processing	0(0.00)	103(47.91)	10(4.65)	102(47.44)	1.95	9th	797.08
Reducing hearing ability due to excessive noise while grinding Cassava	79(36.74)	2(0.93)	18(8.37)	116(53.95)	1.73	10th	375.58
Headache due to strenuous work while processing cassava	34(15.81)	5(2.33)	9(4.19)	167(76.27)	2.42	5th	332.50
Malaria and typhoid due to insect infestation while planting, harvesting and processing of Cassava	1(0.46)	4(1.86)	7(3.26)	203(94.42)	2.92	3rd	638.93
Death due to snake bite while processing cassava	116(53.95)	27(12.56)	19(8.84)	53(24.63)	0.99	17th	318.14
Damage to the lungs due to inhalation of smoke while frying of garri	112(52.09)	25(11.63)	27(12.56)	51(23.74)	1.03	18th	372.75
Catarrh while sieving yam flower	29(13.49)	2(0.93)	130(6.05)	173(66.51)	2.50	6th	276.42
Poisoning of food due to cyanide content in the cassava if not properly dewatered	109(50.70)	6(2.79)	14(6.51)	86(40.00)	1.29	16th	372.56

Source: Field survey, 2017
Multiple Responses; parentheses represent percentage

4.5. Safety measures adopted by cassava processors.

The safety measure adopted by the processors is presented in Table 5. All the processors admitted they often use sun hats / cap to prevent excessive heat from the sun during processing. This ranked highest at a cost of ₦325.00. From the table about 76 percent of the processors often used overall during gari frying to prevent skin irritation and this cost an average of ₦490.98. Use of overall ranked 6th with a weighted mean score of 2.08. About 97.64% and 95.26% of the respondents attested they often dispose effluents to prevent pollution of food and water from cyanide and made use of hand glove to prevent cut while peeling cassava. This ranked second and third and with a cost of ₦1,345 and 464.08 respectively.

Only 10.70 percent of the processors sometimes go for medical check-up while 3.72 percent never considered it as a safety measure in their activities. Though it ranked fifth it however, noteworthy that medical check-up takes the largest part of resources that the cassava processor used for safety measure (₦2,735.46). About half of the processors (49.06%) testified they do not rob palm oil on their

body to scare insects away during harvesting and frying of gari but 50 percent of then used nose guard while sieving cassava flour to make lafun delicacy. This safety measure ranked the least with a weighted mean score of only 1.43. The implication of the results on the table is that the respondents are not ignorant of the importance of using safety guards. However, this will invariably reduce the occurrence of occupational hazards in cassava processing activities because of the high level of awareness of the safety measures.

Table 5: Frequency and percentage Distribution of respondents according to the safety measures adopted by the Cassava processors.

Safety measures	Never	Sometimes	Often	Average weighted Mean	Rank(s)	Cost of preventive measure
Use of overall to prevent skin irritation	40(18.61)	12 (5.58)	163(75.81)	2.08	6th	490.98
Use of hand glove to prevent cut while peeling Cassava	3(1.39)	10(4.72)	202(95.26)	2.93	3rd	464.08
Use of sun hats/caps to prevent excessive heat	1(0.47)	5(2.33)	209(100.00)	2.97	1st	325.00
Use of footwear to prevent snake bite	3(1.39)	17(7.91)	195(90.70)	2.75	4th	787.36
Medical check-up every month	8(3.72)	23(10.70)	184(85.58)	2.81	5th	2735.46
use of nose guard while sieving yam flower	5(2.33)	106(50.00)	104(49.06)	2.19	7th	967.73
Use of palm oil on the body to scare the insects away during harvesting and frying garri	104(49.06)	12(5.58)	99(46.70)	1.43	8th	109.65
Disposal of the effluents to prevent pollution of food and water from cyanide	4(1.86)	4(1.86)	207(97.64)	2.95	2nd	1345.18

Source: Field Survey, 2017

Multiple Responses; parentheses represent percentage.

4.6. Determinants of poverty among cassava processors

The estimates of the ordinary least square analysis to examine the factors influencing poverty status in the area is presented in Table 6. The coefficient of determination (R^2) value is 0.689, this shows that, 68.9% of influence of treatment cost on per capita expenditure (PCE) can be explained by the explanatory variables while the remaining 31.1% may be due to other factors such as environment and government policies. Household size, treated cost of snake bite, body cuts and headache significantly influence the poverty status negatively respectively at 5%, 10%, and 1% level of significance. This implies that a unit increase in the size of household and treatment of hazards mentioned will make the processing households to become poorer than they used to be by 24.51%, 73.05% and 70.81% respectively.

On the other, at varying significant levels, processing experience (10%), income from processing activities (1%), treatment for joint pain (5%) and eye irritation (10%) positively influence poverty status of the processing households. This implies that an increase in the years of processing and income received from processing activity will improve the poverty status of the processors by (91.76%) and 23.89% accordingly. Noteworthy is the fact that when joint pain and eye irritation are given prompt treatment it will help to improve the poverty status of the processors. This is because it will give them opportunity to process more thereby making increasing their income hence, the ability to cater for the households needs.

Table 6. Presentation of Ordinary least square regression analysis for the Cassava processors showing the influence of occupational hazards in poverty status

Variables	Coefficient	Std error	T- value
Age	0.1862	0. 1213	1.53
Sex	0. 2156	0.2341	0.92
Household size	-0.2451**	0.1186	-2.06
Processing experience	0.9176*	0.5111	1.79
Years in school	0.2134	0.2001	1.06
Total income	0.2389***	0.0924	2.58
Snake bite treatment cost	-0.7305*	0.3956	-1.84
General cut treatment cost	-0.7081***	0.1975	-3.58
Joint pain treatment cost	0.9183**	0.4321	2.12
Eye irritation treatment cost	0.2307*	0.1226	1.88
Impaired hearing treatment	0.3237	0.1688	1.91

Headache treatment cost	-0.2656	0.2714	-0.97
Constant	0.3414***	0.1061	3.21
Adjusted R^2	0.6893		
R-squared	0.7138		

Note: *, **,* significant at 1, 5, and 10 percent levels of probability**

Source: Computations from field survey, 2017

4.7. HYPOTHESIS TESTING.

A one-way ANOVA was conducted to determine if expenditure on treatment of health damages caused by occupational hazard was statistically different for the poverty categories used in the study. The poverty categories used were three groups: core poor category (*n* = 47), moderately poor category (*n* = 98) and non-poor category (*n* = 70). The estimates revealed that there was statistically significant difference between the poverty categories as determined by one-way ANOVA ($F(2,212) = 34.71$, $p = 0.000$) result.

A Tukey post-hoc test revealed that treatment expenses was statistically significantly higher in the non-poor category relative to the core poor category and the moderately poor category both at 1% level of significance (p= 0.000). On a contrary note, there was no statistical significant differences between the moderately poor category and core poor category *p* = 0.897). In view of this fact, the null hypothesis is hereby rejected and the alternative accepted since there is statistical difference in treatment expenditure for the three poverty categories considered.

Table 7. Analysis of variance estimates

Source	SS	df	MS	F	Prob> F	
Between groups	5413.7	2	2706.85	34.71	0.000	
Within groups	16533	212	77.98			
Total	21946	214	102.55			
			Tukey test result			
Trtmentcost	Contrast	Std. Err.	t	P>|t|	[95% Conf.Interval]	
Povcategory						
Moderately poor						
Vs core poor	-219.837	494.6674	-0.44	0.897	-1387.4	947.7236
Non poor Vs	3245.205	528.152	6.14	0.000	1998.611	4491.799

corepoor						
Non-poor Vs						
moderately poor	3465.042	437.9413	7.91	0.000	2431.372	4498.712

5. CONCLUSION

Based on the findings in this study, it was established that cassava processing exposed processors to different occupational hazards which involve financial implication for treatment. The safety measures adopted against the hazards by the processors were equally at a cost and this have its implication on the general wellbeing of the processing households. Treatment of snake bike and body cut will make the farmers to be poorer while prompt treatment given to joint pain and eye irritation will processors to have improved poverty status. The study also discovered that treatment expenses were higher for non-poor household relative to the moderately poor and the core poor household. It is therefore recommended that the processors should be enlightened the more on safety measure which can minimize hazard hence give more opportunity to save resources used for treatment. Also, use of birth controlmethods used be continually emphasized to reduce proliferation which can reduce household well being hence leads to poverty.

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