



AN AGRICULTURE HEALTH PROGRAM FOR FARMERS REGARDING HEALTH AND SAFETY AT WORK

Ahmed Rezk Abdel-ghafar Emara ¹, Afaf Salah Abd El-Mohsen ², Aliaa Mohammed El-Afandy ³

¹ Assistant Lecture at Faculty of nursing- Misr University for Science & Technology

² Professor of Community Health Nursing -Faculty of Nursing -Helwan University

³ Assist. Professor of Community Health Nursing, - Faculty of Nursing -Helwan University

*Corresponding author: Ahmed Rezk Abdel-ghafar Emara , E-Mail: aemara402@gmail.com

Article History: Received: 05.04.2023

Revised: 05.05.2023

Accepted: 13.05.2023

ABSTRACT

Background: Agriculture is known to be one of the most important sectors worldwide, Agriculture is one of the three most hazardous sectors of activity, both in industrialized and developing countries. In today's society, the agricultural sector employs half of the world's labor force with an estimated 1.3 billion workers active in agricultural production worldwide, **Aim:** This study aimed to evaluate the effect of agricultural health program for farmer's regarding health and safety at work place. **Research design:** A quasi-experimental research design was used in this study. **Sample:** Purposive sample was used to choose 319 farmers. **Setting:** The study will conducted in Burqash Village – Imbaba – Giza Governorate. **Tool for data collection:** One tool as interview questionnaire included five parts, **1st part:** demographic characteristic, **2nd part:** Past and present history of farmers, **3rd part:** Farmers Knowledge about agricultural hazards, **4th part:** Farmers reported practice questionnaires and **5th part:** Concerned with attitude regarding farmer health and safety pre and post applying program **Results:** this study showed statistically significant improvement in farmers knowledge ,attitudes and reported practices (6.38±6.00 to 17.84±3.52),(7.01±1.90 to 17.03±0.662) and (26.30±1.84 to 29.37±3.36) representing pre vs. post program with (P > 0.05). **Conclusion:** The current study concludes that improvement in farmer's knowledge, attitudes and reported practices about health and safety at work post agricultural health program than pre also **Recommendations:** adopting periodic agricultural health program for farmers regarding health and safety with in work place and reorientation sessions about farmer's health and safety at work, and publication of the program.

Key words: Agriculture health Program, farmers, Health, and Safety at work

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).

Agricultural 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 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 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 developing countries. A great majority are small scale farmers. They agriculture sectors 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 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).

However, in other older definitions a farmer was a person who promotes or improves the growth of plants, land or crops or raises animals (as livestock or fish) by labor and attention. Over half a billion farmers are smallholders, most of whom are in developing countries, and who economically support almost two billion people. Globally, women constitute more than 40% of agricultural employees (Pixley et al., 2022).

Farmers are often members of local, regional, or national farmers' unions or agricultural producers' organizations and can exert significant political influence. The Grange movement in the United States was effective in advancing farmers' agendas, especially against railroad and agribusiness interests early in the 20th century. The FNSEA (Federation National des Syndicates Exploit and Agricola's) is very politically active in France, especially pertaining to genetically modified food. Agricultural producers, both small and large, are represented globally by the International Federation of Agricultural Producers (IFAP), representing over 600 million

farmers through 120 national farmers' unions in 79 countries (Bellwood, 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).

Farms should have health and safety rules and procedures for risky farm tasks. For example, how to manage problems in the farm dairy, what vehicle to use for which task and when to wear a helmet. Work Safe has guidance on most topics to help with this. During an employee's induction and when assigning tasks, tell farmers about these rules and procedures (Green, 2019).

Agriculture health program will be improve farmer knowledge, attitudes and practices regarding health and safety at work, training farmers about the competences, perfect uses of personal equipment's ,Prepare for incidence and emergency events and Workplace wellness programs (Caudell et al.,2020) .

The articles included in the review used educational interventions for farmers with the purpose of preventing farm-induced diseases and injuries, increasing the health and well-being of farmers, and promoting good manufacturing practices. The educational approaches considered varied from lectures, videos, group discussion, booklet and community fairs, to involving the community in designing the intervention and training farmers to deliver the intervention to the community (Murphy, 2020).

Agriculture health program for farmers has the potential to increase the level of health, safety literacy, and thereby improve farmers'

health and quality of life. The aim of this paper is to provide a systematic review of the published literature documenting different educational interventions for agricultural workers that have the improvement of health and/or safety literacy as an outcome (**Merisalu et al., 2019**).

Interventions that used evidence-based theories, which took into account cultural aspects and individual factors, used biomarkers as a behavior change measurement, and involved the community in the development of the intervention had the best results in terms of behavior change. The strategies of educational interventions identified in this review that produced good results have the potential to inform future researchers and policy makers in the design and implementation of public health interventions, programs and policies to improve the health of farmers and their families (**John et al., 2019**).

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 worker representatives in efforts to promote their health and safety (**Postma , 2019**).

Significance of the study

Agriculture 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. Agriculture development is considered a duty of the state, as recently reaffirmed in the 2022 constitution. 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 (**Merisalu et al., 2019**).

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 farmer 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

This study aim to evaluate the effect of Agriculture health program for farmers regarding health and safety at work:

1. Assess the farmer's knowledge about health and safety at work .
2. Assess the farmer's attitudes and reported practices about health and safety at work.
3. Design health education program for farmers regarding health and safety at work.
4. Implement health education program for farmers regarding health and safety at work .

5. Evaluate the effectiveness of agriculture health program on farmer's health and safety.

Research Hypothesis

Agriculture health program will be effective in improving farmer knowledge, attitudes and practices regarding health and safety at work.

SUBJECTS & METHODS

Subject and methods for this study were portrayed under four main designs as the following:

The technical items include research design, setting, sample and tools for data collection.

Research design: Descriptive research design was used in this study.

Setting: The study conducted at Burqash Village – Imbaba – Giza Governorate.

Burqash Village is one of the villages affiliated to the Imbaba Center in the Giza Governorate in the Arab Republic of Egypt. According to the statistics of 2022, the total population of Burqash was 14.172, including 7.436 men and 6.736 women, it is located within the Giza Governorate next to Elmanashy city in the same governorate. The importance of agriculture in the village of Burqash is considered one of the most important productive and widespread crafts, and it is also able to employ much manpower.

Subject: Purposive sample included all farmers women and farmers men in Burqash village except those refuse to participate – 319 farmers shared in study and agree to participate, that represent about of 10% from total number farmers in village that constitute (1847) related to last approved statistical.

Tool of data collection:

Data was collected through using the following one tool:

A structural interviewing questionnaire that contains 5 parts:

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

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

Part 3: Assess general knowledge regarding hazards for agriculture, as Meaning of agriculture health and safety, meaning of agricultural hazards, enumerate how to prevent agricultural hazards, types of agricultural hazards, How to reduce/prevent stress and depression from working in agriculture?, 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.

Assess reported practices as required by farmers regarding health and safety by frequency determination statements. Such as (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's or animals nearby before sparing pesticides, Note farmers places signs in chemical resource storage places to warn of risks ,Note farmers uses empty pesticide packaging after well washed, Note farmers enters grain and feed stores only after ventilation, Note farmers uses a tiller tractor to cover him to protect himself from sunlight, Note farmers drinks water only when thirsty , animals and birds are kept far from home, farmer is keen

to vaccinate his children according to the dates, Note farmer is interested in diversifying food varieties to ensure a full and balanced meal, researcher following a healthy diet, Regular breakfast).

Scoring system for reported practices.

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

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

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

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

Assess attitude regarding health and safety using Liker's rating scale statement designed and modified by researchers, as (Do not see the need for regular medical check-up as long as I am in good health, Be careful not to expose 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 your hands before eating anything on the farm, Stop smoking on the farm, Farms wear protective shoes while working, If I get hurt at work, farmer care about the tetanus feeding cheek, Every farmer should know the first aid, Be careful not to enter the house with the clothes I wear in the spray, farmer care about vaccinating my children, Use household utensils in mixing pesticides in washing, Make sure you don't enter the field after spraying according to the recommended period, researcher 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 point.
 - Total score = 58 point.

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

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

This for pre test and post test questionnaire.

Validity and reliability:

- The study tool were tested for content and face validity by jury test of five experts in the field of nursing community to evaluate the individual items as well as the entire instrument as being relevant and appropriate to test what they wanted to measure. The face validity of the questionnaire was calculated based on experts' opinion.
- 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 will be obtained from faculty of nursing Helwan University the Scientific Research Ethics Committee. Participation in the study is voluntary and subjects will be given complete full information about the study and their role before signing the informed consent. The ethical considerations will include 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 will be respected.

Preparatory phase:

It includes reviewing of related literature and theoretical knowledge of various aspect 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 tools. The needed modification will be incorporated and those subjects will be included from the actual study sample.

Field work:

After attaining the approval to conduct the study, sample will be collected during the period of working of Farms, fields of agricultural

workers, working for their health and safety. Burqash Village – Imbaba – Giza Governorate. After establishing a trustful relation, every subject will be interviewed individually by the researchers to explain the study purpose then study tool will be completed by farmers. Teaching method will be used: group discussion, brainstorming, demonstration and re-demonstration, also media as picture and handout. Booklet will be prepared by researchers.

Agriculture health program for farmers regarding health and safety at work was conducted in four phases:

Preparatory Phase: tool of data collection based on the review of the past and current related literature reviewing various aspects of farmer's health and safety done using available books, periodical articles, and magazines. The aim is acquainted with the research problem to develop the study tool.

Assessment phase: using a pre-testing questionnaire to assess the present farmer's knowledge, reported practices and attitudes about health and safety at work. The researchers first introduced the purpose of the study briefly to the farmers. Met the farmers as sub groups, farmers were assured that the obtained information would be treated confidentially and used only for the purpose of the study.

Planning phase: Based on the assessment phase results, the researcher tailored the session content of agriculture health program to farmer's needs. Agriculture health program session was developed after reviewing related literature. Detected needs and requirements were clarified and discussed in the form of the booklet. The contents of the booklets were selected based on identified needs. The booklets consisted of introduction and knowledge about agriculture health program, meaning health and safety at work, assessment of agriculture hazards, types of agriculture hazards, Efficiency, education, and training. Work efficiently – personal protective equipment. Prepare for potential

events and emergency- workplace wellness programs. Teaching methods such as lectures, role play, open discussions, brainstorming was frequently used during sessions. Media such as lab top (power point), pictures, videos, and a booklet prepared by researcher.

Implementation phase: after developing agriculture health program content.

- Data collected within 9 months in 2022 , two days per week (Thursday and Friday) from 8 am – 12pm and interviews with farmers about health and safety .
- An agriculture health program was improved farmers knowledge, reported practice and attitudes about health and safety at work and aims are explained to all participants. Based on the result of the pre-test questionnaire the researchers utilized 5 session needs from 30-45 minutes and meeting the farmers two day per week.
- Post-test done after applied sessions. The study sample equals 319 farmers divided into 11 groups which consist of 10 groups containing about 30 farmers and 1 group about 19 farmers. An agriculture health program includes 5 sessions.
- * An agriculture health program includes 5 sessions. (four sessions theoretical + 1 session practical)
- Four theoretical sessions by the end this sessions each farmer new knowledge and good attitude about health and safety at work such as knowledge about agriculture health program, meaning health and safety at work, assessment of agriculture hazards, types of agriculture hazards, Efficiency, education, and training. Work efficiently – personal protective equipment. Prepare for potential events and emergency- workplace wellness programs.
- One practical session by the end this session each farmer new good reported practices as hand washing and uses personal protective equipment's.

- By the end of each session, the farmers were intended about the content of the next sessions.

Program Booklet:

A booklet included all content of the program was designed and give to farmers as an educational reference during and after the program implementation. Contents of the booklet include (introduction and knowledge about agriculture health program, meaning health and safety at work, assessment of agriculture hazards, types of agriculture hazards, Efficiency, education, and training. Work efficiently – personal protective equipment. Prepare for potential events and emergency-workplace wellness programs.)

Evaluation phase: this phase aimed at farmer's knowledge, reported practices and attitude was improved after applying for an agriculture health program for farmers regarding health and safety at work. Done after one month after implementing the agriculture health program.

An approved to carry out this study was obtained from Dean of Faculty of Nursing, Helwan University and send to agriculture administration in Giza governorate.

Statistical items.

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

Significance of results:

- When $P > 0.05$, it is 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)

RESULT

Table (1) Shows that 70.5% were male farmers, 48.6 % of participant farmers age between 20 > -40 years, with mean age, 32.9 % no Read and write, 74% were married, Also 31.3 % from married farmers have more than 3 children.

Table (2) shows past and current medical history and medical data for participate farmers and emphasized that 46.4% from farmers Suffering from chronic diseases , 39.2% of them suffers from Hypertension , 68.3 % have Actual Injures and hazards result from agriculture work, 54.5% exposed to wound, also 19.7 % had disability .

Table (3) shows 62.4% had poor level of total knowledge for farmers in pre applying program with mean 6.38±6.00 while 77.2 % had good level of total knowledge for farmers in post applying program with mean 17.84±3.52. Also shows that statistically significant difference between pre and post program.

Table (4) shows that statistically significant difference between pre and post program, shows 99.1% had unsatisfactory Levels of total reported practices in pre applying program with mean 7.01±1.90 while 100 % satisfactory Levels of total reported practices among farmers in post applying program with mean 17.03±0.662.

Figure (1) illustrates that 86.8 % had negative attitude among farmers in pre applying program while 79.9 % positive attitude among farmers in post applying program.

Table (5) Shows significant relation between total score knowledge and total score reported practices pre applying program among the studied sample while insignificant relation between total score of knowledge and total score of attitude and insignificant relation between total score reported practices and attitude pre applying program among the studied sample.

Table (1): Frequency Distribution of demographic Data among farmers regarding heath ad safety at work (n=319).

Demographic data	The studied sample (N=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:		
No 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 (2): Frequency Distribution of the farmers regarding Medical data (n=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 result 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 in part of the body		
yes	63	19.7
no	256	80.3

Others (Asthma, Rheumatoid, joint, and parkino)

Table (3): Number and Percentage Distribution of Total Knowledge among Farmers regarding Health and Safety at work Pre and Post Applying Program (319).

Total knowledge scores about	nurses pre and post applying program				χ^2	P
	Pre-applying		Post- applying			
	No.	%	No.	%		
Levels of total knowledge:					3.36	0.04
Poor	199	62.4	3	0.94		
Average	103	32.3	70	21.94		
Good	17	5.3	246	77.2		
Mean scores of total knowledge pre applying:	Mean change of scores of total knowledge post applying:				Paired T test P	
Range	Mean \pm SD		Range	Mean \pm SD		29.54 0.000
22	6.38 \pm 6.00		18	17.84 \pm 3.52		

Table (4): Number and Percentage Distribution of Total reported practices among Farmers regarding Health and Safety at work Pre and Post Applying Program (319).

Total reported practices scores	farmers pre and post applying program				χ^2	P
	Pre-applying		Post- applying			
	No.	%	No.	%		
Levels of total practices:					243.9	0.000
unsatisfactory	316	99.1	---	---		
satisfactory	3	0.9	319	100		
Mean scores of total practices pre applying:	Mean change of scores of total practices post applying:				Paired T test P	
Range	Mean \pm SD		Range	Mean \pm SD		92.10

16	7.01±1.90	5	17.03±0.662	
----	-----------	---	-------------	--

Figure (1): Percentage distribution of Total Attitude among Farmers regarding Health and Safety at Work Pre and Post Applying Program (319).

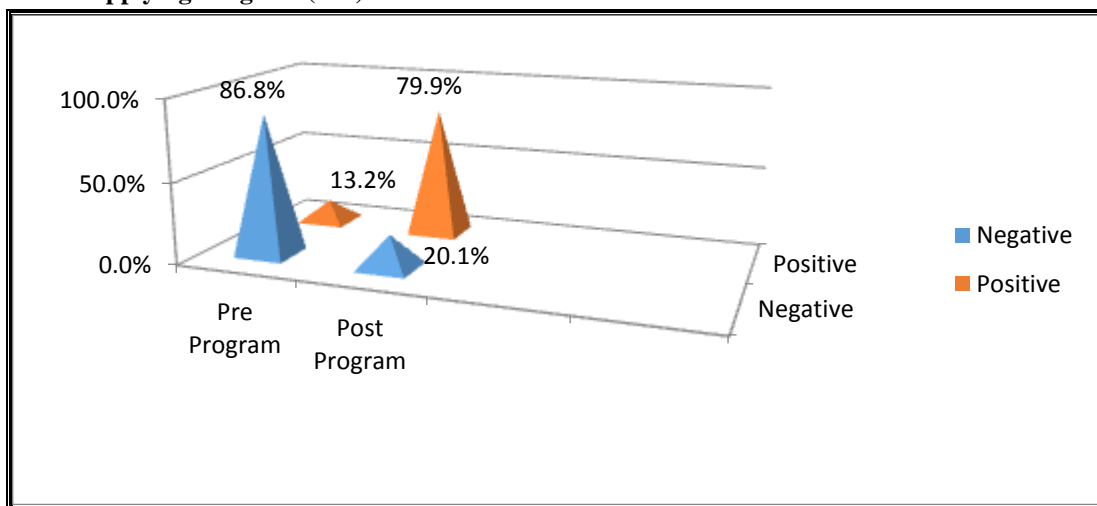


Table (5): Correlation between Knowledge, reported practices, and attitude pre applying Program (N=319).

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
Practices	0.101	0.072	----	-----	0.046	0.417
Attitude	0.001	0.981	0.046	0.417	-----	-----

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

The present study finding revealed that nearly three quarter of studied subjects were married and more than one quarter was single. This result was in accordance with **Saed et al., (2020)** who conducted published study at Palestine entitled as " Knowledge and reported 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 researcher point view, this might be due to the customs preserve marriage and build Egyptian family high family bonding than urban area.

Concerning the education level the present study revealed that one third of studied subjects had no read and write and more than one

twenties had University education this finding was similar with **Hagel et al., (2022)** who conducted a published study at Vietnam entitled as" Prevention of agricultural injuries: an evaluation of an education-based intervention. Injury Prevention in Southeast Asia in Vietnam " conducted cross-sectional study directed among the agricultural worker in Primary Health Care Centers in Vietnam and founded that 33 % and 13 % participants had illiterate or read and write and university education, respectively. From researcher point view, considered rural area that concerning agriculture more than education.

Concerning the children number of the present study revealed less than half of studied subjects hadn't children and this finding was in agreement with **Bassi et al., (2021)** who conducted a published study at Kaduna State in Nigeria entitled as " Agrochemical Use and Associated Risk Factors in Fadan Daji District of Kaura LGA, Kaduna State, Nigeria. " Stated that 43 % of studied subjects were haven't children. From researcher's point of view, this might be due to large number work in the craft of agriculture under the age of marriage.

Part II: Medical history of the farmers:

Regard the medical history for farmer who suffering from chronic diseases, the results of the present study showed that more than half of studied subjects not suffering from chronic diseases and this finding was the same direction with **Heitor (2022)** who conducted a published study in Brazil under title " Trade, productivity, and the spatial organization of agriculture: Evidence from Brazil " 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 symptoms.

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 published study in Ethiopia under title " Reducing the maize yield gap in Ethiopia: Decomposition and policy simulation " 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 eat too much salt and don't eat enough fruit and vegetables and don't give enough exercise.

Concerning the actual injures and hazards result from agriculture work, the present study results delineated that more than two third of studied subjects had actual injures and hazards result from agriculture work to farmer and this finding agreement with **El Aparna & Gopal, (2020)** who conducted published study at Indian under title " Addressing crisis in Indian agriculture through agricultural information delivery " reported that, 69 % of studied subjects had actual injures and hazards result 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 result from agriculture work as wound and this finding was agreement with **Alene & Manyong, (2021)** who conducted published study at northern Nigeria under title " Farmer- to- farmer technology diffusion and yield variation among adopters: The case of improved cowpea in northern Nigeria " reported that, 69 % of studied subjects had actual injures and hazards result from agriculture work as wound. 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 quarter of studied had subjects not had disability and this finding agreement with **Deng et al., (2021)** who conducted published study at China under title of "Impact of public research and development and extension on agricultural productivity in China " reported that 79 % of studied subjects not had disability. From researcher's point of view, this might be due to

there are precautions that can be taken to minimize or eliminate these potential hazards (physical and mechanical hazards).

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

Regarding the effective of the program on total knowledge of studied subjects, the present study revealed that there was statistical significant difference (improvement) between pre and post program in all knowledge items and this finding was in the same line with **Maanda et al., (2023)** whose conducted published study at Health Clinics in the Vhembe District, South Africa under title of " The Determinants of Smallholder Farmers on the Functionality of Plant Health Clinics in the Vhembe District, South Africa " revealed that there significant improvement in the knowledge of studied subjects after application of the health education intervention.

Also, concerning the effective of the program on total knowledge studied subjects, the present study revealed that there was statistical significant difference between pre and post program implementation in all knowledge items this finding was supported with **Roberto et al., (2023)** whose conducted published study in a Mediterranean Environment under title of " Durum Wheat Production as Affected by Soil Tillage and Fertilization Management in a Mediterranean Environment—a cross-sectional study" reported there statistical significant difference between pre and post implementation program in the knowledge of studied subjects and recommended with continuous prevent agricultural hazards to farmer and health care providers through coordinated effective methods to them when exposure to hazards.

Part IV: Farmers reported practice questionnaires regarding agricultural hazards:

The present study illuminated ninety-seven and a half percent of studied subjects had correct answered post applied of agricultural hazards

program for farmer always stores chemicals in closed and safe places and this finding was similar with **Andreisa et al., (2023)** who conducted published study at Tanzania under title " Growth Inhibitory Activities and Feeding Deterrence of Solanaceae-Based Derivatives on Fall Armyworm " reported 97.6 % of studied subjects that farmer always stores chemicals in closed and safe places. From a researcher's point view, this might be due to exposure to chemicals can lead to a variety of immediate or long-term health effects including poisoning, respiratory illness and burn.

As regard farmers practice about agriculture hazards post agriculture health program one hundred percent of studied subjects had corrected answer about household utensils are used in the preparation of insecticides and this finding was agreement with **Nembangia et al., (2022)** who conducted published study at Cameroon under title of " Insecticide Use and Application in Cameroon " reported total number of studied subjects had correct answer. From a researcher's point view, this might be due to control pests such as ants, cockroaches, houseflies, mosquitoes, fleas, ticks, bedbugs, termites, rodents, mites and microbes.

Concerning the farmer attitude about agriculture hazards after applying the safety guide line program the present study revealed that about total number of studied subjects about stop smoking on the farm and this finding was agreement with **Daniela (2022)** who conducted published study at San Antonio USA under title" Innovative technology to obtain vegetal bio stimulants by biodegradation of agricultural postharvest waste and medicinal plant extracts ".

Concerning the effective of the program on total attitude studied subjects, the present study revealed that there was statistically significant difference between pre and post program implementation in all attitude items this finding was supported with **Shivanand et al., (2021)** whose conducted published study in London, UK under title of " Effect of different organic nutrient management practices on growth and

yield of pigeon pea (*Cajanus cajan* L. Millsp.) " reported there statistically significant difference between pre and post implementation program in the attitude of studied subjects and recommended with continuous prevent agricultural hazards to farmer and health care providers through coordinated effective methods to them when exposure to hazards.

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

Also, concerning the farmer attitude about agriculture hazards after applying the safety guide line program the present study revealed that about total number of studied subjects about every farmer should know first aid and this finding was agreement with **Vasilis (2022)** who conducted published study at Mesolonghi, Greece under title" Integrated Weed Control Management for Sustainable Agriculture Commentary " reported that, 100 % of studied subjects stop smoking on the farm.

Also, concerning the farmer attitude about agriculture hazards after applying the safety guide line program the present study revealed that about total number of studied subjects about every farmer should know first aid and this finding was agreement with **Ebenezer & Jianguo (2020)** who conducted published study at Zurich, Switzerland under title" Climate change and agricultural production nexus in Sub-Sahara African emerging countries: sustainable development goals exacerbates " reported that, 100 % of studied subjects stop smoking on the farm.

Concerning the effective of the program on total attitude studied subjects, the present study revealed that there was statistically significant difference between pre and post program implementation in all attitude items this finding was supported with **Shivanand et al., (2021)** whose conducted published study in London, UK under title of " Effect of different organic nutrient management practices on growth and yield of pigeon pea (*Cajanus cajan* L. Millsp.) " reported there statistically significant difference between pre and post

implementation program in the attitude of studied subjects and recommended with continuous prevent agricultural hazards to farmer and health care providers through coordinated effective methods to them when exposure to hazards.

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

Concerning correlation between total percentage of knowledge, reported practices and attitude post program implementation, the present study show significant correlation between total score knowledge, reported practice and attitude and this finding was supported with **Samuel et al., (2022)**, who published study at Mbare Musika and Mutoko, Zimbabwe under title of " Heavy Metals Levels and Adult Health Risk Assessment in Horticultural Systems in Mbare Musika and Mutoko, Zimbabwe " reported that there was significant correlation observed between health of farmer to prevent agricultural hazards and knowledge and reported practices regarding agricultural health. From a researcher's point view, this might be denoting to importance application prevention guide line program about agricultural hazards prevention on farmer.

Also, this finding reinforced by **Vasilis (2022)**, stated in systematic review that good knowledge and reported practice regarding farmer health reduced the risk of agricultural hazards and ultimately pathogen organisms such as bacteria and fungi that attack certain species are also used in biological control. They are numerous and cause harm too many sections of the body (leaves, stems, seeds, roots), and reported there statistically significant positive correlation between knowledge a and reported practice about agricultural hazards, which is the basic preventive measure of farmer health hazards.

CONCLUSION

Based on the result of the present study and research hypothesis the following conclusion include. The result of the study supported the study's hypothesis and showed that,

There was a marked improvement in farmer's knowledge and attitudes about health and safety at work post education than pre-program, there was statistically significant improvement in farmers total reported practices about health and safety at work post applying health educational program than preprogram.

RECOMMENDATIONS

In the light of the findings of this study's the following points are recommended:-

- Continuous agriculture health education program for farmers about health and safety at work in other places to generalized the results.
- Make posters or banners and instructions photos about health practices and safety at work and agriculture hazards preventions and put in public and collection areas as agricultural societies and ministry of agriculture.
- Periodic prevention guide line program and reorientation sessions about farmer's health and safety at work.

REFERENCE

- A.D. Alene, V. Manyong (2021).** Farmer- to-farmer technology diffusion and yield variation among adopters: The case of improved cowpea in northern Nigeria. *Agricultural Economics*, 35 (2) (2021), pp. 203-211 <https://doi.org/10.1111/j.1574-0862.2006.00153.x>
- Ajila Venkat,Dong-Won Bae andSowbiya Muneer (2023).** Circadian Clock Contributes to Modulate Salinity Stress-Responsive Antioxidative Mechanisms and Chloroplast Proteome in Spinacia oleracea. *Agriculture* 2023, 13(2), 429; <https://doi.org/10.3390/agriculture13020429> (registering DOI) - 11 Feb 2023

- Andreisa F. Lima, Leandro P. Ribeiro, Simone P. Lira, Geraldo A. Carvalho and José D. Vendramim (2023).** Growth Inhibitory Activities and Feeding Deterrence of Solanaceae-Based Derivatives on Fall Armyworm Agriculture 2023, 13(2), 420; <https://doi.org/10.3390/agriculture13020420> (registering DOI) - 10 Feb 2023 Viewed by 107
- Aparna Krishna, Gopal Naik (2020).** Addressing crisis in Indian agriculture through agricultural information delivery. Received 21 January 2019, Revised 6 January 2020, Accepted 23 September 2020, Available online 28 September 2020, Version of Record 22 October 2020. <https://doi.org/10.1016/j.iimb.2020.09.004>
- Bassi AP, Ramyil MCS, Ogundeko TO (2021).** Farmer: Agrochemical Use and Associated Risk Factors in Fadan Daji District of Kaura LGA, Kaduna State, Nigeria. American Journal of Medical and Biological Research. Vol. 4, No. 3, 2021, pp 33-41. Available From: <http://pubs.sciepub.com/ajmbr/4/3/1>
- Bellwood, P. (2023):** First farmers: the origins of agricultural societies. John Wiley & Sons.
- Caudell, M. A., Dorado-Garcia, A., Eckford, S., Creese, C., Byarugaba, D. K., Afakye, K., ... & Swiswa, S. (2020):** Towards a bottom-up understanding of antimicrobial use and resistance on the farm: A knowledge, attitudes, and practices survey across livestock systems in five African countries. *PloS one*, 15(1), e0220274.
- Daniela Trifan (2022).** Innovative technology to obtain vegetal biostimulants by biodegradation of agricultural postharvest waste and medicinal plant extracts Scientific Tracks Abstracts: Agrotechnology International Conference on Agri Biotech & Environmental Engineering September 11-12, 2022 San Antonio, USA
- Dawson B D and Trapp R G: Reading the medical literature (2020) :** Basic & Clinical Biostatistics. Lange Medical Book/ McGraw
- Hill. Medical Publication Division, New York. 3rd ed., Ch. 7-9, PP 161-218 and Ch. 13, PP 305-314, 2018.
- Deng, H., Jin, Y., Pray, Xia, E., Meng, H (2021).** Impact of public research and development and extension on agricultural productivity in China. *Med.* 2020 Jul; 15(4): 252-261. Available From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2886885/>
- Ebenezer Ababio Tetteh and Jianguo Du (2020).** Climate change and agricultural production nexus in Sub-Sahara African emerging countries: sustainable development goals exacerbators. Scientific Tracks Abstracts: Agrotechnology 13th International Conference on Agriculture & Horticulture September 10-12, 2020 | Zurich, Switzerland
- Green, K. L. (2019):** Farm health and safety: Rural couples' beliefs and practices. *Journal of agricultural safety and health*, 5(1), 83.
- Hagel LM, Pickett W, Pahwa P, (2022).** Prevention of agricultural injuries: an evaluation of an education-based intervention. *Injury Prevention* 2022; 14:290-295. Available From: <http://injuryprevention.bmj.com/content/14/5/290.citation-tools>
- Hawkes C & Ruel M (2022).** The links between agriculture and health: an intersectoral opportunity to improve the health and livelihoods of the poor. *Bull. World Health Organ.* 2022; 83:984-8.
- Heitor S. Pellegrina (2022).** Trade, productivity, and the spatial organization of agriculture: Evidence from Brazil. Received 21 July 2020, Revised 6 September 2021, Accepted 29 December 2021, Available online 31 January 2022, Version of Record 5 February 2022. <https://doi.org/10.1016/j.jdevec.2021.102816>
- Hesham, A. E. L., Kaur, T., Devi, R., Kour, D., Prasad, S., Yadav, N., ... & Yadav, A. N. (2021):** Current trends in microbial

- biotechnology for agricultural sustainability: conclusion and future challenges. In *Current trends in microbial biotechnology for sustainable agriculture* (pp. 555-572). Springer, Singapore.
- John Wiley & Sons, Inc.; Hoboken, NJ, USA (2019):** Thelin A.D.K. Agricultural Medicine: Occupational and Environmental Health for the Health Professions.
- Maanda Rambauli, Michael Akwasi Antwi, Phumudzo Patrick Tshikhudo and Fhatuwani Nixwell Mudau (2023).** The Determinants of Smallholder Farmers on the Functionality of Plant Health Clinics in the Vhembe District, South Africa *Agriculture* 2023, 13(2), 428; <https://doi.org/10.3390/agriculture13020428> (registering DOI) - 11 Feb 2023
- Mary E. Cramer, Mary J. Wendl, Harlan Sayles, Ellen Duysen, Chandran Achutan (2021).** Knowledge, Attitudes, and Practices for Respiratory and Hearing Health among Midwestern Farmers. *Journal Of Public Health Nursing*. 14 November 2021. Available From: <http://onlinelibrary.wiley.com/doi/10.1111/phn.12306/abstract>.
- McIvor, A. (2020):** Guardians of Workers' bodies?: Trade Unions and the history of Occupational Health and Safety. *Labour History*, (119), 1-30.
- Merisalu E., Leppala J., Jakob M., Rautiainen R(2019):** Variation in Eurostat and national statistics of accidents in agriculture. *Agron. Res.* 2019; 17:1969–1983.
- Michiel van Dijk a, Tomas Morley, Marloes van Loon, Pytrik Reidsma, Kindie Tesfaye, Martin K. van Ittersum (2020).** Reducing the maize yield gap in Ethiopia: Decomposition and policy simulation. Received 29 November 2019, revised 20 March 2020, Accepted 23 March 2020, Available online 15 May 2020, Version of Record 15 May 2020. <https://doi.org/10.1016/j.agry.2020.102828>
- Mougeot, L. J. (2019):** Urban agriculture: Definition, presence, potentials and risks, and policy challenges. *Cities feeding people series*; rept. 31.
- Murphy D. (2020):** Safety and Health for Production Agriculture. Volume 1. American Society of Agricultural Engineers; St. Joseph, MI, USA: 2020. p. 253.
- Nambangia Justin Okolle, Ekwa Yawa Monono, Amungwa Ivan Tabikam, Mambo Stephania Kingeand Magwell Pierre Fils Rodrique (2022).** *Insecticide Use and Application in Cameroon.* March 2022 DOI:10.5772/intechopen.102634
- Noman, M., Mujahid, N., & Fatima, A. (2021):** The assessment of occupational injuries of workers in Pakistan. *Safety and health at work*, 12(4), 452-461.
- Phillips, P. (2023):** Early farmers of west Mediterranean Europe. Taylor & Francis.
- Pollock, Kirrily S. Fragar, Lyn. J.Griffith, Garry R (2022).** Occupational Health and Safety on Australian Farms: 1. Farmers' Perceptions of Major Hazards. *AFBM Journal: Agricultural Business Management & Farming Systems*. 2022, Issue 11, p41-46. 6p. Available From: <https://web.a.ebscohost.com/abstract>.
- Postma J.(2019):** Environmental justice :Implications for occupational health nurses *AAOHN journal*.54(11):489-496.
- Roberto Mancinelli, Mohamed Allam, Verdiana Petroselli, Mariam Atait, Merima Jasarevic, Alessia Catalani, Sara Marinari, Emanuele Radicetti, Aftab Jamal, Zainul Abideen and Gabriele Chilosi (2023).** Durum Wheat Production as Affected by Soil Tillage and Fertilization Management in a Mediterranean Environment. *Agriculture* 2023, 13(2), 433;

<https://doi.org/10.3390/agriculture13020433> (registering DOI) - 12 Feb 2023

Saed H. Zyoud, Ansam F. Sawalha, Waleed M. Sweileh (2020). Knowledge and practices of pesticide use among farm workers in the West Bank, Palestine: safety implications. *Environ Health Prev Med.* 2020 Jul; 15(4): 252-261. Available From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2886885/>.

Samuel Kodani, Elias Chipunza and Stanislaus Zvarimwa (2022). Heavy Metals Levels and Adult Health Risk Assessment in Horticultural Systems in Mbare Musika and Mutoko, Zimbabwe. Research Article: *Agrotechnology*, 2022: 280 Correspondence: Samuel Kodani, Department of Chemical Engineering, National University of Science and Technology, Bulawayo, Zimbabwe, Email: Received: 30-Aug-2022, Manuscript No. AGT-22-17903; Editor assigned: 05-Sep-2022, Pre QC No. AGT-22-17903 (PQ); Reviewed: 19-Sep-2022, QC No. AGT-22-17903; Revised: 26-Sep-2022, Manuscript No. AGT-22-17903 (R); Published: 03-Oct-2022, DOI: 10.35248/2168-9881.22.11.280

Shivanand Pradeep, Ullasa M Y and Kumar Naik a H (2021). Effect of different organic nutrient management practices on growth and yield of pigeon pea (*Cajanus*

cajan L. Millsp.) Scientific Tracks Abstracts: *Agrotechnology 0th International Conference on AGRICULTURE & HORTICULTURE* October 02-04, 2021 London, UK

Shivanand Pradeep, Ullasa M Y and Kumar Naik a H (2021). Effect of different organic nutrient management practices on growth and yield of pigeon pea (*Cajanus cajan* L. Millsp.) Scientific Tracks Abstracts: *Agrotechnology 0th International Conference on AGRICULTURE & HORTICULTURE* October 02-04, 2021 London, UK

Swain, S., Jakhar, P., & Rout, P. K. (2021): Economic Empowerment of Farm Women through Improved Post Harvest Technologies and Value Addition of Horticultural Crops. *Promoting Women Agripreneurship through Crop-Livestock-Fisheries Technologies [E-book]*, 125.

Vasilis Zavra (2022). Integrated Weed Control Management for Sustainable Agriculture Commentary: *Agrotechnology*, 2022: 262 Received: 03-May-2022, Manuscript No. AGT-22-16965; Editor assigned: 06-May-2022, Pre QC-No. AGT-22-16965 (PQ); Reviewed: 20-May-2022, QC No. AGT-22-16965; Revised: 27-May-2022, Manuscript No. AGT-22-16965 (R); Published: 03-Jun-2022, DOI: 10.35248/2168-9881.22.11.262