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ENVIRONMENTAL HEALTH RISKS TO FARMERS AS A RESULT OF PESTICIDES’ MISMANAGEMENT IN KHANYOUNIS GOVERNORATE, GAZA STRIP

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ABSTRACT

Several poisoning and death cases were reported in Khanyounis Governorate as a result of mis-use and mishandling of pesticides. Carcinogenic and internationally banned pesticides are still available in the markets in all the governorates of the Gaza Strip. This study aims to investigate the awareness and health issues of the farmers. Forty-five farmers were randomly selected to fill a questionnaire prepared for this purpose. The results showed that protective clothing are totally not worn during application of pesticides. Lack of storage facilities, unlicensed pesticide shops, improper disposal of the empty containers and smoking and eating during application are among the hot spots related to pesticides handling and application. Also, 44.5% of the farmers complain of health problems, of which headache, coughing, skin rashes and difficulty in breathing. Only 4.5% of the farmers attended general agricultural training courses. In conclusion the study suggests that the government, public, the non-governmental organizations and all the interested parties should cooperate in a collective and serious work to minimize these environmental and health risks.

INTRODUCTION

Khanyounis Governorate is located at the southern part of the Gaza Strip. The total area of Khanyounis Governorate is about 65 Km². The average rainfall is 250 mm/annum. The coastal 1-2 km wide belt along the Mediterranean Sea is covered with sand dunes of about 20-40 m above sea level. The population is about 200,000 people according to the census of 1996. The Gaza Strip is 48 km long and 6.5 km wide. It is bordered by Egypt to the east, Israel to the west, and the Mediterranean Sea to the north. The Gaza Strip is a coastal 1-2 km wide belt along the Mediterranean Sea is covered with sand dunes of about 20-40 m above sea level. The average rainfall is 250 mm/annum. The area of Khanyounis Governorate is about 65 Km². The average rainfall is 250 mm/annum. The coastal 1-2 km wide belt along the Mediterranean Sea is covered with sand dunes of about 20-40 m above sea level. The population is about 200,000 people according to the census of 1996.

RESULTS AND INTERPRETATION

The health risks that result during handling and application of pesticides. It is an attempt to understand the problem and to pinpoint the hot issues and/or items that could be placed in the priority list for any action. It is one of the high priority needs to attract the attention of the interested parties, planners, policy makers and decision makers to such hot issues in the environmental and public health.

METHODS OF STUDY

Forty-five small farms in Khanyounis Governorate, were randomly selected for this field survey. The survey was carried out by the authors using an especially prepared questionnaire. Arabic is the language of the questionnaire. It was tested by five experts in agricultural and environmental sciences. The farmers were then, individually visited and informed about the purpose of the study. They have been asked by the interviewer to participate, and were assured that all the information regarding their responses will be dealt as a top confidential matter. All these farmers were then interviewed and their responses were recorded in the questionnaire. The surveyor explained to the farmers any question which was not clear to them. The surveyor used to fill the questionnaire by himself. This study was carried out during June and July, 1997. The data were analyzed by descriptive statistical method.

The age of the interviewed farmers was found in the range between 20-65 years, with an average of about 37 years and standard deviation of 15. The average number of years of experience for these farmers is 14 years, ranging between 1-40 years, with standard deviation of 11. About 90% of the visited farms produce vegetables, while the rest mostly produces citrus. The area of these farms ranges between 1-40 dunums (1 dunum=1000 square meter), with an average of 6 dunums and standard deviation of 8. Other issues were surveyed during this work; the results are shown in Tables 1-12 and described below.
1. THE EDUCATIONAL LEVEL

The survey showed that 80.2% of the farmers finished the intermediate level of education, while 6.6% are totally non-educated, 13.2% are in the level of primary school, 15.8% are holding university degrees (Table 1). These results illustrate that the education level of the farmers is generally good, which means that over 85% of the interviewed farmers can read and write. This of course will help in any training courses to be held in the future. Such results are normally expected in the Palestinian society as a whole. This is because of the majority of the Palestinians in Gaza are educated as a result of the political, social and economic pressure during the last 4-5 decades. As most of the pesticides used in the Gaza Strip are imported from Israel, none of the farmers can read Hebrew language, by which most of the instructions are written. This suggests that any imported pesticides should have an Arabic translation of the instructions either by the manufacturers or the importers.

2. PESTICIDE SOURCES

The farmers were asked about the place from which they buy pesticides, all of them indicated that they get it from the local market (Table 2). This was not the case in Rafah Governorate, where some farmers get their pesticides from other sources, e.g. the extension services, the Israeli settlements in the area (Abd Rabou and Al-Agha, 1998). The pesticide local markets in the Gaza Strip are not governmentally supervised. Obtaining pesticides from the local shops is considered a source of risk to both farmers and crops. This is because the shop's owners are not qualified to guide the farmers to the instructions of pesticide use.

3. EATING, DRINKING AND SMOKING DURING HANDLING AND APPLICATION

Although eating and drinking are prohibited during handling and application of pesticides, only (2.2%) of the interviewed farmers admitted that they drink or eat, while others said that they do not do so (Table 3). Regarding smoking, 57.8% of the farmers are smokers, while 42.2% are non-smokers (Table 4). It was found that 15% of the smokers smoke sometimes during the handling and application of pesticides. The low percentage of the non-eaters or drinkers during work was explained to us by the farmers due to the fact that, they definitely know that pesticides are toxic and may rout to the human body during eating or drinking. The high percentage of smokers is attributed to the fact that all of them do not know that smoking could have harmful impacts on the human body during application of pesticides. Other smokers said that they do not smoke during work only because they cannot do it.

4. PROTECTIVE CLOTHING OR WORKING CLOTHES

Protective clothes must be worn during handling and application of pesticides. However, it was found that none of the farmers has real protective clothes. But what they have is just clothes for work, which are different from those clothes clothed by the farmer during his normal life. The definition of the protective clothes by these farmers is not more than “working clothes”. We had seen many of these clothes used by the farmers and they are not more than second-hand or even third-

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### Table 1: Educational level of the farmers

<table>
<thead>
<tr>
<th>Education</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-educated</td>
<td>3</td>
<td>6.6</td>
</tr>
<tr>
<td>Primary school</td>
<td>6</td>
<td>13.2</td>
</tr>
<tr>
<td>Preparatory school</td>
<td>10</td>
<td>22.2</td>
</tr>
<tr>
<td>Secondary school</td>
<td>19</td>
<td>42.2</td>
</tr>
<tr>
<td>University degree</td>
<td>7</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2: Pesticide sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local shops</td>
<td>45</td>
<td>100</td>
</tr>
<tr>
<td>Extension services</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 3: Eating and drinking during pesticide handling and application

<table>
<thead>
<tr>
<th>Eating and drinking</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>97.8</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 4: Smoking during pesticide handling and application

<table>
<thead>
<tr>
<th>Smoking</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26</td>
<td>57.8</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>42.2</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 5: Wearing of Protective clothing (working clothes)

<table>
<thead>
<tr>
<th>Protective clothing</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>46.7</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>53.3</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 6: Storage of pesticides

<table>
<thead>
<tr>
<th>Storage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special store</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Home</td>
<td>36</td>
<td>80</td>
</tr>
<tr>
<td>Farm</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>
hand clothes. Some of these clothes were found with several holes in it, and some were found as short-legged pants and short-sleeved shirts. Shoes were found occasionally worn, and socks were very rarely worn. Thus, the term -protective clothing- was applied here according to the definition of the farmers themselves. This does not mean that the authors agree on such status. It was found that 46.7% wear these clothes, while 53.3% use their normal clothes (Table 5). 90% of the farmers do not know that pesticides may rout to the human body through skin. Such a risky and striking result needs urgent and serious campaigns among the farmers to raise their awareness and the health risks which they are exposed to.

5. STORAGE OF PESTICIDES
One of the striking results of this study is that 80% of the farmers store pesticides in their homes or houses, while only 20% store them in the farms (Table 6). Some of the farmers were asked why they used their homes for pesticide storage and they answered that pesticides may be lost or stolen in the farm, because they do not have safe stores in their farms.

6. DISPOSAL OF EMPTY CONTAINERS
Most of the empty pesticide containers are considered as one of the dangerous hazardous wastes, if they were not thoroughly washed and rinsed after use. 53.4% of the farmers dispose of these containers either by burning or burial in the farm depending on the type of the material from which the container is made (paper, plastic or metal). 44.4% of the farmers throw these containers away in the farm or along its fence. Both of these do not rinse the containers after use. 2.2% of the interviewed farmers admitted that they could use these empty containers for domestic purposes when the size and the shape are affordable for some kinds of uses (Table 7). In the Third World countries, the use of the empty pesticide containers for domestic purposes is common.

7. DRAINAGE OF PESTICIDES ON THE HUMAN BODY/SKIN
The farmers were asked on their behavior when pesticides drain on their bodies during application. 44.5% said that they take their clothes off and wear others. While 48.9% stated that they do not care when pesticides drain over their clothes and/or bodies and continue their work, after then they will have a bath. The remaining 6.6% of the farmers said that they do not care and even do not bath after finishing their work; they just take their clothes off in the end of the day (Table 8).

8. PRE-HARVESTING INTERVAL
Pre-harvesting interval is the period which must be left between the application of a pesticide in the farm and the harvesting of a crop. This is to ensure that pesticide residue on the crop becomes within the acceptable and safe limits for human use (GIFAP, 1989). 46.7% of the farmers allow for only 4-8 days to harvest their crops, 37.5% were harvesting 1-3 days after application. 15.8% of the interviewed farmers waited from 9-15 days to harvest the crop (Table 9).
9. ATTENDING TRAINING AND/OR AWARENESS COURSES

4.5% of the farmers said that they attended training courses in various agricultural topics, where pesticides were part of the training material. While 95.5% of the farmers pointed out that they never attended such training courses and even they are not invited to these activities (Table 10). This is of course, backdated since they started their work, where we stressed on this point during our survey.

10. HEALTH COMPLAINTS

During the present survey, 44.5% of the farmers stated that they acquire some health complaints during application of pesticides (Table 11). On the other side 55.5% of the farmers indicated that they do not have any health problems during application of pesticides. 8.9% stated that they have diseases that are not related to their work, while the rest 91.1% pointed out that they do not complain of any disease (Table 12). Farmers who have health complaints during the application of pesticides, showed that they have coughing, headache, skin rashes, chest pains and difficulty in breathing.

DISCUSSION

The results of this survey showed that there are many dangerous and hot spots in the life and the health of the farmers during handling and application of pesticides. Several striking results were reported such as protective clothing, eating, drinking, and smoking during pesticide handling and application, pesticide waste disposal, storage and pre-harvesting period. Other issues were of high importance like the health complaints and the low percentage of farmers attending training courses. All these hot issues are of very dangerous impacts on the farmers’ health and even the public health in general. The risk of pesticides to the human body depends on the exposure and toxicity. The long exposure periods are very dangerous on the human health, even if the toxicity is not high. On the other side toxicity of pesticides is variable from one type to the other. Long period of exposure of low toxic pesticide could produce risk more than a high toxic pesticide with short period of exposure. In this study, some farmers did not give attention to the exposure period and even the routes of exposure. Such results indicate how the situation is, and these suggest an urgent and serious action. In order to minimize exposure awareness campaigns and training courses are strongly recommended to start soon. However, the issue of the protective clothing is a very hot spot to which the attention of the government and the farmers must be directed. It is very sad situation that none of the farmers wears real and healthy protective clothes.

CONCLUSION

Khanyounis Governorate depends mostly in the agriculture as the main source of income to many of its population. Several poisoning and death cases were reported in this Governorate in the last few decades as a result of pesticide mismanagement. Several types of carcinogenic and internationally banned pesticides are still in use in the Gaza Strip as a whole. The survey indicated that the situation in Khanyounis Governorate is horrible regarding the awareness of the farmers on how to deal with pesticides in a safe and healthy way. It is very obvious that the most dangerous issue is the protective clothing, where none of the farmers found wearing a safe and healthy clothes. Another important issue which is the storage and disposal of pesticides, where about 80% of the farmers uses their homes to store these toxic materials. Eating, drinking and smoking while application and handling of pesticides was found also a hot spot. Pre-harvesting period is not strictly followed by the farmers. The health complaints (coughing, headache, skin rashes, chest pains and difficulty in breathing) were expected as most of the activities related to pesticide handling and application, were done in an improper and unhealthy way. These are the important components of the environmental health and awareness among the farmers in Khanyounis Governorate.

References


