

Effect of an educational program for farming mothers to protect their children from pesticide exposure

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Abstract: Pesticides represent a major environmental hazard. The toxic effects of pesticides are a concern among high risk groups, especially children.

Aim: To evaluate the effect of an educational program for farming mothers to protect their children from pesticide exposure.

Subjects and method: Quiz-experimental design was used for this study. The study was conducted in general pediatric out-patient clinics at Assiut University Children Hospital. The study subjects included a convenient sample of 60 farming mothers. Two tools were developed by the researchers for data collection. **Tool I:** Socio-economic scale; it was developed by (Abd El-Twaab 2004). **Tool II:** Structure interview questionnaire: divided into two parts: **Part I** Questions to assess farming mothers' knowledge about pesticides: **Part II:** Questions to assess farming mothers' knowledge about their practice regarding pesticides.

Results: the mean age of the mothers was 38.8± 9.7 years. 60% were illiterate, 95% were house wife and farmer, and more than half were in the middle social class. Most of the mothers had poor knowledge and unsatisfactory knowledge about practices in the pretest. Statistically significant differences were detected between mothers' total score of knowledge and their knowledge about practice.

Conclusions: Most of the mothers had poor level of knowledge and unsatisfactory knowledge about practice regarding pesticide in preprogram and after implementation of program, the level of mothers' knowledge and their knowledge about practice improved.

Recommendation: Medical conveys in the village for the public about pesticides by the directors of rural health units shared with professors in medicine and nursing in the university. Using mass media to disseminate correct information about pesticides and to increasing the mothers' awareness about its harmful effect on health.

Keywords: pesticides, farming mothers, knowledge, practices,

I. Introduction

Pesticides are substances meant for preventing, destroying or mitigating any pest. The most common use of pesticides is as plant protection products, which in general protect plants from damaging influences such as weeds, diseases or insects. The pesticides which used in the home and garden such as slug pellets, weed killers and ant powders, as well as those used by farmers. In addition to long workdays, injuries, and fatalities associated with agricultural work, pesticides pose a particularly serious threat to people living or working in the field [1].

According to the Stockholm Convention on Persistent Organic Pollutants, 9 of the 12 most dangerous and persistent organic chemicals are pesticides [1]. More than an estimated billion pounds of active pesticide ingredients are used annually in the United States, representing approximately one quarter of worldwide pesticide use [2].

Pesticide poisoning has been recognized as an important public health issue around the world. Approximately 350,000-440,000 annual suicides by means of deliberate pesticide poisoning have been estimated to occur worldwide [3]. The numbers of victims of nonfatal pesticide poisoning are assumed to be much greater [4]. Pesticides are widely used in agriculture in Egypt. Approximately 10.000 to 60.000 tons of pesticides are used annually in agriculture or for public health reasons [5].

Agriculture is a workplace unlike many others in our country. Farm families often live practically in the middle of the work environment and help out on the job. As a result, children can come into close contact with dangerous pesticides. Residues from the parents' clothing, dust tracked into the house, contaminated soil, food brought directly from the fields to the table, and contaminated water are significant sources of exposure for farm children. Children are particularly vulnerable to pesticide exposure because of immature biological and developmental processes [6]. So it is important to pay attention to their exposures and their health because of what they can tell us about risks to all children [7].

Large families, small accommodation, careless storage of potentially poisonous household substance, easy availability of poisons, lack of time for supervision of children, lack of discipline and anticipatory guidance

are influencing factors of greater risk of poisoning [8]. Pesticides can enter the body orally, dermally or by inhalation. Clothing contaminated with pesticides can be an important route of exposure for children [9].

The signs and symptoms of pesticide poisoning depend upon the pesticide involved and the type and magnitude of exposure. Mild signs of acute pesticide poisoning, such as nausea, vomiting, diarrhea, or wheezing are often not recognized as being potentially linked to pesticide toxicity. Rashes and other skin reactions are another major manifestation of pesticide toxicity that is often misdiagnosed [10].

Chronic effects of pesticide exposure may include adverse effects on neurological function, cancer, reproductive harm, reduced growth and development, and birth defects. Much of the evidence of chronic effects is based on studies of adult workers who are exposed to a mixture of chemicals every day, making it difficult to pinpoint specific pesticides. Little research on the chronic effects of pesticides has been done directly on children, and even less on farm children[11].

The diagnosis is based upon the history of exposure, such as pesticides are available in the home, recently applied, or child was found playing with containers. Also signs and symptoms of exposure and laboratory measurements. After acute exposures, pesticides and their metabolites can be measured in samples of blood, urine, breast milk, amniotic fluid or meconium. This can confirm the diagnosis [12].

Specific treatments for acute pesticide poisoning are often dependent on the pesticide or class of pesticide responsible for the poisoning. However, there are basic management techniques that are applicable to most acute poisonings, including; skin decontamination, air way protection, gastrointestinal decontamination, and seizure treatment [11].

Pesticides should be used only when the benefits outweigh the risks, and non-chemical pest control procedures have failed. Integrated pest management (IPM) procedures which include hygiene, sealing of cracks and crevices, screening of doors and windows, and other measures should be the first line of defense for pest management. If pesticides must be used, they should be stored only in their original containers with manufacturers' labels intact, preferably with child-proof seals, out of the reach of children and in locked cabinets or cupboards. Users should always follow the safety precautions specified by the manufacturer and observe all safety recommendations including use of gloves, masks, protective clothing and observation of reentry times [13].

Pesticide safety education and pesticide applicator regulation are designed to protect the public from pesticide misuse, but do not eliminate all misuse. Reducing the use of pesticides and choosing less toxic pesticides may reduce risks placed on society and the environment from pesticide use [4]. The pediatric nurse play a unique role in pesticide poisoning prevention because of their regular contact with patients, care givers and the general public [14]. Arrange for counseling of parents, children and guide the parents for regular psychological follow up. Teach the parents and family members about the prevention of accidental poisoning and need for parental supervision [8].

Significance of the study:

Poisoning is one of the important accidental hazards among children. The children below five years of age are the common victim of this problem [8]. Pesticides represent a major environmental hazard. The toxic effects of pesticides are a concern among high-risk groups, especially children [5]. Therefore development of culturally educational programs for farming mothers about pesticide is essential to protect their children from hazard of pesticides exposure.

Aims of the work:

This study aimed to

- ♦To assess the farming mothers' knowledge and their knowledge about practice regarding pesticides.
- ♦To evaluate the effect of an educational program for farming mothers about pesticides

II. Subjects and Method

2.1 Hypothesis of the study

Lack of farming mother's knowledge and unsatisfactory knowledge about practice regarding pesticides.

2.2 Research Design:

Quiz - experimental study was used

2.3 Setting:

The study was conducted at general pediatric out-patient clinics at Assuit University Children Hospital

2.4 Subjects:

The study subjects included a convenient sample of 60 farming mothers

2.5 Tools of the study:

Two tools were utilized for this study:

Tool I: Socioeconomic scale; it was developed by [15] and used to assess the socioeconomic status. It included four items; level of education of parents (8 items), family income (6 items), job of parent (2 items), and life styles (3 items). Each item have one score the total score was divided into three classes as high, moderate and low classes. The item of income has been modified of social class by the researchers as following; according to the rate of inflation and increase to be conforming to recent income. Each item have one score; as high from 85-100%, moderate from 60-84% and low less than 60%.

Tool II: Structure interview questionnaire divided into two parts.

Part 1: Questions to assess farming mothers knowledge: which include definition of pesticides and period of prohibition, types, methods of transmission, effect on children's health, family past history about exposure of children to pesticides such as; frequency of using pesticides inside the house, types of pesticides causing poisoning, child complains and place of first aid and sources of information for farming mothers.

Part 11: Questions to assess farming mothers knowledge about their practice regarding precautions to be followed; before, during, after and at storing of pesticides. Precautions to prevent children's from pesticides exposure at home and agriculture. The protective methods used by the mothers and the alternative methods used to reduce the using of pesticides at home and agriculture.

The content validity of the program and tools were assessed by a jury of 5 experts in the pediatrics and pediatric nursing field ,the content validity index was 95%. Reliability was assessed using Cronbach α test to measure the internal consistency and its result was $R=0.66$.

2.6 Pilot study

Before embarking on the actual study, a pilot study was carried out on 10 % of the sample to assess the tools for clarity, reliability and applicability and to evaluate the time needed for filling the sheet. The necessary modifications were done based on the results of the pilot study and these farming mothers were excluded from the study subjects.

2.7 Methods of data collection:

2.7.1 Preparation phase

Before implementation of the study, an official permission was obtained from Dean of the Faculty of Nursing directed to the director of out-patient clinics for data collection after explaining the purpose of the study. Approval of nursing ethical committee in the faculty was obtained.

The program has been specially designed for farming mothers in Arabic language thorough review of the up-to-date literature relevant to the study subject was done prior to the development of an interview questionnaire.

2.7.2 Planning phase

General and specific objectives were developed and explained for mothers prior implementation of the program.

2.7.3 Strategy

Discussions through booklet contained colored pictures, posters, and power point were used as a method to teach the farming mothers.

2.7.4 Implementation

The data were collected starting from October 2015 to the end of the March 2016. The researchers interviewed the mothers and their children in Out-Patient Clinics coming from rural areas, at Assuit University Children Hospital. Data was collected before the application of the program and after 3 weeks from the program application. During interview the researchers introduce them self to the mothers and their children to explain the purpose and nature of the study. The theoretical part of the program presented in two day, the researchers did the interview with the mothers throughout three sessions one session began to fill the interview sheet and applied the pretest and giving handout before starting the session of the program. The second session for explaining the program and the second day for doing posttest. The researchers interviewed on three to five mothers one day/weekly. The average time for filing the pretest sheet was around 10-15 minutes depending on the response of farming mothers. After that the program content was discussed through booklet contained colored pictures, posters, and power point at students teaching class. The average time to applied and filing the posttest sheet was around 20-30 minutes.

2.7.5 Evaluation of the program was completed by using the (pre and posttest). This evaluation based on scoring system as following:

1- Scoring system for knowledge. It consisted of 9 questions were used for farming mothers, each complete correct answer takes two score, incomplete correct answer takes one score and incorrect answer takes zero score. The grading of farming mothers according to their knowledge total score was interpreted as the following: poor = <50%, good 50%: 70% and very good = >70% [16].

2- Scoring for assess mothers knowledge about their practice. It consisted of (7 Questions) with 56 right answer. The score that was given for subject to responses was zero for unsatisfactory, one for satisfactory. The grading of farming mothers according to their practice total score was interpreted as the following: unsatisfactory (less than 75%) and satisfactory (75% and more) [17].

2.8 Ethical consideration

The researchers were explained to farming mother and their children the aim of the study and confidentiality of the data. They were informed about their right to withdraw from the study at any point. Finally there is no risk for farming mothers/or their children at all during application of the research.

2.9 Analysis of Data

The data analyses were performed with the IBM SPSS 20.0 software. Categorical variables were described by number and percent (N, %), where continuous variables described by mean and standard deviation (Mean, SD). Continues variables test for normality using **Anderson Darling** . Chi-square test and fisher exact test used to compare between categorical variables where. Paired T test used to compare between continuous variables. Pearson correlation coefficient was done to measure correlation between quantitative variables. P-value considered statistically significant when $P < 0.05$.

III. Results

Table (1): Sociodemographic characteristics of the studied farming mothers

| Items | No.(n=60) | % |
|---------------------------|-----------|------|
| Mother Age: years | | |
| <25 years | 3 | 5.0 |
| 25 - 35 years | 14 | 23.3 |
| ≥35 years | 43 | 71.7 |
| Mean±SD | 38.8±9.7 | |
| Mother education: | | |
| Illiterate | 36 | 60.0 |
| Basic education | 17 | 28.3 |
| Secondary | 7 | 11.7 |
| Mother occupation: | | |
| House wife and farmer | 57 | 95.0 |
| Employee | 3 | 5.0 |
| Marital status: | | |
| Mired | 5 | 8.3 |
| Divorced | 19 | 31.7 |
| Widow | 36 | 60.0 |
| Family size: | | |
| 4 – 8 person | 38 | 63.3 |
| ≥8 | 22 | 36.7 |
| Mean±SD | 6.8±1.7 | |
| Social class: | | |
| Low | 8 | 13.3 |
| Middle | 35 | 58.3 |
| High | 17 | 28.3 |

Table (1): represented that ,less than three quarters (71.7%) of the farming mothers age were 35 years and more, with mean age 38.8±9.7years .less than two thirds (60%) were illiterate and widow. Moreover the vast majority of them (95%) were house wife and farmer. Regarding family size about two third (63.3%) had family size from 4-8 person, with mean of 6.8±1.7. Finally more than half (58.3%) of farming mothers had middle social class.

Table (2): Family history regarding exposure of children to pesticides

| Family history | No. (n= 60) | % |
|---|----------------|------|
| Children exposed to poisoning by pesticides: | | |
| Yes | 8 | 13.3 |
| No | 52 | 86.7 |

| | | |
|---|----|------|
| Frequency of exposure to poisoning :n= 8 | | |
| Once | 8 | 13.3 |
| Frequency of using pesticides inside the home: | | |
| every day | 2 | 3.3 |
| every two days | 4 | 6.7 |
| Every three days | 9 | 15.0 |
| Every four days and more | 45 | 75.0 |
| Types of pesticides causing poisoning: n= 8 | | |
| Home pesticides | 4 | 50.0 |
| Farming pesticides | 4 | 50.0 |
| Child complains :n= 8 | | |
| Gastrointestinal disturbance | 2 | 25.0 |
| Chest disturbance | 2 | 25.0 |
| Gastrointestinal and Chest disturbance | 4 | 50.0 |
| Place of first aid: n = 8 | | |
| Hospital | 4 | 50.0 |
| Health care unit | 4 | 50.0 |

Table (2): shows that, the minority of mothers (13.3%) said their children exposed to poisoning by pesticide and exposed only once. Three quarter of the farming mothers (75.0%) used pesticides inside the home every four days and more weekly. Half of the children poisoned from home pesticides and the same percentage from farming pesticide .As regards to child complains half of them had complained from gastrointestinal tract and chest disturbance, also the same percentage received the first aid in the hospital and health care unit (50%).

Table (3): Percentage distribution of farming mothers' knowledge about pesticides in pre and post program

| Mothers knowledge | Pre test | | Post test | |
|--|-------------|------|------------|-------|
| | No. (n= 60) | % | No. (n=60) | % |
| Definition of pesticides: | | | | |
| Correct complete answer | 2 | 3.3 | 6 | 10.0 |
| Correct incomplete answer | 33 | 55.0 | 50 | 83.3 |
| Incorrect answer | 25 | 41.7 | 4 | 6.7 |
| Definition period of prohibition: | | | | |
| Correct complete answer | 4 | 6.7 | 34 | 56.7 |
| Correct incomplete answer | 14 | 23.3 | 22 | 36.7 |
| Incorrect answer | 42 | 70.0 | 4 | 6.6 |
| Types of pesticides used in the home:# | | | | |
| Peirsol to kill flying insects | 54 | 90.0 | 58 | 96.7 |
| powder for cockroaches crawling | 38 | 63.3 | 57 | 95.0 |
| pesticide for mouse | 39 | 65.0 | 54 | 90.0 |
| powder or liquid to kill the head lice | 8 | 13.3 | 23 | 38.3 |
| Methods of transmission:# | | | | |
| By inhalation | 59 | 98.3 | 60 | 100.0 |
| Through ingestion / swallowing with digestion | 18 | 30.0 | 39 | 65.0 |
| Through the skin | 26 | 41.7 | 42 | 70.0 |
| Through the eye | 19 | 31.7 | 44 | 73.3 |
| Effect of pesticides on children's health:# | | | | |
| The sensitivity of the chest | 57 | 95.0 | 60 | 100.0 |
| The sensitivity of the skin | 0 | 0.0 | 47 | 58 |
| Toxic effect on the liver | 9 | 15.0 | 9 | 15.0 |
| Reducing child's memory | 10 | 16.7 | 10 | 16.7 |
| Reducing the child's intelligence | 1 | 1.7 | 34 | 56.7 |
| Its effects on the nervous system | 14 | 23.3 | 41 | 68.3 |

More than one answers #

Table (3): shows that , more than half (55%) of studied mothers gave correct incomplete answer about definition of pesticides in pretest compared to (83.3%) in posttest .Also less than three quarters of them (70%) gave incorrect answer related to definition of period of prohibition before the program compared to (6.6%) in posttest .As regards to types of pesticides used in the home (90%) and (96.7%) of the farming mothers mentioned peirsol to kill flying insects in pretest and posttest respectively. The vast majority of them (98.3%) mentioned the pesticides enter the body through inhalation in pretest compared to (100%) in posttest. The majority of the mothers (95%) mentioned sensitivity of the chest and only 1.7% mentioned reducing the child intelligence as effect of pesticides on the child health in pretest compared to 100% and 56.7% in posttest.

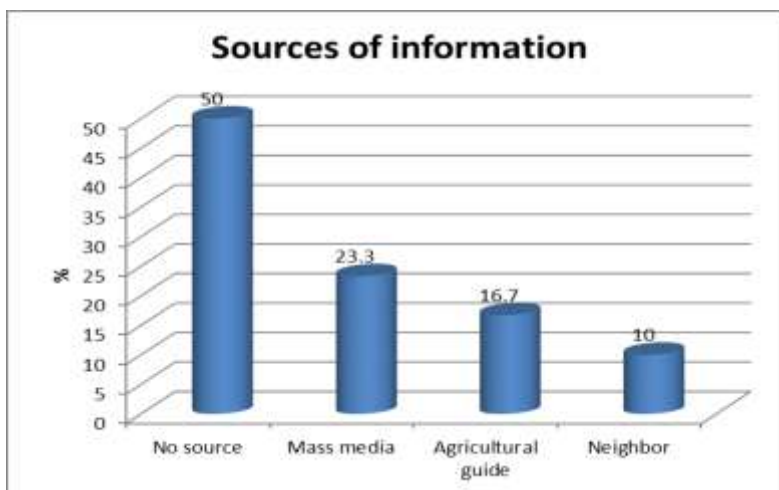


Fig (1): Frequency distribution of farming mothers regarding the sources of information about pesticides.

Figure (1): this figure shows that, half of the mothers don't had any source of information about pesticides, while the information from mass media, agricultural guide and neighbor were constituted 23.3%, 16.7% and 10% respectively.

Table (4): Percentage distribution of farming mother's knowledge about their practice regarding pesticides in pre and posttest program.

| Mothers practice | Pretest program | | | | Posttest program | | | | P. value |
|---|-----------------|------------|----------------|-------------|------------------|-------------|----------------|-------------|--------------------|
| | Satisfactory | | Unsatisfactory | | Satisfactory | | Unsatisfactory | | |
| | No. | % | No. | % | No. | % | No. | % | |
| 1-Precautions to be followed:# | | | | | | | | | |
| a-Before using pesticides. | 10 | 16.7 | 50 | 83.3 | 48 | 80.0 | 12 | 20.0 | <0.001** |
| b- During using pesticides. | 23 | 38.3 | 37 | 61.7 | 50 | 83.3 | 10 | 16.7 | <0.001** |
| c- After using pesticides. | 14 | 23.3 | 46 | 76.7 | 54 | 90.0 | 6 | 10.0 | <0.001** |
| d -Storing pesticides at home. | 18 | 30.0 | 42 | 30.0 | 52 | 86.7 | 8 | 13.3 | <0.001** |
| 2-Precautions to prevent children from pesticides exposure:# | | | | | | | | | |
| a-At home. | 27 | 45.0 | 33 | 55.0 | 51 | 85.0 | 9 | 15.0 | 0.079 |
| b- At agriculture. | 25 | 41.7 | 35 | 58.3 | 49 | 81.7 | 11 | 18.3 | <0.001** |
| 3- Using the protective methods. | 2 | 3.3 | 58 | 96.7 | 34 | 56.7 | 26 | 43.3 | <0.001** |
| 4-The alternative methods used to reduce using pesticides:# | | | | | | | | | |
| a-At home. | 2 | 3.3 | 58 | 96.7 | 54 | 90.0 | 6 | 10.0 | 0.143 |
| b-At agriculture. | 1 | 1.7 | 59 | 98.3 | 31 | 51.7 | 29 | 48.3 | <0.001** |

More than one answer#

Table (4): illustrated that, a statistically significant differences were detected between farming mothers' knowledge about their practice in pre and posttest related to all variables $p = 0.001$, except for precautions to prevent children from pesticides exposure and the alternative methods used to reduce the using pesticides at home.

Table (5): Relationship between the farming mothers' total score of knowledge and their total score of knowledge about practice regarding pesticides.

| Items | Total score of knowledge | | | | | | | | P. value | |
|---------------------------------|--------------------------|-----|------|------|----------|----------|------|------|----------|----------|
| | Pretest | | | | P. value | Posttest | | | | |
| | Good | | Poor | | | Good | | Poor | | |
| | No. | % | No. | % | | No. | % | No. | % | |
| Total score of Practice: | | | | | | | | | | |
| Satisfactory | 1 | 1.7 | 13 | 21.6 | 0.364 | 37 | 61.7 | 10 | 16.7 | <0.001** |
| Unsatisfactory | 1 | 1.7 | 45 | 75.0 | | 2 | 3.3 | 11 | 18.3 | |

Table (5): revealed that, there were significant relation between the farming mothers' total score of knowledge and their total score of knowledge about practice regarding pesticides in pre and posttest $p = 0.001$.

Table (6): Relationship between socio-demographic characteristics of the farming mothers and their total score of knowledge in pre and posttest program .

| Socio-demographic characteristics | Pretest knowledge | | | | P. value | Posttest knowledge | | | | P. value |
|-----------------------------------|--------------------|-------|-----------------------|------|----------|---------------------|------|-----------------------|-------|----------|
| | Satisfactory (n=2) | | Unsatisfactory (n=58) | | | Satisfactory (n=39) | | Unsatisfactory (n=21) | | |
| | No. | % | No. | % | | No. | % | No. | % | |
| Mother age: | | | | | | | | | | |
| <25 years | 0 | 0.0 | 3 | 5.2 | 0.647 | 1 | 2.6 | 2 | 9.5 | 0.455 |
| 25 - 35 years | 1 | 50.0 | 13 | 22.4 | | 10 | 25.6 | 4 | 19.0 | |
| 35+ years | 1 | 50.0 | 42 | 72.4 | | 28 | 71.8 | 15 | 71.4 | |
| Mother education: | | | | | | | | | | |
| Illiterate | 0 | 0.0 | 36 | 62.1 | 0.001** | 19 | 48.7 | 17 | 81.0 | 0.100 |
| Basic education | 0 | 0.0 | 15 | 25.9 | | 12 | 30.8 | 3 | 14.3 | |
| Secondary | 1 | 50.0 | 6 | 10.3 | | 6 | 15.4 | 1 | 4.8 | |
| University | 1 | 50.0 | 1 | 1.7 | | 2 | 5.1 | 0 | 0.0 | |
| Mother occupation: | | | | | | | | | | |
| House wife | 0 | 0.0 | 57 | 98.3 | 0.001** | 36 | 92.3 | 21 | 100.0 | 0.192 |
| Worked | 2 | 100.0 | 1 | 1.7 | | 3 | 7.7 | 0 | 0.0 | |
| Social class: | | | | | | | | | | |
| Low | 0 | 0.0 | 8 | 13.8 | 0.073 | 4 | 10.3 | 4 | 19.0 | 0.012* |
| Middle | 0 | 0.0 | 35 | 60.3 | | 19 | 48.7 | 16 | 76.2 | |
| High | 2 | 100.0 | 15 | 25.9 | | 16 | 41.0 | 1 | 4.8 | |

Table (6): represented that, there were a statistically significant differences between mothers education, occupation and their total score of knowledge in pretest P =0.001 and mothers social class in posttest P 0.012 .While no statistically significant differences were detected regarding the other variables in pre and posttest.

Table (7): Relationship between socio-demographic characteristics of the farming mothers' and their total score of knowledge about practice in pre and posttest program.

| Socio-demographic characteristics | Pretest practice | | | | P. value | Posttest practice | | | | P. value |
|-----------------------------------|------------------|-------|----------------|-------|----------|-------------------|-------|----------------|-------|----------|
| | Satisfactory | | Unsatisfactory | | | Satisfactory | | Unsatisfactory | | |
| | No. | % | No. | % | | No. | % | No. | % | |
| | 14 | 100.0 | 46 | 100.0 | | 47 | 100.0 | 13 | 100.0 | |
| Mother age: | | | | | | | | | | |
| <25 years | 0 | 0.0 | 3 | 6.5 | 0.569 | 3 | 6.4 | 0 | 0.0 | 0.639 |
| 25 - 35 years | 4 | 28.6 | 10 | 21.7 | | 11 | 23.4 | 3 | 23.1 | |
| 35+ years | 10 | 71.4 | 33 | 71.7 | | 33 | 70.2 | 10 | 76.9 | |
| Mother education: | | | | | | | | | | |
| Illiterate | 7 | 50.0 | 29 | 63.0 | 0.013* | 27 | 57.4 | 9 | 69.2 | 0.400 |
| Basic education | 2 | 14.3 | 13 | 28.3 | | 11 | 23.4 | 4 | 30.8 | |
| Secondary | 5 | 35.7 | 2 | 4.3 | | 7 | 14.9 | 0 | 0.0 | |
| University | 0 | 0.0 | 2 | 4.3 | | 2 | 4.3 | 0 | 0.0 | |
| Mother occupation: | | | | | | | | | | |
| House wife | 13 | 92.9 | 44 | 95.7 | 0.674 | 44 | 93.6 | 13 | 100.0 | 0.350 |
| Worked | 1 | 7.1 | 2 | 4.3 | | 3 | 6.4 | 0 | 0.0 | |
| Social class: | | | | | | | | | | |
| Low | 1 | 7.1 | 7 | 15.2 | 0.644 | 6 | 12.8 | 2 | 15.4 | 0.504 |
| Middle | 8 | 57.1 | 27 | 58.7 | | 26 | 55.3 | 9 | 69.2 | |
| High | 5 | 35.7 | 12 | 26.1 | | 15 | 31.9 | 2 | 15.4 | |

Table (7): showed that, no statistically significant differences between socio-demographic characteristics of the farming mothers' and their total score of knowledge about practice in pre and posttest except for mothers' education in pretest p = 0.013.

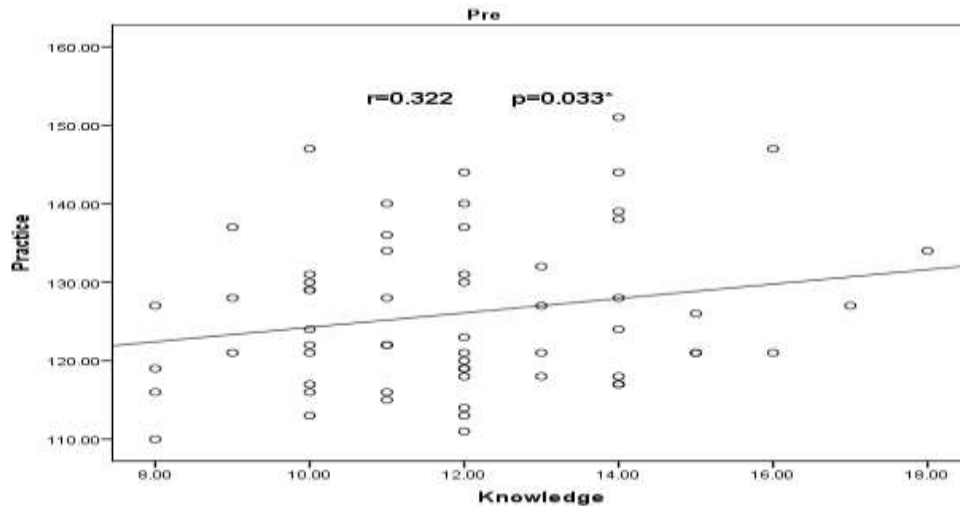


Fig (2): Correlation between total score of mother's knowledge and their total score of knowledge about practices regarding pesticides in pretest

This figure represent that ,there were a positive correlation between total score of mother's knowledge and their total score of knowledge about practices regarding pesticides in pretest, with statistically significant difference, P= 0.033, r 0.322.

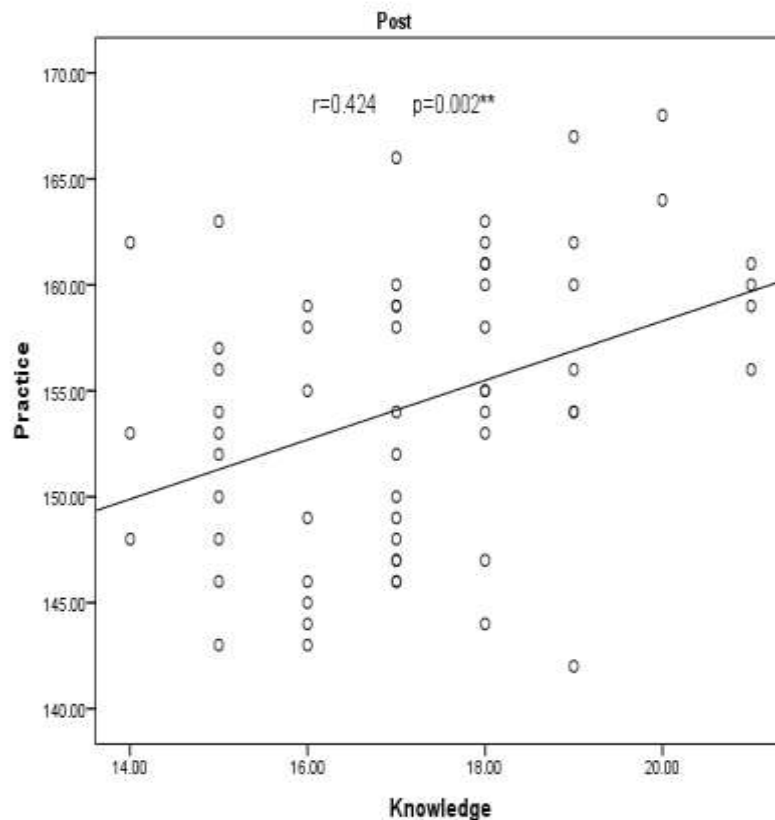


Fig (3): Correlation between total score of mother's knowledge and their total score of knowledge about practices regarding pesticides in posttest.

This figure showed that, there were a positive correlation between total score of mother's knowledge and their total score of knowledge about practices regarding pesticides in posttest, and statistically significant difference were detected, P= 0.002, r 0.424.

IV. Discussion

One of the major problems facing the world today is environmental pollution. The source of the pollution in the area of agriculture is excessive use of pesticide [18]. Pesticide exposure has been linked with immediate and delayed health effects. Not only farmworkers exposed to pesticides while working in the fields, they and their families may also face increased pesticide exposure due to living in proximity to where the pesticides are applied. Children and infants can be particularly affected by pesticides because of their physiological immaturity and greater risk of exposure to pesticides [19].

Concerning the mothers' age, the current study showed that, less than three quarters were 35 years and more and the mean age 38.8 ± 9.7 . The results of the present study in the same line with [20], who reported that (51%) of the studied sample were age ranged from 30-49 years. Also the results agree with [21], who found that mean age of participants was 41.8 years.

Regarding the mothers' education, the present study found that, less than two thirds of farming mothers were illiterate. This result disagree with [5], who found that, more than half of study participant were graduated from secondary school or higher. Our results in accordance with [22], who reported that, the majority of the studied sample (84%) was completed high school. Also the results inconsistency with [23], who indicated that around half (45.5%) of the study participants were illiterate.

The present study showed that, the vast majority of farming mothers were house wife and farmer and not received training about pesticide. The present study disagree with [24], who represent that 40 percent of mothers were employed in farm work, but not received pesticide training. Regards to social class more than half of the farming mothers had middle social class. This in agreement with [22], who reported that, the majority of participants (84%) were high social class. As regards marital status, the present study showed that, two third of the mothers were widow. These finding in accordance with [25], who conducted a study in Cairo University and found that the majority of the study participant were married.

Concerning to the number of children who exposed to poisoning by pesticides 13.3% exposed to poisoning only once. These findings inconsistency with [26], who found that 63.5% and 76.4% of the poisoned respondents reported two or more poisonings.

Regarding the frequency of using pesticides inside the home, the present study found that, more than three quarter of the mothers using pesticides every four days and more weekly. These results incongruent with [5], who reported that most of the families (80.5%) frequently applied pesticides (4-7 days/week). Also the results of the present study in accordance with [20], who reported that (97%) of farmer hadn't use pesticides.

As regards to child complain, the results found that one quarter complain from gastrointestinal disturbance, these results disagree with [27], who reported that pesticides were the most common causes of poisoning and 60% of poisoned children had complain from gastrointestinal disturbance.

As regards the farming mothers' knowledge about pesticides in pre and post program application, it was observed that mothers' knowledge were improved after the program application. This result implies the importance of an educational program to raising the mother's awareness about pesticides. This result in the same line with [17], who mentioned that continuous educational program increases the knowledge of participants.

The present study revealed that the mothers said there were different methods for pesticide to invade of the human body as inhalation, eyes, skin and ingestion. The results similar to the finding of [28], who found that the farming mothers and their children may be exposed to pesticides in various ways.

Regarding mothers' knowledge about effect of pesticides on children's health, the present study found that, the farming mothers said the exposure to pesticides causing sensitivity of the chest and skin, effect on the liver, child memory, child intelligence and nervous system. These results agree with [29], who reported that (92.0 %) of sample think pesticides can have a negative effect on the health. While the results in accordance with [30], who found that majority of the participant reported that exposure to pesticides hadn't an adverse effect on human health.

Concerning the mothers' knowledge about practice precaution before, during, after and in storing pesticides at home. Most of the mothers' had unsatisfactory knowledge about practice in pretest, while there was improvement in their knowledge about practice after program application. This result implies the importance of an educational program to rising the mother's awareness about pesticides.

Another focus of this study was to examine the mothers' knowledge about practice regarding using protective methods during use of pesticides; it was found that, less than half of the mothers after program application still not used the personnel protective equipment. This can explained by unavailability or high cost of personnel protective equipment, lack the farming mothers' knowledge about types and importance of using the personnel protective equipment and may be related to their habits and belief. This result disagree with [31], who reported that the majority of participants didn't use appropriate personnel protective equipment when handling pesticides and (67%) use ordinary clothing when spraying. Also these finding in accordance with [26], who reported that (66.9%) of farmers no personnel protective equipment use at all.

The results indicated that, there were improvement in the total score of the farming mothers' knowledge and their knowledge about practice in posttest. The results in the same line with [5], who found that knowledge scores of participants improved after health education program, as compared to the pre-program. Although the practice scores were improved. The findings disagree with [32], showed that the knowledge of the respondents to the use of pesticides is still need to be improved.

The present study revealed that, the illiterate mothers showed greater improvement in their knowledge and their knowledge about practice than mothers with secondary school and university degree. These results disagree with [5], who found that the parents with high school or university degree showed significantly greater improvements in knowledge and practice than parents who were illiterate or only able to read and write. Also the results inconsistency with [26], reported that there was a significant association between respondents' education (High education versus low education) and reported practice toward pesticide use

The present study indicated that, there were a positive correlation between mothers' total score of knowledge and their total score of knowledge about practice regarding pesticides. With statistically significant difference. These results agreement with [24], who found that there is a significant correlation ($r = 0.525$; $p < 0.001$) between the knowledge score and the practice score regarding pesticides. While our results disagree with the finding of [33], who found that the improvement of knowledge scores was significantly higher than that of practice scores.

V. Conclusions

Most of farming mothers had poor level of knowledge and unsatisfactory knowledge about practice regarding pesticide in preprogram and after implementation of the program, the level of mothers' knowledge and their knowledge about practice improved.

VI. Recommendations

- Medical conveys in the village for the public about pesticides by the directors of rural health units shared with professors in medicine, nursing in the university and association of agriculture.
- Using mass media to disseminate correct information about pesticides and to increasing the mothers' awareness about its harmful effect on health.
- Certain efforts must be placed on the execution of personal protective measures which necessary to decrease the pesticide exposure of mothers and their children.

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