

Assessment of Health and Safety among Farmers Regarding Agriculture Hazards

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Abstract

Background: Agricultural work is considered as one of the most hazardous sectors in both developing and developed countries with high rates of accidental deaths, injuries, and work-related illnesses. **The aim:** Assessment of Health and Safety among Farmers Regarding Agriculture Hazards at Burqash Village in Giza Governorate. **Design:** Descriptive design was used to conduct this study. **Setting:** the study was conducted at Burqash Village- Imbaba- Giza Governorate, **Sample:** Convenient sampling technique was used to select 319 farmers. **Tools for data collection:** One tool was interview questionnaire included five parts, **(1):** demographic characteristics, **(2):** Past and present health history of farmers, **(3):** Farmers' knowledge about agricultural hazards, **(4):** Farmers' reported practice and **(5):** attitudes of farmers regarding health and safety. **Results:** more than half of the studied farmers were exposed to agricultural injuries and hazards, more than one quarter of them were exposed to wounds and fractures, and one tenth of them were exposed to burns, suffocations and poisoning. More than half of the studied farmers had average level of knowledge regarding agriculture hazards. More than one third of the study sample had poor level of knowledge regarding agriculture hazards, more than of studied farmers had negative attitude toward agriculture hazards while results show that 99.1% had unsatisfactory level of total reported practices. **Conclusion:** the main risk factors that affected farmer's health and safety were educational level, gender, marital status, and farmers' exposure to different hazards such as physical, chemical, mechanical, biological and psychological hazards. **Recommendations:** providing educational programs to increase farmers' awareness about agricultural hazards, and replicate this research study in different settings and on larger samples.

Keywords: Agriculture hazards, Farmers, Health and Safety.

Introduction

Agriculture is one of the three most hazardous sectors of activity, both in industrialized and developing countries. According to estimates from the International Labor Office (ILO), some 170,000 agricultural workers are killed each year. This means that workers in agriculture run at least twice the risk of dying on the job as compared with workers in other sectors (Noman et al., 2021).

Agriculture is known to be one of the most important sectors worldwide, in terms of not only supplying foods but also employing a number of workers. However, the agricultural work is considered as one of the most hazardous sectors in both developing and developed countries with high rates of accidental deaths, injuries, and work-related illnesses. Agriculture is a physically demanding sector and places farmers and farm workers at potential risks of musculoskeletal disorders (Mougeot, 2019).

In today's world the agricultural sector employs half of the world's labor force with an estimated 1.3 billion workers active in agricultural production worldwide. The majority of agricultural workers are found in

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developing countries. A great majority are small scale farmers. They have been more often victims rather than beneficiaries of the green revolution, the technological development and the globalization trends which characterized the 20th century (Swain et al., 2021).

A farmer is a person engaged in agriculture, raising living organisms for food or raw materials. The term farmer usually applies to people who do some combination of raising field crops, orchards, vineyards, poultry, or other livestock. A farmer might own the farm land or might work as a laborer on land owned by others. In most developed economies, a "farmer" is usually a farm owner (landowner), while employees of the farm are known as farm workers (or farmhands) (Phillips, 2023).

Health and safety are a fundamental requirement of a sustainable farming work and should be regarded as an essential part of farm work management. Unwise risk-taking is an underlying problem in those working on their own are especially vulnerable. The personal costs of injury and ill health can be devastating. Life is never the same again for family members left behind after a work-related death, or for those looking after someone with a long-term illness or serious injury caused by their work (Hesham et al., 2021).

Machine safety is critical to workers' safety, because machine have many ways to injure workers: Many machines have moving parts, sharp edges, and hot surfaces with potential to cause severe workplace injuries such as crushed fingers or hands, amputations, burns, or blindness. Safeguards are essential for protecting workers from these preventable injuries. Any machine part, function, or process that might cause injury must be safeguarded. When the operation of a machine may result in a contact injury to the operator or other in the vicinity, the hazards must be eliminated or controlled (Zhang et al., 2015).

Community and occupational health nurses play an important role in providing knowledge of injury prevention principles and measures, ability to recognize hazards that might create unsafe working/living environment. Knowledge of and appropriate use of community resources to complement agricultural health programs, networking skills, leadership skills, knowledge of epidemiological principles, public speaking and presentation skills, also serve as liaisons between agricultural health, and farm workers communities because historically, vulnerable populations have not been influential in the research process, it is especially important to include workers' representatives in efforts to promote their health and safety (Postma , 2019).

Significance of the study

It is estimated that about 24 million Egyptians (or more than one-quarter of the population) work in farming. Historically, Egypt has always seen itself as farming nation. Employment in agriculture in Egypt was reported at 24.69 % in 2022 according to the World Bank collection of development indicators, compiled from officially recognized sources. The area of agricultural land in Egypt is confined to the Nile valley and delta, with a few oases and some arable land in Sinai. The total cultivated area is 7.2 million feddans, representing only 3% of the total land area of Egypt (Dignard and Leibler, 2022).

Agricultural injuries frequently involve the use of agricultural machinery, and a common cause of fatal agricultural injuries in developed countries is tractor rollovers, pesticides and other chemicals used in farming can also be hazardous to farmers' health, and farmers exposed to pesticides may experience illness or have children with birth defects (McIvor, 2020).

Agricultural mortality rates have remained consistently high in the last decade as compared with other sectors, where fatal accident rates have decreased. Millions of agricultural workers are seriously injured in workplace accidents with agricultural machinery or poisoned by pesticides and other agrochemicals. Furthermore, due to the widespread under-reporting of deaths, injuries and occupational diseases in agriculture, the real picture of the occupational health and safety of farm workers is likely to be worse than what official statistics indicate (Noman et al.,2021).

Aim of the study

The aim of this study was to assess health and safety among farmers regarding agriculture hazards at Burqash Village in Giza Governorate through:

1-Determining agricultural hazards.

2-Assessing farmers' knowledge, reported practice and attitude regarding agriculture hazarded, health and safety.

Research questions:

1. What are agricultural hazards encountered in Burqash Village?
2. What are the farmer's knowledge, related to agriculture hazards, health and safety?
3. What are the farmer's reported practices related to agriculture hazards, health and safety?
4. What are the attitude related to agriculture hazards, health and safety?

Subjects and Methods

Research design: Descriptive research design was used in this study. **Setting:** The study was conducted at Burqash Village – Imbaba – Giza Governorate. **Sample size:** total farmers in Burqash Village was 1847 in the year 2020. Using equation of sample size with 95% confidence interval and 5% error, the sample size was calculated as 319 farmers. Inclusion criteria included accepting to participate in the study, land owner, and full time work at land.

Tool of data collection:

Data was collected through using the following tool:

A structured interview guide that contains 5 parts:

Part 1: Demographic characteristics of the farmers: which include: age, sex, education, marital status, and number of children.

Part 2: Past and current medical history, (such as chronic diseases, diseases and injuries-related work, having a disability).

Part 3: Assessment of general knowledge regarding hazards of agriculture, (such as meaning of agricultural health and safety, meaning of agricultural hazards, prevention of agricultural hazards, types of agricultural hazards, how to reduce/prevent stress and depression from working in agriculture? and how can violence in the field be reduced/prevented?

Scoring system for knowledge.

- 11 open end questions (about health and hazards). Wrong and no answer = zero point. Incomplete answer = one point. Complete and correct answer = two point. Total score = 22 point.

The total knowledge scores ranged from (0-22).

- Good knowledge (< 75%).
- Average knowledge (from 50% - 75%).
- Poor knowledge (> 50%).

Part 4: Concerned with reported practices regarding agricultural hazards.

Reported practices by farmers regarding health and safety was assessed by frequency determination statements regarding use of household utensils in the preparation of insecticides, use of canal water in washing and bathing , use empty pesticide containers after washing them thoroughly , make sure there are no children or animals nearby before spraying pesticides, presence of warning signs on chemical storage places to warn of risks, uses empty pesticide packaging after well washed ventilating grain and feed stores use of a tiller tractor to cover and protect oneself from sunlight. Drinking of water, animals and birds are kept far from home, farmer is keen to vaccinate his children according to allocated dates and ensuring a full and balanced meal.

Scoring system for reported practices.

- 22 close ended questions for general reported practice.
- Practice done = one point.
- Practice not done = zero point.
- Total score = 22 point.

The total reported practice scores ranged from (0-22).

- Satisfactory reported practice ($\leq 50\%$).
- Unsatisfactory reported practice (> 50 %).

Part 5: Concerned with attitude regarding agriculture farmer's health and safety.

This part assesses attitude regarding health and safety using Liker's rating scale statements designed and modified by the researchers , as "Do not see the need for regular medical check-up as long as I am in good health", "Be careful not to be exposed to the sun directly and use the head cover", "Should read the instructions carefully before spraying pesticides", "Wash my hands carefully after spraying pesticides", "It doesn't matter to wash my hands carefully after spraying pesticides if I use my guillotine", "farmer care about washing hands before eating anything on the farm", "Stop smoking on the farm", "Farmers wear protective shoes while working", "If I get hurt at work, farmer cares about the tetanus feeding cheek", "Every farmer should know first aid measures", "Be careful not to enter the house with the clothes I wear in the spray", "farmer cares about vaccinating his children", "Use household utensils in mixing pesticides", "Make sure you don't enter the field after spraying according to the recommended period", "researchers see that first aid tools include cotton, gauze and disinfectant in the field", "farmer think primary care professionals are consulted in case of injuries or bleeding", "the farmer must be familiar with the hospitals and medical points surrounding or nearest the area or have a phone number from the doctor in the gravity of the situation", Follow the vaccination schedule on the barn of animals and birds for direct contact between them and farms, farmer think it would be better to put the pesticide in the store and stay away from the kids, Full periodic examinations of pesticides are performed from time to time, Warnings and side effects of placement are taken into account, farmer see working at sunrise time better than working in the afternoon, Gloves are worn before chemicals are used in this area, A place away from the stockpile of chemicals for eating and drinking, farmer see that you wear a face mask on the nose and mouth while spraying pesticides, Hand and mouth are washed with soap and water before eating, It is taken into account that smoking at work must be away from fire-assisting materials to ignite, Prefer not to use pots and dishes used for spraying and mixing the pesticide for personal purposes to eat or drink.

Scoring system for attitude.

- 29 close ended questions for attitude.
- Never answer = zero point.
- Sometimes answer = one point.
- Always answer = two points.
- Total score = 58 point.

The total attitude score ranged from (0-58).

- Positive attitude ($\leq 50\%$).
- Negative attitude ($> 50\%$).

Validity and reliability:

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- The study tool was tested for content and face validity by jury of five experts in the field of community nursing to evaluate the individual items as well as the entire instrument as being relevant and appropriate to test what they wanted to measure.
- The experts were asked to evaluate the individual items on the study tool in relation to its relevance and appropriateness in terms of the construct and if the items adequately measure all dimensions of the construct. The experts were asked to evaluate farmers items and rate items on a four -point scale as follows; not relevant scored (1), Little relevant scored (2), relevant scored (3) and very relevant (4).
- A pilot study was carried out on 10% from the study subjects and was excluded from the total sample. To assess reliability, the study tool was tested by the pilot subjects at first session for calculating Cronbach's Alpha which was 0.827 for knowledge questionnaire, 0.89 for reported practices questionnaire, and 0.84 for attitude questionnaire.

Ethical considerations:

An official permission to conduct the proposed study was obtained from Faculty of Nursing Helwan University the Scientific Research Ethics Committee. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it will not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

Preparatory phase:

It included reviewing of related literature and theoretical knowledge of various aspects of the study using books, articles, internet and magazines to develop tools for data collection.

Pilot study:

A pilot testing will be conducted on 10% of the farmers under study (33) farmers, to assess the feasibility of the study as well as clarity and objectivity of the tool. No major modifications were identified by subjects, , they were included in the actual study sample.

Field work:

After attaining the approval to conduct the study, sample were approached during the period of working of farms In Burqash Village – Imbaba – Giza Governorate. After establishing a trustful relation, every subject was interviewed individually by the researchers after explaining the study purpose of the study.

Statistical items.

Upon completion of data collection, data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 24. The P value was set at 0.05. Descriptive statistics tests as numbers, percentages, mean standard deviation (SD), were used to describe the results. Appropriate inferential statistics such as the “t” test were also used.

Significance of results:

- When $P > 0.05$, it is not a statistically insignificant difference.
- When $P < 0.05$, it is a statistically significant difference.
- When $P < 0.01$ or $P < 0.001$, it is a statistically highly significant difference. (Dawson and Trapp, 2020).

Results

Table (1): Frequency Distribution of Demographic Data among Farmers. (NO319).

Demographic data	The studied sample (NO=319)	
	No.	%
Sex:		
Male	225	70.5
Female	94	29.5
•Age:		
20 > -40	155	48.6
40- > 60	122	38.2
60 > more	42	13.2
Mean ± SD	38.04 ± 14.11	
•Level of education:		
Illiterate /Read and write	105	32.9
Primary	70	21.9
preparatory	72	22.6
Secondary	27	8.5
University	45	14.1
• Marital status:		

Single	83	26
Married	236	74
Divorced /Widow	--	--
• Children number		
Haven't children	134	42
1	26	8.2
2	16	5
3	43	13.5
More than three	100	31.3

Table (1) Shows that 70.5% of farmers were males, 48.6 % of participant farmers' age was between 20 > -40 years, with mean age of **38.04 ± 14.11**, 32.9 % illiterate /Read and write, 74% were married, and 31.3 % have more than 3 children.

Table (2): Frequency Distribution of the Farmers Regarding Medical Data (NO=319).

Items	No	%
Suffering from chronic diseases		
✓ Yes	148	46.4
✓ No	171	53.6
If yes type of chronic diseases (148)		
✓ Diabetes	37	25
✓ Hypertension	58	39.2
✓ Cardio	24	16.2
✓ Kidney	11	7.4
✓ Liver	3	2.02
✓ Digestive	10	6.8
Others	5	3.5
Actual Injures and hazards resulted from agriculture work		
✓ Yes	218	68.3
✓ No	101	31.7
If yes Type of injuries and hazards (218)		
✓ Wound	119	54.5
✓ Fracture	47	21.5
✓ Burn	17	7.8
✓ Poisoning	16	7.3
✓ sun stress	19	8.7
Disability		

✓ yes	63	19.7
✓ no	256	80.3

Others (Asthma, Rheumatoid, joint, and parkino)

Table (2) shows past and current medical history and medical data for participate farmers and indicated that 46.4% were suffering from chronic diseases , 39.2% were suffering from hypertension , 68.3 % have injures resulted from working in the field , 54.5% had wounds , and 19.7 % had disabilities.

Table (3): Number and Percentage Distribution of Total Knowledge among Farmers Regarding Agriculture Hazards (NO=319).

Total knowledge scores	The studied sample (NO=319)	
	No	%
<u>Levels of total knowledge:</u>		
Poor	199	62.4
Average	103	32.3
Good	17	5.3
Range	22	
Mean ± SD	6.38±6.00	

Table (3) Shows that 62.4% of farmers had poor level of total knowledge while 17 % had good level of total knowledge regarding agriculture hazards with mean 6.38±6.00.

Table (4): Number and Percentage Distribution of Total Reported practices among Farmers Regarding Agriculture Hazards (NO=319).

Total practices scores	The studied sample (NO=319)	
	No	%
<u>Levels of total practices:</u>		
unsatisfactory	316	99.1
satisfactory	3	0.9
Range	16	
Mean ± SD	7.01±1.90	

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Table (4) Shows that 99.1% of farmers had unsatisfactory levels of total reported practices while 3 % had satisfactory levels of total reported practices with mean 7.01 ± 1.90 .

Table (5): Number and Percentage of Total Attitude among Farmers Regarding Agriculture Hazards (NO=319).

Total attitude scores	The studied sample (NO=319)	
	No	%
Levels of total attitudes :		
negative	277	86.8
positive	42	13.2
Range	11	
Mean \pm SD	26.30 \pm 1.84	

Table (5) Shows that 86.8 % of farmers had negative attitude, while 13.2 % had positive attitude with mean 26.30 ± 1.84 .

Table (6): Correlation between Knowledge, Reported Practices, and Attitude among Farmers Regarding Agriculture Hazards (NO=319).

Knowledge practices and attitude	Changes of scores of total knowledge, practices, and attitude pre Program					
	knowledge		practices		attitude	
	r	p	r	P	R	p
Knowledge	-----	----	0.101	0.072	0.001	0.981
Reported practices	0.101	0.072	----	-----	0.046	0.417
Attitude	0.001	0.981	0.046	0.417	-----	-----

Table (6) Shows significant relation between total score of knowledge and total score of reported practices among the studied sample. While insignificant relation was found between total score of knowledge and total

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 score of attitude and insignificant relationship was found between total score of reported practices and attitude among the studied sample.

Table (7): Relation between total Knowledge and workers' demographic characteristics regarding Agriculture Hazards (NO=319).

Demographic characteristics	Total knowledge level among the studied sample						χ^2	P
	poor level (NO=199)		Average level (NO=103)		good level (NO=17)			
	NO	%	NO	%	NO	%		
Sex								
Male	132	58.7	80	35.6	13	5.8	4.50	0.105
Female	67	71.3	23	24.5	4	4.3		
Age years:								
20 > -40	97	62.6	48	31	10	6.5	7.82	0.098
40- > 60	83	68	35	28.7	4	3.3		
60 > more	19	45.2	20	47.6	3	7.1		
Education level:								
Illiterate /Read and write	54	51.4	44	41.9	7	6.7	35.4	0.000
Primary	58	82.9	8	11.4	4	5.7		
Preparatory	34	47.2	32	44.4	6	8.3		
Secondary	23	85.2	4	14.8	0	0		
University	30	66.7	15	33.3	0	0		
Marital status:								
Single	51	61.4	29	34.9	3	3.6	0.879	0.644
Married	148	62.7	74	31.4	14	5.9		
Divorced /Widow	---	----	---	----	---	---		

Table (7) shows significant relation between studied demographic data and educational level and Total knowledge level among the studied sample while other demographic variables shows not significant relation.

Table (8): Relation between total practices scores and workers demographic characteristics among Farmers Regarding Agriculture Hazards (NO=319).

Demographic characteristics	Total practices level among the studied sample				χ^2	P
	Satisfactory		Unsatisfactory			
	NO	%	NO	%		
Sex						
Male	3	1.3	222	98.7	1.26	0.261
Female	0	0	94	100		
Age years:						
20 > -40	2	1.3	153	98.7	0.622	0.733
40- > 60	1	0.8	121	99.2		
60 > more	0	0	42	100		
Education level:						
Illiterate /Read and write	1	1	104	99	7.53	0.110
primary	0	0	70	100		
preparatory	0	0	72	100		
Secondary	0	0	27	100		
University	2	4.4	43	95.6		
Marital status:						
Single	0	0	83	100	1.06	0.302
Married	3	1.3	233	98.7		
Divorced /Widow	---	---	---	---		

Table (8) shows not significant relation between all studied demographic data and Total reported practices level among the studied sample.

Table (9): Relation between total attitude scores and workers demographic among Farmers Regarding Agriculture Hazards (NO=319).

Demographic characteristics	Total practices level among the studied sample.				χ^2	P
	Positive		negative			
	NO	%	NO	%		
Sex					5.788	0.01
Male	23	10.2	202	98.8		
Female	9	20.2	75	79.8		
Age years:					4.96	0.08
20 > -40	27	17.4	128	82.6		
40- > 60	12	9.8	110	90.2		
60 > more	3	7.1	39	92.9		
Education level:					16.28	0.003
Illiterate /Read and write	4	3.8	101	96.2		
Primary	12	17.1	85	82.9		
Preparatory	10	13.9	62	86.1		
Secondary	4	14.8	23	85.2		
University	12	26.7	33	73.3		
Marital status:					0.001	0.978
Single	11	13.3	72	86.7		
Married	31	13.3	205	86.9		
Divorced /Widow						

Table (9) shows significant relation between studied demographic data and educational level, sex and total attitude level among the studied sample while it showed no significant relation between age, and marital status.

Discussion

Agricultural health is the study of environmental, occupational, dietary, and genetic factors on the health of farmers, farm families, pesticide applicators, and others who work with and are exposed to agricultural chemicals. Farmworkers are exposed to numerous safeties, health, environmental, biological, and respiratory hazards. These include increased rates of respiratory diseases, noise-induced hearing loss, skin disorders, certain cancers, chemical toxicity, and heat-related illnesses. There are precautions that can be taken to minimize or eliminate these potential hazards (**Hawkes & Ruel, 2022**).

Part I: Demographic characteristics of the farmers.

The present study finding revealed that more than third of studied subjects were male and this finding was similar with **Pollock et al., (2022)** who conducted a study at Australia under title of " Occupational Health and Safety on Australian Farms: Farmers' Perceptions of Major Hazards. And "Reported that 40% of studied subjects were males.

Concerning age, less than half of studied subjects were 20 to less than 40 years of age, and this finding was in agreement with **Mary et al., (2021)** who conducted a study at Midwestern titled "Knowledge, Attitudes, and Practices for Respiratory and Hearing Health among Midwestern Farmers. In Ohio City, Midwestern" reported that 48 % of studied subjects were above 35 years of age.

The present study finding revealed that nearly three quarters of studied subjects were married and more than one quarter were single. This result was in accordance with **Saed et al., (2020)** who conducted a study at Palestine titled " Knowledge and practices of pesticide use among farm workers in the West Bank, Palestine" reported that 73 % and 27 % of studied subjects were married and single, respectively. From the researchers' point view, this might be due to the customs that preserve marriage as the base for family establishing.

Concerning the education level, the present study revealed that one third of studied subjects were illiterate or can only read and write and more than one twentyth had University education. This finding was similar to **Hagel et al., (2022)** who conducted a study at Vietnam titled " Prevention of agricultural injuries: an evaluation of an education-based intervention. Injury Prevention in Southeast Asia in Vietnam ". They conducted a cross-sectional study among agricultural workers in Primary Health Care Centers in Vietnam and found that 33 % and 13 % of participants were illiterate or can read and write and had university education respectively.

Concerning the children number, the present study revealed that less than half of studied subjects did not have children and this finding was in agreement with **Bassi et al., (2021)** who conducted a study at Kaduna State

Vol. 2, Issue 1, Month: June 2023, Available at: <https://hijnrp.journals.ekb.eg/> in Nigeria titled " Agrochemical Use and Associated Risk Factors in Fadan Daji District of Kaura LGA, Kaduna State, Nigeria." They Stated that 43 % of studied subjects did not have children.

Part II: Medical history of the farmers:

Regarding the medical history for farmers who were suffering from chronic diseases, the results of the present study showed that more than half of studied subjects did not suffer from chronic diseases and this finding was in the same direction with **Heitor (2022)** who conducted a study in Brazil under title " Trade, productivity, and the spatial organization of agriculture: Evidence from Brazil ". They reported that, 55% of studied subjects were recently not suffering from chronic diseases. From researcher's point of view, this might be due to spreading health awareness and periodic examination for early case finding.

Concerning the type of chronic diseases, the results of the present study showed that more than one third of studied subjects were recently diagnosed with hypertension and this finding was the same direction with **Michiel et al., (2020)** who conducted a study in Ethiopia under title "Reducing the maize yield gap in Ethiopia: Decomposition and policy simulation ". They reported that 39 % of studied subjects were recently diagnosed with hypertension. From researcher's point of view, this might be due to bad habit as eating too much salt and not eating enough fruits and vegetables and not having enough exercise.

Concerning the actual injures and hazards, the present study results delineated that more than two thirds of studied subjects had actual injures and hazards resulting from agriculture work. This finding is in agreement with **El Aparna & Gopal, (2020)** who conducted a study in Indian under title "Addressing crisis in Indian agriculture through agricultural information delivery". They reported that, 69 % of studied subjects had actual injures and hazards resulting from agriculture work. From researcher's point of view, this might be due to overturning tractors and heavy machinery.

Also, the present study revealed that more than half of studied subjects had actual injures and hazards resulting from agriculture work as wounds. This finding is in agreement with **Alene & Manyong, (2021)** who conducted a study at northern Nigeria under title " Farmer-to-farmer technology diffusion and yield variation among adopters: The case of improved cowpea in northern Nigeria ". They reported that, 69% of studied subjects had actual injures and hazards resulting from agriculture work as wounds. From researcher's point of view, this might be due to use of pesticides, heavy agricultural machinery and equipment.

The presented study showed that more than three quarters of studied subjects did not have disability and this finding is in agreement with **Deng et al., (2021)** who conducted a study at China under title of "Impact of public research and development and extension on agricultural productivity in China". They reported that 79 % of studied subjects did not have disabilities. From researcher's point of view, this might be due to precautions that can be taken to minimize or eliminate potential hazards.

Part III: Farmers Knowledge about agriculture hazards pre and post agriculture health program:

Before program implementation farmer's knowledge level was not homogenous, and farmer's knowledge seemed to be haphazard and not based on scientific background. This might be due to little or no agriculture hazards management education program provided to farmers in Burqash Village –.

As regard total level of knowledge, less than two thirds of studied subjects had poor knowledge pre applied agriculture health program and this finding was in agreement with **Harun et al., (2023)** who published a study at Malesia under title of Management of Weeds in Maize by Sequential or Individual Applications of Pre- and Post-Emergence Herbicides”. They reported that 40% of studied subjects had poor knowledge. From researcher's point of view, this might be due to the fact that more than one third of studied subjects didn't read and write

Part IV: Farmers reported practice regarding agricultural hazards:

As regard to total level of reported practice, ninety-nine and one tenths of a percent of studied subjects had unsatisfactory practice pre-applying agricultural program and this finding was in agreement with **Andualem et al., (2022)** who conducted a study in North East Ethiopia under title " Effect of Species Diversity and Forest Structure on Soil Chemical Properties of Gatira George's Church Forest and Gemeshat Natural Forest, in North East Ethiopia”. They reported that 99 % of studied subjects had unsatisfactory reported practice.

Part V: Concerned with attitude regarding agriculture farmer health and safety.

Regarding farmer attitude about agriculture hazards the present study revealed that about one third of studied subjects about not be careful to wash hands carefully after spraying pesticide and this finding was disagreement with **Hermanto (2022)** who conducted published study at Italy under title" New Developments and Innovations in Hybrid Seed Production Technology" reported that, 60 % of studied subjects wash hands after spraying pesticide.

Part VI: The statistical relation and correlation among study variables.

Regarding relationship between total knowledge and farmer's demographic characteristics preprogram implementation, the present study showed no significant relation between them and this finding was in agreement with **Leonel (2022)** who reported no statically significant relation between total knowledge and farmer's demographic characteristics preprogram implementation. In addition, this finding is in accordance with **Sean (2022)**, who reported non-significant relation between total knowledge level among the studied subjects and demographic characteristics?

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Although this finding was in disagreement with **Ligita (2022)**, who published a study at Germany under title of “Different grain-filling properties of high-yielding rice”. They reported a significant difference between studied farmers knowledge scores and their age, gender and education level.

Concerning assessment of farmer’s knowledge, preprogram the present implementation study shows no statistically significant relationship between age and marital status, but this finding was in disagreement with **Camille (2019)**, who conducted a study in Beijing, China under title "How innovations in agricultural sector could help small and medium-sized enterprises to face a policy evolution". “They reported that, there was significant and positive relationship between total knowledge and age and marital status.

Conclusion

In light of results of the current study it could be concluded that; more than half of the studied farmers exposed to agricultural injuries and hazards, more than one quarter of them exposed to wound, fractures and tenth of them exposed to burns, suffocation and poisoning, more than half of farmers had average level of total knowledge.

While, more than one third of them had poor level of knowledge, more than of studied farmers had negative attitude while Shows 99.1% had unsatisfactory Levels of total reported practices while 3 % satisfactory Levels of total practices among farmers with mean 7.01 ± 1.90 Finally, there were highly statically significant negative relation between studied sample total score knowledge, practice, attitude and agricultural injury exposure.

Recommendations

Based on study findings, the following recommendations are suggested:

- Providing continues education that help in improving knowledge, attitude about agricultural hazards, and improve practice towards health and safety.
- Replicate this research finding in another setting and large scale from farmers for generalization.

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