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Intoxication and risks derived from exposure to pesticides in farmers Metztitlan Hidalgo, Mexico

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Original article

Abstract: The aim of the investigation consists on describing the toxic impact of pesticides, as well as analyzing farmers' awareness and knowledge about their uses and risks by conducting a discourse analysis and community intervention in Metztitlán Hidalgo, Mexico**.** A qualitative intervention study was conducted with a phenomenological-ethno methodological pragmatic design through the analysis of the discourse of 4 people, where three of them had been intoxicated by pesticides, as well as one vendor of these products. In three phases, a contextual tour was performed. Photographs of the agricultural context were taken, especially when the pesticides were being applied; depth interviews were applied, and finally categories were structured in order to conduct the analysis of people speech. Exclusive irrigated crops were observed. Utilizing water from River, the applicators mix the pesticides in a plastic barrel and then application tanks are filled. Their hands are even used to verify the filling. They do not have equipment to provide them with the minimal protection for the managing and application of the pesticides. The empty containers thrown on the ground indicate the type of pesticides used by farmers. The people intoxicated have required hospitalization and they made reference to some deaths due to the exposition to these products. The farmers-applicators of pesticides are not aware of the risks to which they are exposed to. This is correlated with the low level of pupillage that farmers mentioned to have, as well as with the lack of accessibility to buy equipment for personal security.

Key Words: application pesticides, exposition, intoxicated, knowledge risk, toxic impact.

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Introduction

Food demand for the world population, economic development and population growth has required food production on a larger scale. In order to ensure production the use of predominantly organophosphate and carbamate pesticides in agricultural and health activities has been increased (Cortez Genchi, et al., 2008). A Pesticide is defined as "The substance or mixture of substances that are bound to control pests, including vectors that transmit human diseases and animal diseases, and species that are not desired that cause damage or that interfere with the agricultural or forestall production, even the defoliants and desiccants" (De la Iglesia and Delgado, 1987; SEMARNAT, 1996; 2007; Camarena et al. 2012). Since the 1930's, has begun the synthetic chemical pesticides production. Then, after World War II, the production and use of pesticides and fertilizers began at a greater scale. (WHO, 1990). The extensive application of pesticides is a common practice around the world. Although the production and marketing of certain pesticides which are harmful to humans have been banned, other products continue to be used, without being fully aware of the negative impact that these compounds may have on ecosystems and public health. Therefore, unintelligent use of pesticides has led to reduced connectivity (trophic interaction between organisms), loss of biodiversity, ecological imbalance and environmental stability decreased. Consequently, the lack of rational use of pesticides by men has been and is still threatening the sustainability (Prieto, et al, 2012). On the other hand, more than a third of the whole population in the world work in agricultural activities.

The World Health Organization (WHO) estimates that each year there are in the world around one million acute poisonings by pesticide exposure, with a fatality rate of 0.4% and 1.9%. Occupational exposure would be behind with 70% of these fatalities. Contact with pesticides has been associated mainly with intoxication, nervous system disorders, reproductive problems, effects in the immunity system, alterations in the endocrine system and in more severe cases, the presence of cancers and tumors. According to the prevention of risks in the use of pesticides, the risks are

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a result of a conjunction of different variables like toxicity, time of contact, amount absorbed or the concentration of the product, entry way of the toxic into the organism, individual susceptibility, and manipulation. (UNEP, UNICEF and WHO, 2002; Godina, 2004, Badii y Landeros, 2007; Ascarrunz et al, 2006).). However, the agricultural workers have a lack of information towards the use of pesticides and have little access to the necessary information. Even though the workers know that they are using the pesticides in an inappropriate and insecure way, they fear the consequences of refusing to do the job or getting informed about them. (De la Iglesia and Delgado, 1987).

The risk for the agriculture workers is influenced by diverse factors, one of them is the necessary equipment that could be not available, in bad shape, or that can be inadequate for the climate conditions. And even though the equipment was available, the socioeconomic status influences its acquisition. On this matter, pesticides are often being used in an inadequate form and with incorrect concentrations. With frequency, the packaging of the pesticides are not labeled or the labels contain information that farmers cannot read due to insufficient literacy skills.

In Mexico, synthetic pesticides have been used since mid-century. Actually, they have been converted into a necessity for agriculture. There are several government agencies for the regulation of sales, use and application thereof. These units are focused on ensuring food Safety and Quality (SENASICA) and the prevention of risks from exposure (Ministry of Health through COFEPRIS). These units provide technical information (COFEPRIS, 2010; SENASICA, 2013). However, there are risky scenarios associated with mishandling by lack of information or a lack of perception of risk management, use and final disposal of pesticides. In Mexico, it is estimated that about 71% of pesticide poisonings occur due to occupational factors in male working age population (15-44 years) (Ministry of Health 2013). In a study conducted in the community of Tixtla, Guerrero., 303 farmers of vegetables, grains and flowers where evaluated, where 23% showed any symptoms, the most common were headache, itching, dizziness, skin burning and tingling (Cortez were evaluated

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Genchi et al., 2008). The poisonings are mainly due to organophosphate, followed by carbamates. (Rodríguez, 2005; Hernández 2007). A qualitative investigation was designed from a pragmatic approach where the group of investigators pursue to explore and to document what it indicates,(González, 2006) "each human being considers what is true according to what is useful in their daily life" and ever since phenomenology, with special emphasis in the essence of the human experiences, and from an ethnomethodological approach (Caballero, 1991; Sánchez, 2008; Sandoval, 2013), which emphasizes that the characteristics of societies are produced by the motivated adhesion of the people and their expectations of the world where they live and socialized in, where the ordinary practices are their own reality (Garfinkel,1967,2002).

Geographical location context

Metztitlán community is located at 81 Km of Pachuca city in Hidalgo, Mexico and at 175 km of D.F, its coordinates are 20 ° 31' and 20 ° 43' N and 98 ° 37' and 98 ° 52' W and has a length of 1,264 m. The main use of the rangeland soil is in a very small a part of agriculture (http://www.inafed.gob.mx). Farmers in the community of Metztitlan use agrochemicals to increase crop production, without adequate protection to counteract the toxic effects of the pesticides used, it is therefore important to describe the toxic effects documented by each of them in order to know the drawbacks.

The **aim** of the investigation consists on describing the toxic impact and awareness of the utilization of pesticides by farmers through the analysis of discourses and community intervention in Metztitlan Hidalgo, Mexico**.**

Material and methods

A qualitative intervention study was performed with a phenomenological-ethno methodological pragmatic design through the analysis of the discourse of four people,

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where three of them had been intoxicated with pesticides and one vendor of these products.

This project was developed in three phases. The first phase, known as Contextual Recognition in which the investigation group moved among the Metztitlán population to perform a contextual tour. Pictures of each of the harvest zones were taken. Close ups were done with the workers who apply such substances. Some of the investigators focused on the search of field workers that had suffered ravages due to the exposition to pesticides for the second phase was conducting interviews. Questions and mediation were done in order to facilitate the participation of people; as well as to obtain greater veracity and as much information as possible by exploring their discourse, the way how they have been living with their environmental surroundings and their experience when applying pesticides. In a general way, they were questioned subjects that were previously explained in an interview guide. Notes were taken, the information was recorded and transcribed and finally the analysis of their speech was done, establishing categories looking forward to rescuing their experiences in their work with pesticides. The measures that they indicate to have when applying pesticides and even their awareness towards the risks they are exposed to in their social context were analyzed.

The analysis of the investigation is from an interpretative perspective but based on the exploration of previous knowledge of the population that is going to be studied, in this case, the life experiences in their social-environmental context, adds Rodríguez (2009).

In the human sciences, qualitative investigation is like a multicultural process." It is here where the following investigation in a social-cultural level finds itself immerse in an area of the environmental sciences of qualitative studies about contamination-exposition to pesticides that seems like it has not been investigated from this paradigm of investigation. Based on Bowen, (2005)

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Results

The results showed as follows make reference to the data collected from the observations conducted; the analysis of answers and comments made during the interviews and in the last phase results correspond to the analysis of the discourse; in order to facilitate the understanding of the data collected, information was organized into a table; in order to explain the information obtained in the first two phases. The tour in the social-environmental context allowed checking an entity that is a highly producer of food resources not only for human consumption but also for the maintenance of animals. It is common to find trucks and tractors that transport fodder on the road on their way from Metztitlán to other communities in the town.

The context denotes the importance of conducting scientific investigation in the town due to the fact that the cases adjoin with food stores and other types of businesses. It was possible to talk to people who attend businesses that sell these products and which denote lack of knowledge about the toxicological risks implied in selling these products. A photographic record was obtained from other businesses or convenience stores. The presence of seeds in sacks and in opened recipients were also observed. People who own such stores do not sell accessories or special equipment, outfits that avoid the exposition to pesticides such as gloves or masks. A consumer remarks the following “In some part of Pachuca city people sell a type of raincoat to cover the body up when you apply the pesticides but it´s uncomfortable and they don’t sell masks or anything.” This denotes that there is not accessibility to buy accessories for personal protection to apply pesticides.

This represents an area of opportunity to work over the creation of public politics and rules that establish the access to personal security. In the fields you can observe that there are empty containers as trash generating contamination that has not been evaluated yet and that are considered as a risk factor for the health. In this context we observed that the types of harvest are irrigated crops and even though a sewage river passes close by, they use water from the river. People get surprised when being asked

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about the application of pesticides, but they get even more surprised when asked about the risks behind the exposition to pesticides.

The workers of the businesses that sell these products, and even the field workers, indicated in their discourse that there were not any risks in applying these types of products. A great amount of these products have a label saying “Lightly toxic product” and we wondered, “Is it or is it not toxic?” And we considered that obviously it is toxic and that it indicated that it is an affirmation to their toxicity. The level of school education that the fieldworkers have is very low and that in a way has to do with their scarce level of critical analysis about the toxicity of such products. Therefore it has to do with their exposition to risks, risks that are not only personal bur risks for their families as well. At an environment level these products can be airborne and get impregnated onto their clothes by leaving empty containers of such products on the field.

Deep interviews to intoxicated workers about their exposition to pesticides

One of the pesticides that is being most used in that zone is FURADAN. We searched for people that had been intoxicated and once found, we talked to them in order to inform them about the project, and they were also told about the confidentiality of their data. It was important for us and for them to speak to us openly about pesticides specially after building rapport; we proceeded to apply the depth interview. Thus, data was registered, transcribed and an analysis of people’s discourse was performed. The first chart denotes that it is urgent to work on people awareness of applying agricultural products with the correct attire to avoid contact and other risks. (charts 1, 2, and 3.)

Participative observation in the context of usage of pesticides

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Discourse of a seller of pesticides and other agricultural pesticides as well as the health risks in agricultural products with greater amount of sales.

30 year old male, Which are the products that are sold with greater frequency per week?= 60 liters of Lorsvan which are chlorpyrifos, it's an organophosphate, 60 liters of velcron— monocrotophos, 40 liters de Kaisen which are Methamidophos, 50 liters of arrivo which is a Cypermethrin , 20 liters of Beleaf whichs is a flonicamid, 60 liters of palgos which is an espinoteraun, On harvest times they sell Lapinox, Top class, auxigro, enrk, lannate, approximately 20 liters of FURADAN which is a carbofuran, 10 dosis of muralla which is a imidacloprid plus betacifluxtril, 10 doses of lannate which is a methomyl, for example, one liter of FURADAN gets dissolved in 400 liters of water. We recommended them no to have contact with these products. Use mouth covers and gloves. They indicated that protection equipment is not sold.

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Figure 1. Health risks. Field workers in Metztitlán. The photographic records demonstrate that exposition to pesticides and to a diverse of agrochemicals exist, but it is fundamental to indicate that health risks also exist.
This demonstrates the cases of intoxication where they signal the observed symptoms and feelings of each.
The risks are not only acute; they can also have a chronic effect. EPA Environmental Protection Agency indicates that the substances that provoke an effect in high doses can also be provoked by low doses.

Discourse analysis under the category of common knowledge about the application of pesticides.

1er category; Common Knowledge about the application of pesticides.	2a category: Toxic risk.	3a category: Toxic impact.
[1] Can you tell us your experience as a field worker and the managing of pesticides? [2]How do you know which one is toxic? [8]Is capacitation given to you?	[4]What type of pesticide was it? [5]Do you know what security measures to take? [6]Have you heard about furadan? [10]Do you know the characteristics of the protective suit?	[3]Have you been intoxicated? [7]What is your marital status? [9]What is your opinion about pesticides?

Chart 1. Discourse analysis under the category of common knowledge about the application of pesticides.

1er category; Common Knowledge about the application of pesticides.	2a category: Toxic risks.	3a category: Toxic impact.
[1]21 year old male. Mecanic. Sometimes gets hired as a fumigator E1P1: They are applied according to the types of pests, some are for flowers and others as insecticides. E1P2: In the label it says that they are highly, moderately or lightly toxic and that special equipment because we may be allergic. E1P8: No, the boss explains but it's not a especial training. I don't use protection equipment because there is none, supposedly the boss knows, he	E1P4: I think it was an (arrivo) and with that I got intoxicated. E1P5: No, when I started fumigating. I wasn´t going to school. That was like 6 years ago. I was young and unexperienced. The bosses; some are responsible and others are not, now the boss gives me milk before applying them. E1P6: Yes but I haven´t worked with it. Only with liquids for bugs, nothing else. E1P10: The suit is like an overall, completely plastic. What did you do to the clothes that you wore the day you got	E1P3: Yes, we started fumigating early and I got splashed. After that I went to eat and then I started feeling dizzy. I felt very bad. I went to the hospital and they had to give me serum and something for the intoxication. I had not read that I could have drunk milk to avoid it. E1P7: I´m married. I have a girl. She is fine. Everything has been ok since she was born. What made you change your job? A= I like to be a mechanic, but I also like working on the fields. E1P9: Right now there is a lot

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has to acquire them. The mixtures depend on the type of pest. Some get mixed with others and then with water.	intoxicated? A= I threw it away. It even had an odor. Even my skin had an odor. Even after showering. Maybe the toxic washed off but the odor didn´t.	of pest and it's necessary to get rid of them.

Discourse analysis

The discourse of these people confirm that risks exist. Even though, one of the interviewees changed his job, he occasionally does these types of jobs. He knows how to read instructions on containers. He indicates that he must wear special equipment for application, but he got intoxicated by contact, which indicated that he didn't use protection gear. He was 15 years old. This denotes the necessity to work at that age and under risks without training and without equipment. The clothes he used turns to be exposed at home and to the environment. Since the containers get thrown away, it's clear that there exists exposition due to the fact of the skin conditions.

Chart 2. Discourse analysis under the category of common knowledge about the application of pesticides.

1er category; Common Knowledge about the application of pesticides.	2a category: Toxic risks.	3a category: Toxic impact.
[2] 21 year old male. Son of a farmer. Owner of the land. E1P1: My dad told us to fumigate, he explained but we forgot and we got confused. E1P2: We didn´t know what we mixed. E1P8: No, we read what was on the container.	E1P4: We didn't know what we mixed. E1P5:No E1P6: Yes E1P10: No	E1P3: One guy who helped me started shivering and we took him to the hospital and they kept him for 5 hours. I was 18 years old. We didn't even know what we mixed. We struggled in getting him to the hospital. He had nausea and sleepiness. We had only fumigated a little, like two tanks. The next day my dad went with another guy to finish the job and the same thing happened. He went to complain to the person who sold us the product and the guy said that only one fourth of a liter was to be used for each tank. E1P7: Yes, I'm married. E1P9: Yes, they are toxic.

Discourse analysis

The discourse of this person's interview confirms that risks exist. They applied pesticides without knowing what they mixed, He mentioned some symptoms that his helper had. It had been little of what they applied. He indicated that his father went

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with another man the following day who also got intoxicated as the first helper. They had applied a lot of the product when they only had to apply one fourth of a liter into the tanks. They have little knowledge of what they were applying. He did not know any security measures. He knows what furadan is. This product is what they had applied. He recognizes that pesticides are toxic but does not know the characteristics of a protection suit which indicates that they do not used them.

Chart 3. Discourse analysis under the category of common knowledge about the application of pesticides.

1er category; Common Knowledge about the application of pesticides.	2a category: Toxic risks.	3a category: Toxic impact.
[3] 36 year old male E1P1: It has been said that there has been people who have been intoxicated. Some are unknown cases. He says that he had to be hospitalized. He went to the physician. The principle symptoms were vomit, dizziness, diarrhea, and even death. Protection isn´t used because of the heat. The bosses don't worry about a fumigation schedule. In all his life he has seen that agrochemicals are used. He has two sons. One is 5 years old and the other is 1 year old and 7 months. He says that a women who worked selling these products for 6 years is not fertile. She got diagnoses with something at 25 years old. E1P2: They are toxic. E1P8: Only recommendations from the place purchased.	E1P4: (We didn't get an answer. He turned his head and looked at some containers) E1P5: No we don't used protection because of the heat. E1P6: Yes E1P10: No, we don´t used protection because of the heat.	E1P3: Yes the principle symptoms are vomit, dizziness, diarrhea, even death. A woman who sold these products for 6 years can´t have children. She got diagnosed with something at 25. E1P7: Married. A child of 5 years old and another of 1 year old and 7 months. E1P9: It didn´t get explored (The interview was applied in the place where it gets sold) The seller had an opinion "We recommend them to not have contact with these products and to use mouth masks and gloves." They indicated that they don't sale any type of protection.

Discourse analysis

The discourse of this person´s interview confirms that there are risks. He indicates that some cases are unknown. He even got intoxicated and had to go to the hospital. He even mentioned some symptoms that he encountered when being intoxicated. He indicates that there are toxic products that can even cause death and that a woman who had been working during 6 years in selling these products, couldn´t have children, something that was diagnosed at the age of 25. He does not indicate having

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no knowledge about protection but he still applies it without protection because of the heat.

Discussion

The ordinary practices of every day are the reality of the people. (Garfinkel, 1967, 2002; Ramírez et al, 2002). It is demonstrated that the discourse of the farmworkers and applicators of pesticides express the essence of their experience on managing these types of chemical substances, but also reflects the scarce knowledge that they have about personal care. They are people who expose themselves to health risks and that had suffered due to exposition to pesticides (Ramírez et al, 2002; Martínez, 2007; Maldonado, 2007). The relevance of this study consists on identifying the lack of knowledge on the utilization of security measures in order to avoid risky exposition to pesticides. This highlights the lack and weaknesses that exists in the matter of environmental legislation which opens the door to search for public politics or to simply modify the rules regarding the use of pesticides in our country. For example, furadan is a pesticide that is prohibited in Europe and the United States of America due to its toxicity and its impact in public health. In Mexico, it is supposedly endorsed under some circumstances. This allows the possibility to influence the improvement of safer work conditions for field workers.

Some of the conditions that are needed in order to provoke a toxic effect are that there must be an interaction between the substance and a biological organism. This requires the balance between different biological factors such as a.) Contact (location) needs to be established so it could be transported from the exterior to the interior, b.) Solubility of the compound and, c.) The reaction tends to be balanced, unless the toxicity gets eliminated. Other complementary aspects result from contact, transport, or absorption. All living beings are protected by different barriers (membranes) against the environment that surrounds it. So a reaction in the compound could take place, it needs to be transported from the exterior to the interior. The transportation of

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a compound implies its exposition to different parts of the organism like for example: kidneys, liver, sweat glands, respiratory tract, gastrointestinal tract, etc. Also, during the transportation it could be biotransformed, deposited (stored), or reach a specific site of action ("locus") causing biological alterations and this is demonstrated in the expression of the discourses of the people who have had intoxication by pesticides. (Paz-Miño et al, 2007)

Yes, agriculture is being benefited with the utility that pesticides generate by decreasing the amount of loss of crops and increasing the agricultural production, but it is necessary to indicate that accessibility does not exist in reference to the farmworkers or applicators of pesticides to get their personal security equipment to avoid contact with such chemicals. It is demonstrated that its necessary for the authorities in charge to emit rules that monitor that these things get done and therefore guarantee a better quality of life and more time of life in years for the workers and their families; and to avoid exposing their own family and environment, since they mentioned in their discourses that they do not count with their work equipment because there are not any places to buy them. They throw away the clothes that they used for the application of pesticides; there is not even little knowledge about the risk they are being exposed to.

The toxic effect of pesticides has been demonstrated in people that work in the fields that are exposed to such substances (Paz-Miño et al, 2002, 2004, 2007). Even in animal models like rodents of both genders from the NMRI and Balb C strains are being used (Arecimbia y cols, 2009), and it seems that we would have to check in our country, if for example, if the pesticides and their formulation are imported to other countries and if in Mexico its danger is not being evaluated. This is done in the country of origin, efficacy studies are only done if the conditions require them. This means that the production is more important that the exposition and risks for health. Even though the containers are normed, the fact that they say that they are lightly toxic means that they are toxic and that it is obvious that measures are required in order to avoid contact. This leads us to a reflection, what is going on then? Why not

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conducting studies about the evaluation of the risks. In the paradigm of the qualitative investigation the principal instrument is the investigator.

The investigator must be conscious that common sense is an inevitable resource once doing the investigation, according to Martínez (2002). Observation is used, audio and video is recorded, which facilitates the ability to analyze repeatedly the scenes; in that way we could check and facilitate the interpretations. The conversations obtained from the interviews are transcribed, the information received gets organized as subjects, the transcription of each one of the discourses and the interpretation or analysis of the discourse. To complete and analyze the discourse, special attention and interest was put on the notes and photographs taken during the application of the interviews. This denotes the difficulty that exists on the risks of applying the pesticides without protection, even though some of them had gotten intoxicated. The purposes of the qualitative investigation were oriented to interpret the reality. This is done by social actors. The phases include the planning of the study until the recording of each one of the changes could be necessary to begin with the study. In a certain way it is flexible in the sense that the investigator would have to be prepared to record what he would like to analyze with objectivity, but even more with what could be presented during the investigation. The investigator would have to establish what his focus is and see what method to use so he can establish categories from the informative data and realize his analysis. (Denzin, 2003; Salamanca&Crespo, 2007; Rodríguez 2009). This situation was taken into account during the investigation. The difficulty to obtain information makes us take advantage of the information obtained during the fieldwork.

On another hand, they are in direct contact, the most risky activities are weeding due to the fact that the plants need to be touched and that pesticides are being inhaled. Also the plants need to be “painted” with fungicide to cure the diseases that they have. Since they touch them with their hands, it provokes them vomit and headaches as they are in the greenhouse and because they are breathing the “liquid” that was applied in the grooves. Even though they recognize that the discomforts such as

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vomit and headaches are associated with pesticides and that these are poisonous, they don't catalog it as intoxication. When they go to health services with these conditions, the physicians only provide medication without giving them follow ups as a case of intoxication.

Conclusions.

The qualitative investigation represents a methodology to explore the discourses of the people, their expressions denote their lack of awareness about the risks for their health. The exposition to pesticides requires the interest of scientific investigation.

The preparation of pesticides mixtures and how filed workers serve them into containers for such products represents a risk for their health. The process of putting them into tanks and evenly applying them makes important for us to take advantage of the discourses of the social actors represented by the farm workers or their exposition to pesticides to affirm that acute and chronic risks do exist due to the exposition to pesticides, even death, like some of the interviewed people had mentioned.

The interviewed farmworkers indicate in their discourse, the toxic impact of pesticides. All this comes from the scarce knowledge on the risks that come within the application of these chemicals. The scarce knowledge that they have about the security measures and the inaccessibility of the security measures needed to avoid the exposition, like the necessity to work is influenced in their socioeconomic status and by their health education.

Final considerations

Derived from the results obtained from the following investigation, it is recommended to those who have the possibility to incise in the generation of public politics where it takes in mind the control of sales of agrochemicals, the sales of protection equipment for the applicator, including the equipment that is being sold in independent establishments. That was if they sell pesticides these establishments can

form part of a package of buyer-seller of protection equipment. It is recommended that pesticide containers get controlled. Supposedly some are thrown on the ground, increasing the risks at population level. It is not possible that pesticides continue to be sold, offered or given away. If the field worker does not have the necessary protective equipment, they can easily receive a chemical bomb that will impact on their health and their families as well. The events of intoxication make necessary the generation of public politics in our country, Mexico.

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References

Arecimbia Arreola, D. F. Rosario Fernández, L.A. Rodríguez Y. López feria, Y. Díaz Rivero, D. Frecuencia espontanea e inducida de aberraciones cromosómicas en medula ósea de ratones NMRI y Balb-C de ambos sexos. *Revista de Toxicología*, 2009: pp. 8-22

Arellano García, M.E. Camarena Ojinaga, L. Alysse Von-Glascoe, C. Ruiz Ruiz, B. Zúñiga Violante, E. Tatiana Montaño Soto Daño genotóxico en mujeres y hombres expuestos a plaguicidas en cuatro localidades de Baja California. www.Gobierno Federal.Gob.Mx Www. Semarnat.Gob.Mx, 2012 pp. 95-114

Ascarrunz ME, Tirado N, Gonzáles, AR, Cuti M, Cervantes R, Huici O, Jors E (2006). Evaluación de riesgo genotóxico: biomonitorización de trabajadores agrícolas de Caranavi, Guanay, Palca y Mecapaca, expuestos a plaguicidas. *Cuad - Hosp Clín*, 51(1):7-18.

Badii MHY, Landeros J (2007). Plaguicidas que afectan a la salud humana y la sustentabilidad. *CULCyT*/ Marzo–Abril. Año 4(19):21-34.

Benítez S, Macchi ML, Acosta M (2009). Malformaciones congénitas asociadas a agrotóxicos. *Arch Pediatr*, 80(3):237-247

Bowen, G. A. (2005). Preparing a qualitative research-based dissertation: Lessons learned. *The Qualitative Report*, 10(2), 208-222. Retrieved [Insert date], from http://www.nova.edu/ssss/QR/QR10-2/bowen.pdf

Camarena Ojinaga, L. Alysse von Glascoe, C. Arellano García, E. Zúñiga Violante, E. y Martínez Valdés C. Agroquímicos y Mujeres Indígenas Jornaleras en Baja California. www.Gobierno Federal.Gob.Mx Www. Semarnat.Gob.Mx, 2012 pp 67-78

Caballero Romero JJ. 1991. Etnometodología: una explicacíon de la construcción social de la realidad. *Reims* (56): 83 http://dx.doi.org/10.2307/40199495

Comisión Federal para la protección de riesgos sanitarios (COFEPRIS). 2010. Plaguicidas. Disponible en: http://www.cofepris.gob.mx/AZ/Paginas/Plaguicidas%20y%20Fertilizantes/PlaguicidasYFertilizantes.aspx [última fecha de acceso: 15/septiembre/2014]

De la Iglesia Huerta, A. (1987). Prevención sanitaria de los trabajadores expuestos a Plaguicidas. Ponencia a la Mesa redonda "Programa de Prevención en la utilización de Plaguicidas" XI Congreso Nacional de Medicina, Higiene y Seguridad del Trabajo. Libro de Actas, tomo 2, Ed. INSHT; Madrid, pp. 89-102

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2003). Strategies of qualitative inquiry (2nd ed.). Thousand Oaks, CA: Sage.

Denzin, N., & Lincoln, Y.S. (2004). Strategies of qualitative inquiry (2nd ed.). London: Sage.

Garfinkel, H. (1967). Studies in ethnometodology. Cambridge: Prentice-Hall.

Garfinkel, H. (2002). Ethnometodology program. MD: Rowman & Littlefield Publishers.

González, F. (2006). Los métodos etnográficos en la investigación cualitativa en educación. Recuperado de: http://biblioteca.idict.villaclara.cu/biblioteca/compendios-informativos/metodologia/11

Godina Elena (2004). Children in the New Millennium: Environmental Impact on Health. By UNEP,UNICEF & WHO. *Journal of Biosocial Science*, 36 (6): 741-742.

Hernández GMM, Jiménez GFR, Jiménez A, Arceo GF. 2007. Caracterización de las intoxicaciones agudas por plaguicidas: perfil ocupacional y conductas de uso de agroquímicos en una zona agrícola del Estado de México, México. *Rev. Int. Contam. Ambient*, 23 (4) 159-167.

Maldonado A.; Martínez A. L. (2007). Impacto de las fumigaciones aéreas en las bananeras de Las Ramas-Salitre-Guayas. Anexo 7. Acción Ecológica, FEDESO, Red Juvenil de Salitre. Ecuador, Disponible en: Base de datos RAP-AL, www.rap-al.org.

Martínez C, Gómez S (2007). Riesgo genotóxico por exposición a plaguicidas en trabajadores agrícolas. *Rev. Int. Contam. Ambient*, 23(4):185-200

Paz-y-Miño C, Bustamante F, Sánchez M, Leone P, Cytogenetic monitoring in a population ocupationally exposed to pestices in Ecuador. *Environ Health Perspec*, 2002; 110: 1077-1080. http://dx.doi.org/10.1289/ehp.021101077

ISSN: 0075-5222

Paz-y-Miño C, Melissa Arévalo, María Eugenia Sánchez, Paola.(2004). E Leone Chromosome and DNA damage analysis in individuals occupationally exposed to pesticides with relation to genetic polymorphism for CYP 1A1gene in Ecuador. *Mutation Research/Genetic Toxicology and Environmental*, 552 (1-2): 77-89
http://dx.doi.org/10.1016/j.mrgentox.2004.05.005

Paz-y-Miño C, María Eugenia Sánchez, Melissa Arévalo, María José Muñoz, Tania Witte, Gabriela Oleas De-la-Carrera, Paola E. Leone. (2007). Evaluation of DNA damage in an Ecuadorian population exposed to glyphosate. *Genetics and Molecular Biology*, 30(2):456-460
http://dx.doi.org/10.1590/s1415-47572007000300026

Pérez-Herrera, N. H. Polanco-Minaya, E. Salazar-Arredondo, M.J. Solís-Heredia, J. Alvarado-Mejía, Castillo-Burguete, T.V. Borja-Aburto, L. González-Navarrete, B. Quintanilla-Vega. (2010). Decreased semen quality in agricultural workers from Southern Mexico: A longitudinal study. *Toxicology Letters* 196:S49
http://dx.doi.org/10.1016/j.toxlet.2010.03.199

Pérez Herrera, N.E. Alvarado Mejía, J.A. Castillo Burguete, M.T. y González Navarrete R.L. Efectos reproductivos en agricultores expuestos a plaguicidas en Muna, Yucatán. SEMARNAT-Instituto Nacional de Ecología. Género, Ambiente Y Contaminación Por Sustancias Químicas. www.Gobierno Federal.Gob.Mx Www. Semarnat.Gob.Mx, 2012 pp. 79-94

Palacios-Nava Martha Edilia, M.E. Paz-Román, P. Hernández-Robles, S. Mendoza-Alvarado L. (1999). Sintomatología persistente en trabajadores industrialmente
expuestos a plaguicidas organofosforados. Salud Pública de México 41(1):55-61
http://dx.doi.org/10.1590/s0036-36341999000100007

Prieto García, F. Cortés Ascencio SY. 2012. Gaytan Oyazum, JC et al. Pesticides: classification, uses and toxicity. Measures of exposure and genotoxic risks. *Journal of Research in Environmental Science and Toxicology*, Vol. 1(11). 279-293 Available online http://www.interesjournals.org/JREST

RAP-AL. (2008). Red de Acción en Plaguicidas y sus Alternativas para América Latina - Oficina de Comunicaciones y Administración.

Ramírez A.M. García A., Lacasaña. M. (2002). Prácticas de utilización de plaguicidas en agricultores. *Gaceta Sanitaria* 16(3):236-240 http://dx.doi.org/10.1016/s0213-9111(02)71667-1

Rodríguez Bornaetxea, F. (2009). Etnometodología. [Versión electrónica]. En R. Reyes (Dir.) Diccionario Crítico de Ciencias Sociales: terminología científico social (Vols.1-4). Madrid y México: Plaza y Valdés. Recuperado de http://www.ucm.es/info/eurotheo/diccionario/E/etnometodologia.htm

Rodríguez PL, Wilkins GA, Olvera SR, Silva RR. 2005. Panorama epidemiológico de las intoxicaciones en México *Med Int Mex*, 21:123-32

Sánchez Moreno, E. (2008). Capítulo 10: La investigación cualitativa en la investigación en salud. Fundamentos y rigor científico. *SEMERGEN-Medicina de Familia*, 34(2):75-79
http://dx.doi.org/10.1016/s1138-3593(08)71853-7

Sandoval, J. (2013). Una Perspectiva Situada de la Investigación Cualitativa en Ciencias Sociales. *Cinta de moebio*, 46:37-46 http://dx.doi.org/10.4067/s0717-554x2013000100004

ISSN: 0075-5222

Salamanca Castro, AB. Crespo Blanco CM. El diseño en la Investigación Cualitativa. Nure INVESTIGACIÓN, n° 26, 2007

Secretaria de Salud. Boletín Epidemiológico. 2013. Panorama histórico de morbilidad y mortalidad por Intoxicación por plaguicidas en México 1995-2012 34 (30):34 Disponible en: http://www.epidemiologia.salud.gob.mx/doctos/boletin/2013/completo/sem34.pdf [última fecha de acceso: 15/septiembre/2014]

SEMARNAT y Pesca. Instituto Nacional de Ecología. Lo que usted debe saber sobre la gestión de los plaguicidas en México. Serie plaguicidas No. 4, 1996: pp. 1-22 recuperado 01 de junio de 2013 disponible en: http://books.google.co.ve/books/about/Lo_que_usted_debe_saber_la_gesti%C3%B3n_de_l.html?id=vdygYgEACAAJ

SEMARNAT. Plan De Manejo De Envases Vacíos De Agroquímicos Y Afines (Plamevaa) "Conservemos Un Campo Limpio" En: SEMARNAT, editor. Plan De Manejo De Envases Vacíos de Agroquímicos y Afines (Plamevaa) "Conservemos Un Campo Limpio" Asociación Mexicana de La Industria Fitosanitaria A.C.; 2007.

Servicio nacional de sanidad inocuidad y calidad alimentaria (SENASICA) 2013. Plaguicidas de uso agrícola. Disponible en: http://www.senasica.gob.mx/?id=3447 [Fecha última de acceso: 14/septiembre/2014]

UNEP, UNICEF and WHO (2002). Children in the New Millennium. Possible Health Effects of Pesticide Exposure; Environmental Impact on Health. WHO, pp. 142 disponible en: http://www.unep.org/ceh/main 01.html.

World Health Organization, (1990) Public Health Impacts of Pesticides Used in Agriculture, pp. 15, Disponible en: http://whqlibdoc.who.int/publications/1990/9241561394.pdf.

Yáñez Estrada, L. Ma. Ramírez Jiménez, R. Athanasiadou, M. Mejía Saucedo, R. López Guzmán, O.D. Evaluación de la exposición perinatal al DDT y sus metabolitos en mujeres mexicanas www.Gobierno Federal.Gob.Mx Www. Semarnat.Gob.Mx, 2012, pp. 115-132