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Occupational Safety Program regarding Preventive Measures of Occupational Health Hazards among Agriculture Child Labor

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Abstract

Background: Occupational health hazards in agricultural work are subjects to the health and safety risks inherent to a rural environment and deriving from the specific work processes. **Aim:** Evaluate the effect of occupational safety program regarding preventive measures of occupational health hazards among agriculture child labor. **Design:** A quasi-experimental design was used. **Settings: -** Cluster sample was conducted in Kafr Shokr sector in Qalyubia Gover, it includes 23 Village, 25% was selected from 23 Village, 5 Village was selected, 5 Preparatory School was selected then followed by visits. **Sample:** Simple random sample. **Tools:** Two tools were used; **Tool (I)**: A structured interviewing questionnaire: Which included; Socio-demographic characteristics of the studied children and children`s parents' data, occupational data of studied children and work environmental condition, history of occupational health problems and knowledge of children regarding occupational health hazards and first aid instructions. **Tool (II):** Observational checklist. That divided to; use of protective equipment, child practices regarding preventive measures of occupational health hazards. **Results:** 7.6% of children had good total knowledge level regarding occupational health hazards of agriculture labor that improved to be 70.5% of them post occupational safety program implementation,89.4% of them had satisfactory total practices level regarding using protective equipment post occupational safety program implementation . **Conclusion:** Occupational safety program regarding preventive measure had succeeded in improving the children knowledge and practices regarding occupational health hazards at agriculture labor. **Recommendations:** Develop continuous safety program about protective measures for all children at work place to prevent occupational health hazards.

Keywords: Occupational safety program, preventive measures, occupational health hazards and child labor.

Introduction

Occupational health deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards (**Garrigou, 2020)**. The main focus in occupational health is on three different objectives, the maintenance and promotion of workers' health and working capacity; the improvement of working environment (**Parker et al., 2020)** and work to become conducive to safety and health and development of work organizations and working cultures in a direction which supports health and safety at work and promotes a positive social climate and productivity of the undertakings (**Autor, 2021)**.

International Labor Organization (ILO)had estimated that the worldwide incidence of work-related injuries among children as 4.3 percent, or 10 million injured children, with 22,000 deaths every year. According to ILO, farming hires approximately 1.3 billion people globally, losing at least 170,000 farm employees each year with an estimated worldwide fatality rate of 13.07 per 100,000 full-time equivalents. International statistics indicate that agriculture labors are twice more likely to die on the job as opposed to other labor fields **(Pate & Gorucu, 2020).**

Children who work in agriculture face a variety of health and safety dangers, making it a major cause of illness and mortality among them. Without any safety protective clothing; children are operating in hazardous situations, children work unusually long shifts without any breaks, and the lack of sleep makes them more prone to health hazards. The workplace in agriculture might have a range of risks includes risks from chemicals, physical, biological, and mechanical sources (**Hussain et al ., 2020)**.

Agricultural children are also exposed to several health hazards as a result of the professional activities, including ultraviolet radiation; exhaust toxicity; inhalation of organic dust from spores and minerals when handling feed; exposure to microorganisms such as viruses, bacteria and infectious parasites, and the toxic products; as well as pesticides, which are among the greatest potential hazards to the health of agricultural workers (**Datta et al., 2020)**.

Occupational health and safety program includes the identification, assessment, elimination and control of hazards in the workplace **(Garrigou, 2020).** Risk assessment is the process of evaluation of the risks arising from a hazard, taking into account the adequacy of any existing controls and deciding whether or not the risks is acceptable. It is impossible to eliminate all hazards, so the goal is to eliminate and control the hazards with critical and high potential risk to the lowest reasonable risk level so as to protect workers from harm (**Coman, 2020)**.

Preventive measures are very important in agriculture farming for children. There should be proper safety measures during the handling, receiving, washing, storage, and pre-processing, and many more (**Hill, 2021)**. Care should be taken to avoid microbial contamination in all stages. Ingredients should be subjected to an examination for food safety hazards. Children shall maintain a high degree of personal hygiene and should wear protective clothing, face mask, gloves, footwear, and head covering during working. **(Khaled et al., 2019).**

Community Health Nurse (CHN) has a major role in identifying occupational hazards, determining children health problems, early case finding, management and referral to the appropriate community health resources. As well, the occupational health nurse analyzes each job task to detect task situations that place employee at risk through assessment and surveillance of the workplace to identify potential hazards increasing with the work, reducing risk, and minimizing risk problems. Community health nurse informed children about work safety and to take out education safety programs for working children (**De-Assis et al., 2021**).

Aim of the study:

This study aimed to evaluate the effect of occupational safety program regarding preventive measures of occupational hazards among agriculture child labor through:

1. Assessing children knowledge related to agriculture health hazards.
2. Assessing children practices regarding agriculture health hazards preventive measures.
3. Assessing children health problems related to agriculture health hazards.
4. Designing and implementing occupational safety program for preventive occupational health hazards among agricultural child labor.
5. Evaluating the effect of occupational safety program regarding preventive measures of occupational hazards aming agricultural child labor.

Research hypothesis:

The occupational safety program will increase knowledge and improve practices regarding preventive measures toward occupational health hazards among agricultural child labor.

Subject and Methods

Research Design:- A quasi-experimental design was utilized to conduct this study.

Setting: Cluster sample was selected randomly which name Kafr Shokr Sector in Qalyubia government, it includes 23 Village, 25% was selected from 23 Village, 5 Village was selected, each Village had one Preparatory School, 5 Preparatory School was selected then followed by fields visits (Brekta Preparatory School – Tasfa Preparatory School – Asneat Preparatory School - Al shakr Preparatory School – Kafr Elshahawy Khater Preparatory School).

Sampling: - Simple random sample of male students work in agriculture, used in this study to select 25 % of total students working as agricultural child labor, it included students in the second grade of the preparatory school.

The total sample was chosen as fallowing:-

Preparatory School name	Total Male student	25% of total students were chosen
Brekta Preparatory School	96	24
Tasfa Prepar atory School	120	30
Asneat Preparatory School	104	26
Al shakr Preparatory School	112	28
Kafr Elshahawy Khater Preparatory School	96	24
Total	528	132

Tools of Data collection:-Two tools were used to collect the data: -

Tool I: - Structured Interviewing questionnaire: - It was designed in the simple Arabic language by the researcher after reviewing the relevant literature and revised by supervisors. It was consisted of four parts:

First Part: Was concerned with socio-demographic characteristics of the study sample and included two parts: -

A-Socio demographic characteristics of the studied child, it consisted of eight questions about age, child ranking, going to the school, type of the family, live with, numbers of the family members, numbers of house rooms and type of the house.

**B- Children`s parent data,** it consisted of six questions about father`s level of education, father`s job, mother`s level of education, mother`s job, monthly family income / month and source of the family income.

part II: Was concerned with:-

A- Occupational data for children who working in agriculture that consisted of eleven questions such as since when did you start working in agriculture, causes of working in agriculture, types of agricultural activities in which you operate, financial returns from working in agriculture, the aspects of spending the money, the distance between the field and the house, how to go to the field, working time in agriculture, duration of work in

agriculture, time for rest during daily work and days for weakly vacation during the work.

B-Work environmental condition, it consisted of four questions about using of protective equipment, types of protective equipment, uses of agricultural equipment to help during your work and when exposed to health problem during working in agricultural.

Part III: It included child`s history of occupational health problems which consisted of nine questions, (musculoskeletal system, respiratory system, circulatory system, eyes, ears, skin, digestive system, immune system and psychological system).

Part IV: Was concerned which knowledge of children about agricultural occupational health hazards which contained two sections:-

Knowledge of the studied children about agricultural occupational health hazards: - It included six questions, these questions covered areas about (meaning of child labor, meaning of agricultural labor, causes of agricultural child labor, types of occupational health hazards among agricultural child labor, health problem of agricultural labor and prevention of occupational health hazards of agricultural labor).

Knowledge of the studied children about first aid instructions of occupational health hazards during agricultural labor: - It included six questions, these questions covered areas (first aid when high temperature occurs, first aid when bleeding occurs, first aid when a bee sting occurs, first aid in the event of an animal bite, vaccines that are available in case of emergency while working in agriculture and source of knowledge).

Score system of knowledge as following:

Scoring system for children's knowledge was calculated as follows (2) score for correct and complete answer, (1) score for correct and incomplete answer, and (0) for don't know. For each section of knowledge, the score of the items was summed up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. The total score was converted into percentage and construed as follows:

- Good knowledge when the total score equal ≥ 75% (≥ 16 point).
- Average knowledge when the total score equal 50% - < 75% (11- < 16 point)
- Poor knowledge when the total score equal < 50% (< 11 point).

NB: - The scoring system didn`t include source of knowledge.

Tool II: - Observational checklist {Adapted from (Ahmed et al., 2021)}. of child`s practices regarding occupational health hazards which included two parts: - (use of preventive equipment and preventive measures of occupational health hazards.

Part I: - Use of protective equipment which included six items as (masks, gloves, gowns, special shoes for working in agriculture, special hat for work in agriculture and available place to change the personnel clothes).

Score system of using of protective equipment: -

The scoring system was calculated as follows (2) score for available and used (1) score for available and unused and (0) for not unavailable. The total score of the items was summed- up and the total divided by the number of the items, giving a mean score. The total score was converted into percentage and construed satisfactory if the score of the total practices ≥ 60% (≥ 7 point), while construed unsatisfactory if the score of the practices < 60% (< 7 point).

Part II: - Child practices regarding preventive measures of occupational health hazards that included four items eg: (practices related to plowing agricultural land (nine items), practices while spraying pesticides and chemicals during agriculture (fourteen items), practices while lifting and carrying crops (four items) and practices while using sharp agricultural machinery (ten items)).

Scoring system of practices regarding preventive measures of occupational health hazards: -The scoring system was calculated as follows (1) score for done and (0) for not done. The total score of the items was summed- up and the total divided by the number of the items (37 points), giving a mean score. The total score was converted into percentage and construed satisfactory if the score of the total practices ≥ 60% (≥ 22 point), while construed unsatisfactory if the score of the practices < 60% (< 22 point).

Ethical considerations:

Ethhical approval from faculty of nursing committee was obtained ; formal consent was being obtained from each studied children working at agriculture before conducting the interview and given them a brief orientation to the purpose of the study. They were also reassured that all information gathered would be in a confidential manner and used only for the purpose of the study. No names were required on the forms to ensure anonymity and confidentiality. They were also informed about their right to withdraw at any time from the study without giving any reasons.

Pilot study:

The pilot study was conducted on 10 % (13) children who taken in 3 weeks; The pilot study was aimed to test the content, clarity, applicability and simplicity of the tool using the interviewing questionnaire and the observational checklist as a pre-test sheet; time needed to fill each sheet consumed about 30-45 minutes. No modifications were done, so the pilot study sample was included in the total sample.

Content validity of the tools:

Content validity of the tools was done by five of Faculty's Staff Nursing experts from the Community Health Nursing Specialties who reviewed the tools for clarity, relevance, comprehensiveness and applicability and give their opinion.

Reliability of the tools:

Reliability of the study tools were tested for its internal consistency by Cronbach's Alpha. Reliability of the study tools was 0.82 for knowledge sheet, 0.89 for the practices.

Occupational Safety Program construction: -

General objectives of the program: Evaluate the effect of occupational Safety program regarding preventive measures of occupational health hazards among agricultural child labor.

The contents of occupational safety program:

They included the most important information related to children knowledge: -

- Meaning of child labor and agriculture labor.
- Meaning of occupational health hazard.
- Causes of agricultural child labor.
- Types of occupational health hazards among agricultural child labor.
- Health problem of agricultural labor and prevention of occupational health hazard of agricultural labor.
- First aid instruction when (high temperature occurs, bleeding occurs, a bee sting occurs and in the event of an animal bite).
- Vaccines that is available in case of emergency while working in agriculture.

***Children Practices:**

- Wearing personnel protective equipment.
- Preventive instructions during plowing agricultural land.
- Controlling and reducing the health hazards during spraying the pesticides.
- Preventive instructions during lifting the agricultural crops.
- Following instructions while using sharp agricultural machinery.

Occupational safety program Included four phases: -

Based on the results obtained from the interviewing questionnaires, as well literature review, the occupational safety program developed by researcher. It was implemented immediately after pre-test. The researcher implemented the occupational safety program through 4 phases: -

(I) **Preparatory and Assessment phases**: - In this phase of the occupational safety program, preparation of the study design and data collection tool was based on extensive review of the current and past available national and international references related literature about occupational health hazards among agricultural child labor by using a journal, textbooks and internet search to contrast the tool and the occupational safety program.

(II) **Planning phase: -** The researcher identified the important needs for target group, set priorities needs, goals and objectives were developed.

(III) **Implementation phase: -** In this phase the researcher implemented the occupational safety program for the children at the suitable time for them. Data were collected over 10 months from the start of October 2021 to end of the July 2022. The study was conducted by the researcher for the studied sample in the selected setting in kafr shokr sector, 5 Preparatory School (Brekta Preparatory School – Tasfa Preparatory School – Asneat Preparatory School - Al shakr Preparatory School – Kafr Elshahawy Khater Preparatory School) was selected then followed by fields visits .

The first step; The researcher visited the five selected schools during 10 weeks to collect socio-demographic data and pre-test knowledge questionnaire (two week for each preparatory school) (two days / week) (Sundays and Tuesdays) from 9:00 am to 12:00 mid – day.

The average time needed for the sheet was around 20-30 minutes, the average number interviewed at one class from any school from the randomly selected school were 12-14 child / week (6-7 child /day) depending on the responses of the children. The researcher chose these days because increasing the frequency in these days and these days appropriate for researcher. The average number interviewed at the school depending on the responses of the children and took their phone number to communicate them for field visit.

The second step; took (10 weeks) by (2 week for each village), the researcher went to field three days (Thursday-Friday-Saturday) in the weeks to visit children in the field and complete pre-test observational checklist after connected with the children through telephone. In these steps the research connected with (4-5 children /day). **The thirds step;** The researcher implemented the program by using teaching methods. The researcher provided the program through organizing with the studied students in the field to provide the occupational safety program, to ensure that they were exposed to the same learning experiences the researcher implemented the occupational safety program through five sessions of 3 hours and 15 minutes (2 theoretical sessions and 3 practical sessions lasted 30 – 45 minutes) including periods

of discussions and immediately did the post-test knowledge questionnaire, the researcher complete the post- program observational checklist about the observed practices regarding prevention of occupational safety program.

First session (30 minutes): - At the beginning of the first session, the researcher welcomed and introduced himself to the children, an orientation to the program and its process were presented, including definition of agriculturelabor & child labor, causes of agriculture child labor and types of occupational health hazards among agricultural child labor. It was agreed at the time of the session. Taking into considerations use simple language according to the educational level.

Second session (45 minutes): Covered problems of agricultural child labor, prevention of occupational health hazard of the agricultural child labor and mention first aid instructions during occupational health hazards among agricultural child labor. **Third session (45 minutes):** Demonstrate wearing personnel protective equipment and apply practices about preventive measures of occupational health hazards related to plowing. **Forth session (30 minutes):** Perform practices about preventive measures of occupational health hazards related to spraying the pesticides. **Fifth session (45 minutes):** Apply practices about preventive measures of occupational health hazards related to lifting the agricultural crops and using the agricultural machinery. Each session started by summery about the previous session and objects the topics. Direct reinforcement in the form, a copy of the program was given as a gift for each child to use it as future reference, all the participants were cooperative with the researcher.

Program booklet

A booklet including all content of the program was designed and given to agricultural child labor as an educational reference during program implementation and as self-learning reference after program implementation. Its aim was providing accurate knowledge & practices related instructions about occupational safety program and its preventive measures.

Methods of teaching: -

All children received the same content using the teaching methods, there were: illustration discussion, demonstration and re-demonstration, role play and presentation.

Teaching aids: - Suitable teaching aids were specially prepared for implementation, as**: -**
Handout & colored posters and videos.

Phase III: Program evaluation:

Evaluation of the program was done by using the post-test questionnaire and checklist which was the same formats of pre - test in order to compare the change in the children knowledge and practices after implementation of the occupational safety program. The researcher used methods for evaluation the program as feedback (verbal) and observational checklist.

Administrative approval:

Official letter was issued with permission for conduction this study from Dean of Faculty of Nursing, Benha University to the Schools`s director and parents of children. Formal consent was being obtained from each agricultural child labor before conducting the interview, the title, objectives, study technique and tools were illustrated for cooperation, as well as to allow the researcher to prepare a regular arrangement with children for the attendance of the research at children`s field.

Statistical Design:

All data collected were organized, tabulated and analysed using appropriate statistical test. The data were analysed by using the Statistical Package for Social Science (SPSS) version 21 which was applied to calculate frequencies and percentage, mean and standard deviation, as well as test statistical significance and associations by using Chi- square test and linear correlation coefficient (r) and detect the relation between the variables (P value).
Significance levels were considered as follows:

Highly statistically significant	$P < 0.001$
Statistically significant	$P < 0.05$
Not significant	$P > 0.05$

Results:-

Table (1) Shows that 38.6% of the studied children aged 15 years and more with mean was 16.71±4.52, 49.2% of them were the second in the children ranking. Also, 67.4% of studied children went to the school some days of the week and 68.9% of them were from integrated family. Furthermore, 72% of children were lived with both parents, 43.2% of them had five to seven family members, 62.1% of them had four rooms and more in their house and 67.4% of them had private house.

Table (2) Demonstrates that 52.3% of the studied children`s fathers couldn`t read and write and 48.5% of them were farmers. 55.3% of the studied children`s mothers had primary education and 82.6% of them were housewives. Furthermore, 47% of the studied children's parents didn't have enough monthly income and the sources of income for the family were father's work.

Table (3 a) Reveals that 63.6% of the studied children worked in agriculture since six years, 40.9% of them worked in agriculture in response to parents request and 28% of them collected grass as agriculture activity. As well as,

81.8% of studied children didn't get paid as financial return from working in agriculture and 50% of them gave all the money returned from agriculture to family and 72% of them had the field close to the house, 38.6% of them ridded donkey to go to field.

Table (3b) Indicates that 43.9% of the studied children worked daily in agriculture. In addition, 55.3% of them worked one hour to three hours daily in agriculture, 66.7% of them didn't have time for rest during daily work and 68.2% of them didn't have days for weakly vacation during work.

Table (4 a) Demonstrates that 62.1% of the studied children had bruises, 65.2% of them had history of nasal congestion and 35.6 % of them have history of heart palpitation problems. Also, 79.5% of the studied children had history of pain in the eye.

Table (4 b) Shows that 32.6% of the studied children had history of ears infection and 90.9% of them had skin color change as a result of exposure to continuous sunlight. In addition, 63.6% of them had history of constipation, 76.5% of them had fatigue and 60.6% of them exposure to invalid behaviors such as smoking.

Figure (1): Indicates that 7.6% of the studied children had good total knowledge level regarding occupational health hazards of agriculture labor pre program implementation that improved to be 70.5% of them post occupational safety program implementation.

Fig (2) Indicates that 15.9% of the studied children had satisfactory total practices level regarding using protective equipment that improved to be 89.4 % of them post occupational safety program implementation.

Fige (3) Indicates that 20.5% of the studied children had satisfactory total practices level regarding preventives measures of occupational health hazards in agriculture labor that increased to be 80.3% of them post occupational safety program implementation.

Table (1) Reveals that there was high statistically significant positive correlation between the studied children total practices scores and total knowledge scores during post-occupational safety program phase (P<0.001).
Table (1): Frequency distribution of studied children regarding to their socio-demographic characteristics (n=132).

Socio-demographic characteristics	No.	%
Age / years		
13 years	33	25.0
14 years	48	36.4
15 years and more	51	**38.6**
Mean ±SD	**16.71±4.52**	
Child ranking		
The first	20	15.2
The second	65	**49.2**
The third	15	11.4
The forth and more	32	24.2
Going to the school		
Daily	25	18.9
Some days of the week	89	**67.4**
Not going	18	13.6
Type of the family		
An integrated family	91	**68.9**
Parents are separated	13	9.8
One or both parents are dead	28	21.2
Live with		
Both parents	95	**72.0**
Mother	20	15.2
Father	17	12.9
Numbers of the family members		
Two to four members	24	18.2
Five to seven members	57	**43.2**
Seven members and more	51	38.6
Numbers of house rooms		
One to three rooms	50	37.9

Four rooms and more	82	**62.1**
Type of the house		
Private house	89	**67.4**
Rent house	32	24.2
Shared house	11	8.3

Table (2): Frequency distribution of the studied children regarding to their parents' data (n=132).

Children's parents data	No.	%
Father`s level of education		
Don`t read and write	69	**52.3**
Primary education	40	30.3
Secondary education	15	11.4
University education and more	8	6.1
Table (2) Continue		
Father`s occupation		
Farmer	64	**48.5**
Employee	20	15.2
Skilled worker	24	18.2
Commercial business	12	9.1
Retired	12	9.1
Mother`s level of education		
Don`t read and write	34	25.8
Primary education	73	**55.3**
Secondary education	18	13.6
University education and more	7	5.3
Mother`s occupation		
Work	23	17.4
House wife	109	**82.6**
Monthly family income / month		
Enough	59	44.7
Enough and saving	11	8.3
Not enough.	62	**47.0**
Source of the family income		
Father`s work	72	**55.0**
Mother`s work	16	12.1
Children only	20	15.2
Parents and children	14	10.6
Other aids	10	7.7

Table (3) Frequency distribution of the studied children regarding their occupational data (n=132).

Items	No.	%
Since when did you start working in agriculture		
Six years	84	**63.6**
Seven years to ten years	35	26.5
10 years and more	13	9.8
Causes of working in agriculture		
Participation in the income of the family	43	32.6
Work in free time	20	15.2
Buying my own needs	15	11.4
In response to parent's requests	54	**40.9**
***Types of agricultural activities in which you operate**		
Collecting grass	37	**28**
Plowing agricultural land	35	26.5
Sowing seeds	23	17.4
Sparing pesticides	19	14.4
Collecting worms from plants	18	13.6
Sowing plant seeds	17	12.9
Collecting crops	12	9

The use of agricultural machinery	17	12.9
Financial return from working in agriculture		
Get paid	24	18.2
I don`t get paid	108	**81.8**
The aspects of spending your money (n=24).		
Give it all to the family	12	**50.0**
Spend it all on myself	6	25.0
Buying food and clothes	4	16.7
Keep half of it to myself	2	8.3
Keep part of it to myself and give another to my family	0	0
The distance between the field and the house		
Close to the house	95	**72.0**
Far from the house	37	28.0

Table (3) Continue

How to go to the field		
On foot	40	30.3
Riding a donkey	51	**38.6**
By bicycle	21	15.9
By transportation	20	15.2

*All answers aren`t mutually exclusive.

Table (3) continu : Frequency distribution of the studied children regarding their occupational data (n=132).

Items	**No.**	%
***Working time in agriculture**		
After come back from the school	32	24.2
Before going the school	29	21.9
In summer only	13	9.8
During the harvest	28	21.2
Daily work	58	**43.9**
Duration of working in agriculture		
One hour to three hours daily	73	**55.3**
Four hours to six hours daily	35	26.5
More than six hours daily	24	18.2
Time for rest during daily work		
Half hour	13	9.8
One hour	19	14.4
More than one hour	12	9.1
None	88	**66.7**
Days for weakly vacation during your work		
One day	9	6.8
Two days	18	13.6
Three days	15	11.4
None	90	**68.2**

*All answers aren`t mutually exclusive.

Table (4): Frequency distribution of the studied children regarding to occupational health problem which exposed during agriculture labor (n=132).

Items	**No.**	%
***Musculoskeletal system**		
Bone fracture	63	47.7
Bruises	82	**62.1**
Wounds	64	48.5
Tiredness	81	61.4
Joint sprains	69	52.3
Backpain.	73	55.3

Table (4) Continue		
Permanent disabilities	27	20.5
Swelling in the foot	79	59.8
***Respiratory system**		
Shortness in breathing and suffocation.	77	58.3
Sensitivity in the chest	81	61.4
Persistent attacks of thoracic crisis	76	57.6
Nasal congestion	86	**65.2**
Sore throats	80	60.6
Sneeze	78	59.1
Enlarged lymph nodes in the neck	70	53.0
*** Circulatory system**		
Persistent headache.	36	27.3
Dizziness or lightheadedness of constant exposure to sunlight	27	20.5
High blood pressure	27	20.5
Heart palpitations	47	**35.6**
Constant lethargy and sleepiness during the day	45	34.1
*** Eyes**		
Redness in the eye	90	68.2
Persistent sensitivity in the eye	95	72.0
Infections in the eye	93	70.5
Pain in the eye	105	**79.5**
Blurry or duple vision	81	61.4
Not seeing to keep the eyes open	15	11.4

*All answers aren`t mutually exclusive.

Table (4) continu : Frequency distribution of the studied children regarding to occupational health problem exposed during agriculture labor (n=132).

Items	No.	%
*** Ears**		
Pain in the ear	40	30.3
Ear infections	43	**32.6**
Discharges from the ear.	28	21.2
Not responding to sound accurately	27	20.5
*** Skin**		
Skin burns	90	68.2
Eczema.	74	56.1
Skin infections	75	56.8
Skin color change	120	**90.9**
*** Digestive system**		
Abdominal pain	66	50.0
Infectious disease such as infection with infectious bacteria	62	47.0
Poisoning	45	34.1
Nausea, vomiting and diarrhea	67	50.8
Constipation	84	**63.6**
Heart burn (acidity)	58	43.9
*** Immune system**		
Fatigue	101	**76.5**
Yellowing of the skin.	46	34.8
The whites of the eyes.	78	59.1

Rash.	60	45.5
***Psychological risks:-**		
Constant anxiety and stress.	78	59.1
Sleep disturbances.	57	43.2
Constant exposure to fatigue and noise.	93	**70.5**
Exposure to invalid behaviors such as smoking.	80	**60.6**

*All answers aren`t mutually exclusive.

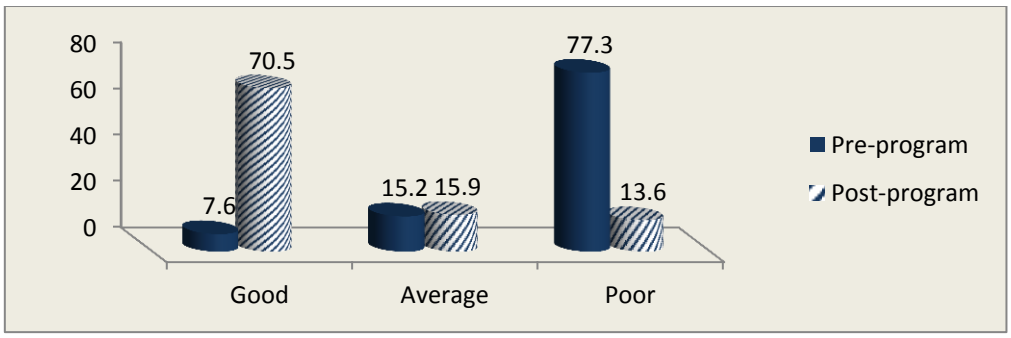

Fig (1): Percentage distribution of the studied children regarding their total knowledge level pre and post occupational safety program (n=132).

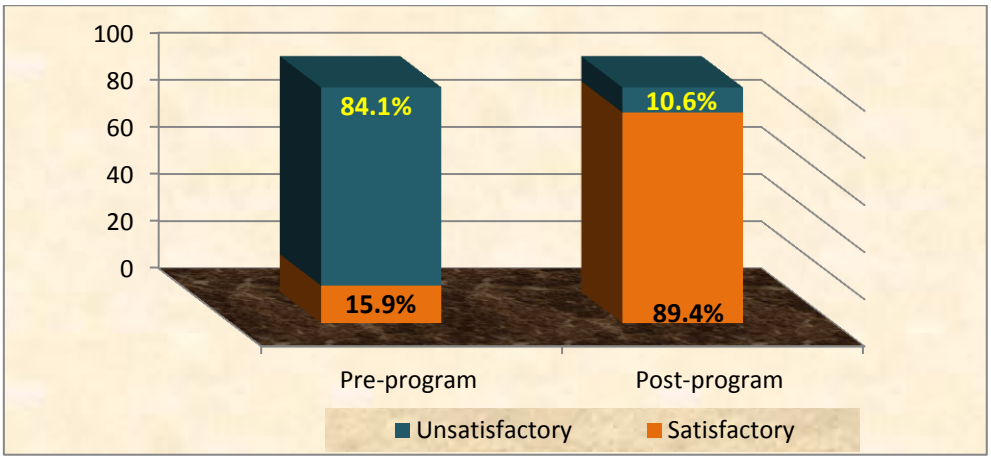

Fig (2) Percentage distribution of the studied children`s total practices level regarding using protective equipment pre and post occupational safety program (n=132).

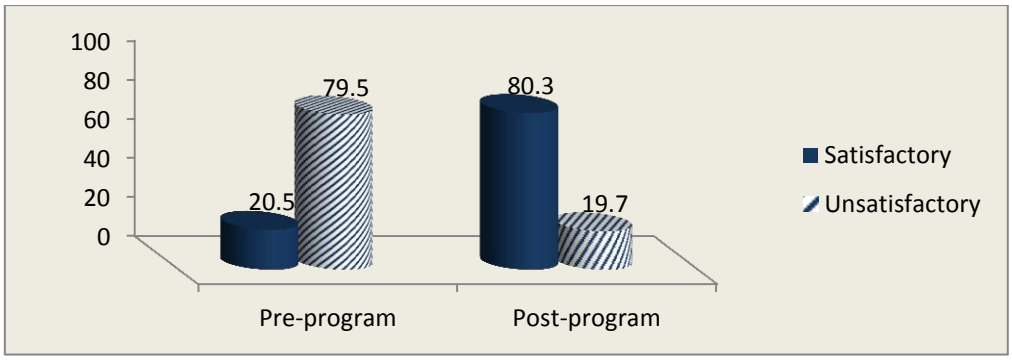

Fig (3) Percentage distribution of the studied children `s total practices level regarding preventive measures pre and post-occupational safety program (n=132).

Table (5) Correlation between total knowledge scores and total practices scores among studied children pre and post- occupational safety program (n=132)

Total practices Scores	**Total knowledge Scores**			
	Pre-program		**Post-program**	
	r	p-value	r	p-value
	.134	.126	.711	.000**

Discussion

Globally, 160 million children are found in child labour. More than 70 percent of them are found in agriculture, working long hours and often performing hazardous tasks **(Fao, 2022)**. Agriculture is in the top three most hazardous sectors of work and has the highest percentage of all hazardous child labour. Some of the most common risks for children working in agriculture include handling pesticides and fertilizers, carrying heavy loads, and unguarded machines. Therefore, supporting, training and assisting agriculture child labor to identify and prevent the risks and create a safer environment for everyone working on the farm **(Torres-Tovar et al., 2019).**

Regarding socio-demographic characteristics of studied children the current study showed that more than one third of the studied children aged 15 years and more with mean was **16.71±4.52** (table 1). This finding was in same line with **Das et al. (2019),** who conducted study about "Child work in agriculture in West Bengal, India: Assessment of musculoskeletal disorders and occupational health problems in India (no=120 for study group and 120 for control group)", and revealed that all the studied children aged 10 to 16 years. Also, this finding was agreement with **Fathy et al. (2020),** who conducted study on "Effect of educational program on prevention of pesticides hazards among children working in agriculture in Egypt (No = 97)", and revealed that more than two thirds of studied children aged 13-15 years.

As regard to, studied children parents' data the present study demonstrated that more than half of the studied children`s fathers couldn`t read and write and also less than half of them didn't have enough monthly family income (table 2). These may be due to people in rural areas prefer working rather than completing their study and also their main income depending only on agriculture which is not enough. These findings were compatible with **Ahmad et al. (2020),** they reported that more than two fifth of fathers were illiterate and didn't have enough monthly income.

In addition, less than half of studied children were farmers (table 2). This might be due to the facts that farming in rural areas is the main occupation that people depend on as a source to fulfill their basic needs. This finding was supported by **Muenchamnan et al. (2023),** who carried out study on "A Two-pronged educational intervention for caregivers to prevent residential pesticide exposure among Thai Young children living in agricultural area in Thailand (No=90)", and found that more than two thirds of participants were farmers.

Concerning children's occupational data, the current study revealed that less than two thirds of the studied children worked in agriculture since six years, and less than one third of them collected grass as agriculture activity (table 3). These might be due to children work in their own field with family and making them collect grasses to train them on field work. These findings were compatible with **Arcury et al. (2020),** who studied "Latinx child farmworkers in North Carolina: Study design and participant baseline characteristics in USA (No=202) ", and found that less than two fifth of studied children collected grass as agriculture activity. But this study was in contrast with **Kotb et al. (2021),** who found that more than half of studied children worked in agriculture since 2 years.

As well as, two fifth of studied children worked in agriculture in response to parents request and half of them gave all the money returned from agriculture to family (table 3). These might be due to some families are poor and have low socioeconomic levels therefore their children working in agriculture for money to help improve the family economic levels. These findings were similar with **Das et al. (2019),** who revealed that half of studied children work in agriculture in response to parents' request and gave all the money returned from agriculture to family. Furthermore, majority of studied children didn't get paid as financial return from working in agriculture and less than three quarters of them had the field close to the house and more than one third of them ridded donkey to go to field (table 3). These might be due to the field and agriculture work is heavy therefore children work to help their fathers. These findings were incompatible with **Jan (2021),** who conducted study about "Role of child labor in agriculture sector of District Mardan. A multinomial logistic regression analysis in Pakistan (No=275)" and found that the field distance from home was more than walking distance. These findings were consistent with **Arcury et al. (2020),** who found that more than two third of children didn't get paid as financial return from working in agriculture.

Regarding children's occupational data the current study indicated that more than two fifth of the studied children worked daily in agriculture. In addition, more than half of them worked one hour to three hours daily in agriculture, more than

two thirds of them didn't have time for rest during daily work and didn't have days for weakly vacation during work (table 4). These might be due to the fact that agriculture work is a heavy work and takes long time for completion and with different seasons and atmosphere make the agriculture work not ended. These findings were supported by **Sharifzadeh & Abdollahzadeh (2021),** who reported that less two thirds of children worked one hour to four hours daily in agriculture, half of them hadn't time for rest and no available weakly vacation during work. While these findings were inconsistent with **Summers et al. (2020),** who reported that majority of the studied children worked daily in agriculture and one fifth of them didn't have time for rest during daily work and didn't have days for weakly vacation.

As regard to children work environment the present study illustrated that majority of the studied children didn't use protective equipment and less than one fifth of them used head cover and more than two thirds of them used agriculture plow to help during work(table 4). These findings were in agreement with **Dewi et al. (2022),** who carried out study on "Children knowledge and practice regarding good agricultural practices (GAP) on safe pesticide usage in Indonesia (No=298)", and revealed that children not wearing gloves and masks, head covers and using tools to remove blockages, never clearing blocked nozzles by blowing into them, and disposing of empty containers properly and are helped by family member in occurrence of any health problem.

Concerning children occupational health problem which exposed during agriculture labor, the current study showed that less than two thirds of the studied children had bruises, and nasal congestion and more than one third of them had history of heart palpitation problems. Also, more than three quarters of the studied children had history of pain in the eye (table 4). These might be due to exposure to different occupational health hazards from agriculture during work. These findings were compatible with **Arcury et al. (2020),** who reported that child farmworkers reporting having a respiratory, heart and vision problem.

The present study showed that less than one third of the studied children had history of ears infection and most of them had skin color change as a result of exposure to continuous sunlight. In addition, less than two thirds of them had history of constipation, and more than three quarters of them had fatigue (table 4). These might be due to children work for long hours on sunlight and heavy agriculture work. These findings were in the same line with the study conducted by **Bakhsh et al. (2020),** who revealed that about two fifth of young farmers had skin infection/rash and history of ears infection. These findings were in the same line with **Summers et al. (2020)** who reported that about most of children felt fatigue and discomfort.

These findings were in the same line with **Mohammed et al. (2020),** who revealed that statistically significant relationships were found of general knowledge of studied farmers and their self- reported practice after the implementation of the health education program. Moreover, this study was supported by **Muenchamnan et al. (2023),** who revealed that there was high statistically significant positive correlation between the studied participants' total knowledge and practices scores post- program implementation. Also, this finding was in the same line with **Mohsen et al. (2021),** who found that there was a correlation between total knowledge and safety practice scores after intervention.

Concerning children knowledge level about occupational hazards and first aid pre and post occupational safety program, the current study indicated that nearly three quarters of the studied children had poor total knowledge level regarding first aid of agriculture labor that decreased to be the minority of them post occupational safety program implementation (figure 1). This might be due to professional and simple occupational safety program used by the researcher to improve students' awareness regarding occupational health hazards and first aid. This finding was supported **Dewi et al. (2022),** who revealed that participants' knowledge was improved after education significantly.

Regarding children total knowledge level pre and post occupational safety program, the present study indicated that the minority of the studied children had good total knowledge level regarding occupational health hazards of agriculture labor that improved to be less than three quarters of them post occupational safety program implementation (figure 2). This might be due to children not had courses at school related to health hazards at agriculture and most of children parents were illiterate, but the program affects positively and help in improving the children knowledge which indicating the program effectiveness. This finding was in the same line with **Mohammed et al. (2020),** who studied on "The impact of health education program about the safe use of pesticides among farmers at a Village in El-Minia City (No 322)", and showed that the total knowledge regarding occupational health hazards of agriculture labor among studied sample were improved after implementation of the program.

Concerning children's total practices regarding using protective equipment pre and post occupational safety program, the present study indicated that less than one fifth of the studied children had satisfactory total practices level regarding using protective equipment that

improved to be the majority of them post occupational safety program implementation (figure 2). This might be due to researcher used well methods in children education program that helping in improving studied children practices regarding the importance and availability of PPE in rural fields. This finding was congruent with **Shafik., & Abd El-Aal, (2021)** who revealed that more than two thirds of children have unsatisfactory practice before implementation of the program improved to more than two thirds of them have satisfactory practice regarding using protective equipment after implementation of the program.

Regarding children total practices level of preventive measures pre and post-occupational safety program, the current study indicated that one fifth of the studied children had satisfactory total practices level of preventives measures regarding occupational health hazards in agriculture that increased to be the majority of them post occupational safety program implementation (figure 3). This finding was in the same line with the study conducted by **Khan et al., (2020),** who showed that the majority of the studied children had unsatisfactory total practices level regarding agricultural health hazards preventive measures. Besides, there was a statistically significant improvement in preventive measures frequency of use from pre- to post-intervention. On other hand, this finding was disagreement with **Asti (2020),** who revealed that child workers safety practices not improved after program implementation.

Regarding correlation between total knowledge scores and total practices scores among studied children pre and post- occupational safety program, the current study reveals that there was high statistically significant positive correlation between the studied children total practices scores and total knowledge scores during post-occupational safety program phase (table 3). These might be due to children gain knowledge resulting in improve child practices.

Conclusion:-

Based on the results of the present study and hypothesis the study concluded that:

The occupational safety program had succeeded in improving the children knowledge and practices regarding prevention of occupational health hazards at agriculture labor. In addition, minority of the studied children had good total knowledge level regarding occupational health hazards of agriculture labor that improved to be less than three quarters of them post occupational safety program implementation. As well as, less than one quarter of the studied children had satisfactory total practices level of preventives measures regarding occupational health hazards in agriculture that increased to be majority of them post occupational safety program implementation. In addition, there was highly statistically significant difference between all items of the children`s practices regarding to use protective equipment post-occupational safety program implementation. Furthermore, there was high statistically significant positive correlation between the studied children total practices scores and total knowledge scores during post-occupational safety program phase.

Recommendations

Based on the findings of this study, the following recommendations: -

- Provide continuous occupational training program about protective and safety measures for all children at work place to prevent occupational health hazards.
- Make periodic checkup of health status for agriculture child labor for early detection of occupational hazards to monitor their health status physically and psychologically.
- Encourage children to go to the closest health unit to receive first aid and care for any emergency health hazards and accident problems.
- Making workshops on first aid measures and occupational safety in schools and health units for children.
- Dissemination of the developed instructional booklet for children. about occupational health hazards
- Providing safety protective equipment and supplies in the workplace for children.

Future studies:

- Assess the long-term effect of work on agriculture child labor.

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