





Community Medicine



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* We mentioned the **mode of entry** before and there is a table that will explain to you the **cause of exposure**, how you're going to be exposed to these materials whether *orally, dermally, inhalation* or *ocular*. (Please refer to the slide # 26)

* **Prevention of exposure: (please refer to slide #27)**

-if you understand the process of spraying of these pesticides & the entry routes of them, then you will start to think of a way to protect people from these exposures.

1- Use strictly according to manufacturer's directions:

ex: if you take a container of pesticides, there will be directions on the bottle for you to explain how to use it, usually farmers don't follow them, they use certain instrument a "container for measurement" like an old glass or bottle for everything, they never use the instrument measurement found within the container package, so the measurement will be approximately and they tend to add more because they like to be sure that the effect of this material is guaranteed, the addition could be a large amount so the amount of pesticides remaining will be higher than usual.

2- Mix or dilute outdoor: don't do it in closed places.

3- Apply only in recommended quantities.

4- Read pesticides labels.

5- Wear proper "PPE= personal protection equipments"

6- Wear proper eye cover, as we mentioned before there's ocular exposure.

7- Use respirator whenever it's needed like when you use pesticides with high toxicity in closed places.

Ex: in the farm in plastic houses.

8- Never eat or drink while working.

9- Never clean a nozzle with mouth,

it's the place from where pesticides are coming might get blocked, don't try to put your mouth and blow through it to remove what is precipitated and end up swallowing some of this material.

10- Safe disposal of pesticides.

* There is a slide with a warning sign, it gives you an impression. (Please refer to slide #29)

***just to have an impression about the size of the pesticides problem (please refer to slide #30)**

- US used **4.5 billion** pounds of pesticides per year. (Pound=1/2 kg) proximal.

-in US **890** active ingredients, 30,000 formulations (wet, dry...) was used.

- Uses:

75% agriculture, **25%** at home...

home use is important and have to be taken in considerations, for example in Jordan in 1990, he evaluated how much was used in home and found it even more than agriculture ._.

*** Potential problems we anticipate from these pesticides: (please refer to slide #31-35)**

1- Resistant of pests to pesticides.

Ex: malaria has been controlled in many parts of the world for a while, and then economical problems started like war, so these countries became inefficient in controlling it, like using less amounts of pesticides, less frequency of spraying. Malaria is back, this new generation of mosquitoes are resistant to pesticides.

2- Enhanced degradation, degradation of certain materials might be affected by these pesticides, it interferes with it.

3- Damage to biological control organisms like BT.

ex: the southern part of the US was used to be inhabited in huge amount of harmful mosquitoes, one way to control this huge number is to raise a new kind of **giant** mosquitoes that don't transmit disease; they feed on the larva of the harmful ones. Or use certain kind of fish called Gambizi fish; they also feed on the larva, so we control mosquitoes by using this fish, however when we use different kind of pesticides we might kill them and damage them.

4- Damage to pollinating insects like Bees, their function is to transmit pollination

from one tree to another; if it's killed it will reduce the amount of crops.

5- **Hazards to wild life and endangered species**, some of these pesticides are wide spectrum and might not limit their killing, it can kill others.

We talked about water before, we mentioned chemicals in water, and the first group was chemical that can cause effect after increasing their level one of them was pesticides.

But again **POLLUTION OF WATER RESOURCES: (please refer to slide #36).**

-**Erosion**: water may be contaminated by pesticides and when you have erosion of the soil; the contamination will be carried to the water sources.

-**Ground water**: it may be too expensive or impossible to clean it up, a country like Jordan that depend on the ground water if it get polluted it will be a problem for us to clean it ._.

it can contaminate the plants, it affects **phytotoxicity**, it can contaminate the soil. **(Please refer to slide #38-39).**

- everyday we all might be exposed to pesticides even if we are far away from it, here is a representation of the exposure of people to pesticides in the form of **pyramid**, on the top of it we have few people with very high exposure, these are *farmers, sprayers, manufacturers & people working with these materials.*

Then we have another group under the small triangle at the top, it's *where people are exposed to relatively high levels, living in farm areas without practicing farming.*

(One of the doctor's studies: he took blood samples from farmers before spraying seasons & examined the impact of pesticides on them, after the spray season he took another blood samples & examine it.

In the same time he took blood samples also from people living nearby, and people from the cities far away.

So farmers are severely affected, to less extent for the people living nearby and to much lower for the people living far away, this continues until the spray season is over, he kept taking blood samples until the results are normal, this takes about **2 months** for people like farmers and the ones living nearby, also it takes 2 months

for the liver to regenerate its ability to produce certain materials in the body, same pattern was seen for the others.)

- What about us people living far away? There are **pesticides residues**; it's the remains of pesticides on the crops.

- Ministry of agriculture in Jordan for example, they take samples of the crops in the markets and test them for the residues and when they find it higher than usual (it's allowed for a certain limit to have them according to the standards), they should do something for that farm like a fine... majority of time we have already eaten the crop, sometimes it is tested before reaching the markets, however this is not easy to do.

- the pesticides residues are found in our food and they depend on the nature - what type of material we are using-, so when you eat a cucumber you're eating 2,3... types of pesticides in it.

Most of the times it is kept within limits, some of these residues are **systemic** (found inside) cleaning or peeling won't help.

We need the government to take care of it. We have a center in Al-Baka'a. This center is part of the national center for agricultural research. The standards used in Jordan are taken from **Germany (GTZ people)**, and it might be good or bad. _.

-In 2007 there was **household survey**; they took information about the pattern of eating or consumption of crops in Jordan, so if you try to take how much people eat cucumber in Jordan and how much pesticides residues on it, then you know the daily consumption, then we can judge if these standards are good or not cause the daily consumption of cucumber for a German family differs from here. From this study we can judge whether the German standards are good or not.

* **Slide #41** shows the difference of consumption or the impact of the pesticides on human being in different countries, in **Sri Lanka** the # of hospitalized people is high, although the amount of pesticides they use might be less than the ones used in the US due to the following up and surveillance there.

Jordan doesn't have numbers because we don't have good reporting & we don't follow the patient up.

slide #42 shows the targets of all materials that were in water, food, pesticides. Where do they go in the body (**Don't memorize them**).

slide #43 these are some articles talking about pesticides and its relation to some **chronic** diseases like Parkinson, pancreatic cancer and lymphoma.

*The effect of pesticides on human being can be:

1- *acute effect*: when you consume large amount and get intoxicated directly, it depends on the nature of the pesticides, we don't have one acute effect in US there's 890 different effects according to the active ingredients.

2- *chronic effect*: it won't show in one day or 2 it needs several years of exposure until you have this problem.

And these effects could be carcinogenic, mutagenic or teratogenic.

It can cause *infertility* that brings the attention of farmers, mention cancer and nobody says a word but mention infertility and everyone loses their mind._.

slide #44

population at risk,

like people living nearby or the sprayers or applicators who don't follow directions.

the end of the slides.

- We mentioned the use of pesticides as one group of **chemical warfare**; chemical warfare includes **nerve gases** such as *sarin, tuban*.
 - Nerve gases are **organophosphorus**.
 - The mode of action of organophosphorus compounds:
it binds to the Ach-ase, there will be continuous stimulation, the muscles become stiff, the chest muscle won't be able to breathe anymore, excessive secretion lead to dry drowning, the fluids will fill the body.

- **Carbamates** cause pin point pupil in the eye.
- Carbamates & organophosphorus compounds will give you the **same** symptoms, however there is a difference, carbamate effect is **reversible** if given time it goes back to normal, the link between the carbamates and the Ach-ase will break.

organophosphorus compounds lead to **aging** process, the link is difficult to be broken, you start giving the patient **atropine**, the patient won't respond.

- We need other things like **2 PAM** (Pralidoxime) will help regeneration of new Ach-ase, might help the patient at that moment.

Diazepam is added to relax the muscle.

It was given to the soldiers during gulf war this **vial = atropine+ 2 PAM + diazepam. Some soldiers got sick because they used it in the wrong way.**

- It should be taken carefully.
- 2 PAM is dangerous to be given for a carbamate person cause there will be huge amount of Ach-ase in the gap leading to no impulse transmission, so you need to differentiate between it and organophosphorus since they have same features, and they way of differentiation is to read the label and bottle --
- 3 specialists had a patient; they suspected that he had organophosphorus poisoning. He had carbamate poisoning. They wanted to give him 2 PAM, but luckily they didn't find 2 PAM. If it was given to him, he would have died.
- soldiers were affected with gulf syndrome because they injected themselves with 2 pam at the wrong time.

- Pin point pupil could be a symptom of **morphine poisoning, carbamate or organophosphorus.**

**So you need to be careful 😊
please refer to the slides.**