

ANALYSIS OF RURAL WORKERS' EXPOSURE TO PESTICIDES

Análise da exposição de trabalhadores rurais a agrotóxicos

Analisis de la exposición de trabajadores rurales a agrotoxicos

Original Article

ABSTRACT

Objective: To analyze the use and handling of pesticides by workers from ten rural communities in the city of Vitória de Santo Antão-PE. **Methods:** Observational cross-sectional descriptive study was conducted from January to July 2010, through the application of a structured questionnaire to a sample of convenience. Sample size was estimated with a level of significance (α) of 5% in order to access variables on personal data, use and handling of pesticides. **Results:** Of 230 farm workers in the studied region, most were women ($n=157$; 69.2%) with incomplete elementary school level ($n=130$; 57%). It was observed that 141 (61.3%) respondent workers reported to use pesticides and only 3 (0.9%) applied the product under technical guidance of experts. Of the interviewees, 97 (28.3%) were unaware of the grace period, 67 (19.5%) unaware of recycling law, 95 (27.7%) did not use personal protective equipment, 80 (23.3%) used the rivers for washing the equipment and 108 (31.5%) reused the remains of liquid preparations. **Conclusions:** The harmful exposure of rural workers who used pesticides and the permanent environment contamination are evidenced. Such data reflects an agricultural model that seeks productivity and financial profits without proper compliance to health promotion and quality of the environment.

Descriptors: Pesticides; Occupational Health; Pesticide Exposure; Agricultural Workers' Diseases; Occupational Risks; Environmental Health.

RESUMO

Objetivo: Analisar o uso e manuseio de agrotóxicos por trabalhadores rurais de dez comunidades do município de Vitória de Santo Antão-PE. **Métodos:** Estudo observacional seccional descritivo realizado no período de janeiro a julho de 2010 por meio da aplicação de questionário estruturado a uma amostra de conveniência cujo tamanho foi estimado com um nível de significância (α) de 5%, a fim de levantar variáveis relativas a dados pessoais, uso e manuseio de agrotóxicos. **Resultados:** Dos 230 trabalhadores rurais da região estudada, a maioria eram mulheres ($n=157$; 69,2%) que cursaram até o ensino fundamental incompleto ($n=130$; 57%). Foi observado que 141 (61,3%) trabalhadores entrevistados utilizavam agrotóxicos e apenas 3 (0,9%) aplicavam o produto com orientação de técnicos especialistas. Dos entrevistados, 97 (28,3%) desconhecem o período de carência, 67 (19,5%) a lei de reciclagem, 95 (27,7%) não usam equipamentos de proteção individual, 80 (23,3%) utilizam-se dos rios para lavagem dos equipamentos e 108 (31,5%) reutilizam as sobras das caldas. **Conclusões:** Ficam evidentes as exposições nocivas dos trabalhadores rurais que utilizam o produto e a permanente contaminação ambiental. Tais dados refletem um modelo agrícola que busca a produtividade e rendimento financeiro, sem a atenção adequada à promoção à saúde e à qualidade ambiental.

Descritores: Praguicidas; Saúde do Trabalhador; Exposição a Praguicidas; Doenças dos Trabalhadores Agrícolas; Riscos Ocupacionais; Saúde Ambiental.

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RESUMEN

Objetivo: Analizar el uso y manejo de agroquímicos en trabajadores rurales de diez comunidades del municipio de Vitória del Santo, Antão-PE. **Métodos:** Estudio observacional seccional descriptivo realizado en el periodo de enero a julio de 2010 a través de la aplicación de un cuestionario estructurado a una muestra de conveniencia cuyo tamaño fue estimado con un nivel de significancia (α) del 5%, para levantar variables relativas a los datos personales, el uso y manejo de agroquímicos. **Resultados:** La mayoría de los 230 trabajadores rurales de la región investigada eran mujeres ($n=157$; 69,2%) que estudiaron hasta la educación primaria incompleta ($n=130$; 57%). Fue observado que 141 (61,3%) trabajadores entrevistados utilizaban agroquímicos y apenas 3 (0,9%) aplicaban el producto bajo la orientación de técnicos especialistas. De los entrevistados, 97 (28,3%) no conocen el periodo de carencia, 67 (19,5%) la ley de reciclaje, 95 (27,7%) no usan los equipos de protección individual, 80 (23,3%) utilizan los ríos para lavar los equipos y 108 (31,5%) reutilizan los restos de las caldas. **Conclusión:** Son evidentes las exposiciones nocivas de los trabajadores rurales que utilizan el producto y la permanente contaminación ambiental. Esos datos reflejan un modelo agrícola que busca la productividad y el rendimiento financiero sin la atención adecuada a la promoción de la salud y la calidad ambiental.

Descriptores: Plaguicidas; Salud Laboral; Exposición a Plaguicidas; Enfermedades de los Trabajadores Agrícolas; Riesgos Laborales; Salud Ambiental.

INTRODUCTION

Pesticides are defined by the Law of Pesticides⁽¹⁾ as products and components of physical, chemical or biological processes intended for use in the production sector, storage and processing services of agricultural products, with the purpose of changing the composition of the flora and fauna, in order to preserve those from the damaging action of living beings considered harmful, as well as substances and products used as defoliants, desiccants, stimulators and inhibitors of growth⁽¹⁾. They represent a group of compounds with various chemical structures and different toxicities. However, the major problems related to these products result from their improper use. Due to their biocide nature, these chemicals are potentially toxic to both the unwanted living beings as to non-target organisms, such as humans⁽²⁾.

Human exposure to pesticides constitutes a serious problem of public health all around the world, mainly in developing countries. Unawareness of the risks and safety regulations, lack of surveillance and free marketing of agrochemicals have contributed to the worsening of health disorders relating to these products. The World Health Organization (WHO) estimates that the uncontrolled use of

pesticides in the world causes annually 70 thousand acute and chronic intoxications in rural workers⁽³⁾.

According to data from the National System of Toxicopharmacological Information (SINITOX - Sistema Nacional de Informações Tóxico-Farmacológicas), 11.3% of all the cases of intoxications by agrochemicals registered in Brazil were notified in the Northeast region, 53.9% of those taking place in the State of Pernambuco. As to the deaths, 32.2% occurred in that state⁽⁴⁾. It is important to emphasize that such statistics might be underestimated, given the high sub-notification of those events in the country⁽⁵⁾.

Several effects on health have been associated to acute and chronic exposure to pesticides. Researches show that the most registered effects derived from acute exposure are the ones caused by the insecticides in the class of organophosphates, as well as the carbamates⁽⁶⁾. These insecticides act in the human organism by inhibiting a group of enzymes named cholinesterases, which operate in the degradation of acetylcholine, a neurotransmitter responsible for conducting impulses in the nervous system (central and peripheral). Once inhibited, this enzyme cannot degrade acetylcholine, affecting the whole chain of transmission of nerve impulses within the body, leading to various disorders that range from headaches to shivering, dizziness and, in some cases, loss of consciousness/fainting⁽⁷⁾.

Regarding the environment, pesticides act in two ways: accumulating in the biota and contaminating the water and soil; its dispersion in the environment might cause an ecological imbalance in the natural interaction between two or more species. Some kinds of pesticides – like the organochlorates, already broadly banned, but with environmental passive due to their high persistence - accumulate along the food chain through biomagnification, that is the increase in the trophic level⁽⁸⁾. The contamination of fishes, crustaceans, mollusks and other animals represents a potential source of human contamination, with risks that can be extended to all consumers of those animals⁽⁹⁾.

In recent years, in a great part of the Brazilian countryside, the traditional production paradigm - based on family agriculture - has presented a shift to agroindustry for export⁽¹⁰⁾, which has as main motto the increased agricultural productivity, supported by the implementation of new production technologies, especially chemical agents used for both controlling and combating pests and for stimulating plant and fruits growth⁽¹¹⁾.

Aiming to modernize the agriculture and enhance its productivity, since the 1950s a deep change in the agricultural production process started in the United States, namely the “Green Revolution”⁽¹²⁾. In the core of this modernization was the use of agrochemicals and other inputs of industrial origin. In Brazil, the “Green Revolution” begins in the 1960s

and becomes stronger in the mid-1970s with the creation of the National Programme of Agrochemicals (Programa Nacional de Defensivos Agrícolas - PNDA).

Among other goals, PNAD aimed to stimulate the national production and consumption of pesticides, to the extent that it conditioned the granting of rural credit to the compulsory use of part of this resource with the purchase of those agrochemicals^(13,14). By linking the rural credit to the pesticides, the Estate was the main supporter of the technological package that represented “modernity” in agriculture, causing the Brazilian market to be among the most important ones to the industry of pesticides.

Brazil followed a global trend, where governmental incentives were part of a global policy for developing countries based in the “Green Revolution”. The policy of subsidies also contributed to the indiscriminate use of agrochemicals, which turned to be used not only by farmers with better financial conditions, but also by family farmers compelled and propelled to acquire this “technological package” in a passive and systematically uncontrolled way. As a result, a great disrespect to the technical prescriptions was observed - as the agronomical pharmacopoeia - and agricultural practices that overexposed farmers and rural workers to the risks of agrochemicals⁽¹⁵⁾.

Measures such as increasing society’s demand for healthier foods, by means of educational campaigns disclosing the levels of contamination and the hazards associated with various products, as performed in recent years by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária - ANVISA*), along with educational campaigns aiming the farmers and workers that apply pesticides, can have a positive impact, even if they yield no structural changes in the production technologies⁽¹⁶⁾.

The panorama of Brazilian agricultural reality shows a scenario that should be discussed, since it is a model of production that features environmental, social and human health impacts. Hence the need for its inclusion in the processes of health promotion to address the issue of pesticides in Brazil. Therefore, the evidences here presented point to a situation of vulnerability for the workers, where smaller and smaller groups produce more and under difficult working conditions, through techniques and practices that are harmful to health.

In order to test the hypothesis that the uncontrolled use of these products continues to occur, favoring the contamination of workers, food and environment, this study investigates the use and handling of pesticides by farm workers from ten communities in the municipality of Vitória de Santo Antão-PE. Those communities are registered and assisted by the Agronomic Institute of Pernambuco (*Instituto Agrônomo*

de Pernambuco - IPA), an organization focused on research, development and production of agricultural goods and services, incorporating the activities of technical assistance, rural extension and water infrastructure. Nowadays, IPA is part of the National Agricultural Research System (*Sistema Nacional de Pesquisa Agropecuária - SNPA*), coordinated by the Brazilian Institute of Agricultural Research (*Empresa Brasileira de Pesquisa Agropecuária - EMBRAPA*).

METHODS

This is a cross-sectional, observational, descriptive study, comprising rural workers resident in ten rural communities of Vitória de Santo Antão-PE: Boa Sorte, Campina Nova, Chã de Calçadas, Chã de Serraria, Cipoal, Figueira, Galileia, Mocotó, Oiteiro e Pirituba. The municipality of Vitória de Santo Antão, a region characterized by the predominance of small farms producers of vegetables, with the family structure of production, is located in the south area of Zona da Mata in Pernambuco, about fifty kilometers from the capital, being the largest producer of leafy vegetables in the state⁽¹⁷⁾.

The sample size was calculated from the registration data provided by the Agronomic Institute of Pernambuco (IPA). Given the difficulty of *a priori* reasoning the number of workers who applied pesticides, the number of individuals in each community was used as the basis for the calculation of sample size, totaling 2,443 people. A sample with a confidence level of 95% and a maximum error equal to 5% was estimated, leading to the total amount of 343 individuals as the ideal size, statistical requisite for the validity of the study. The sample was defined by convenience and composed of workers residing in the ten rural communities registered and assisted by the IPA, randomly selected through home visits or in the workplace.

For exclusion criteria, did not participate in the study the farmers, owners and/or tenants that were not effectively rural workers, totaling 113 subjects excluded. Participants were 230 rural workers of both sexes, aged above 18 who voluntarily agreed to participate and signed a Free and Informed Consent Form.

Data collection was performed in the period of January to July 2010, through a questionnaire especially designed for this study, containing identification and occupational data, such as pesticide application, type of products used, knowledge of the names of the products, the implementation of applications, grace period, use of personal protective equipment (PPE), site of equipment washing, Law of Recycling and use of remains of liquid preparations. The interviewer group, comprising four technicians in Family Farming of the Federal Institute of Education, Science and Technology - *Campus* Vitoria de Santo Antão, was trained

for the application of the questionnaire, participating in the pilot study and its evaluation.

For statistical analysis, the Statistical Package for Social Sciences (SPSS) for Windows, version 18, was used. The data presentation included descriptive analysis of absolute and relative frequencies.

The Ethics Committee for Research involving Humans of the Federal University of Pernambuco approved this study (Process CEP/CCS no.242/09). All the participants were informed about the project and methodology used and signed the Free and Informed Consent Form (ICF), being the illiterate individuals identified by fingerprint, in accordance with Resolution no.196/96 of the Ministry of Health⁽¹⁸⁾, that rules on Research Involving Human Subjects in Brazil.

RESULTS

The results of this study are based on structured questionnaires answered by farm workers of the region

studied. The study included 230 rural workers, having unintended abstentions in the items gender (3), educational level (2) and age range (1).

It is noteworthy that, of the 230 workers, 157 (69.2%) were women, 130 (57%) had incomplete elementary education level and 45 (19.7%) were illiterate. As to the age of the respondents, there was a greater distribution in the range from 21 to 50 years, totaling 175 (76.4%) workers.

Growing vegetables is predominant in the region, with coriander, lettuce and chives as the main crops, grown by 91 (39.6%), 72 (31.3%) and 27 (11.7%) of the respondent workers, respectively. All this data is presented in Table I.

With respect to the application of pesticides, 89 (38.7%) workers reported not using the products, while 141 (61.3%) reported applying them. Insecticides and herbicides were the most used, although 63 (18.4%) reported not knowing what type of pesticides they were using. Table II shows data concerning the use and handling of the pesticides.

The indication of the products was done by street salespeople for 71 (20.7%) rural workers, and by fellows in

Table I - Distribution of the rural workers (N=230) regarding personal data. Vitória de Santo Antão-PE, January to July 2010.

Variables		n=230	(%)
Gender	Male	70	30.8
	Female	157	69.2
	No answer	3	-
Educational level	Illiterate	45	19.7
	Incomplete elementary school	130	57.0
	Complete elementary school	12	5.3
	Incomplete high school	16	7.0
	Complete high school	25	11.0
	No answer	2	-
Age range	18 – 20 years	24	10.5
	21 – 30 years	63	27.5
	31 – 40 years	50	21.8
	41 – 50 years	62	27.1
	Above 50 years	30	13.1
	No answer	1	-
Most cultivated species ¹	Coriander	91	39.6
	Lettuce	72	31.3
	Chives	27	11.7
	Cucumber	25	10.9
	Carrot	0	0.0
	Other species	174	75.7

¹For this variable, the interviewees reported more than one cultivated species.

crop production, for 58 (16.9%). It is noteworthy that only 3 (0.9%) workers received guidance from the state technician (Table II).

Regarding knowledge about the names of the products being used, 69 (20.1%) knew some names. Besides the worker himself performing the product applications, 113 (32.9%) stated that the father was the family member who most frequently performed the applications.

With regard to the grace period, 97 (28.3%) workers reported being unaware of its meaning and 13 (3.8%) reported not obeying the period (Table III). Asked about the use of PPE, 95 (27.7%) reported no use and 13 (3.8%) had no knowledge on this issue.

Equipment used in the application of pesticides were washed into the rivers by 80 (23.3%) workers, while 51 (14.9%) washed them at home. Regarding the disposal of the pesticides' packaging, 67 (19.5%) did so without the knowledge of the Law of Recycling and 50 (14.6%) did not meet the norms about the proper disposal of packaging.

Remainders of the liquid pesticides are reused the next day by 108 (31.5%) workers, while 28 (8.2%) reported throwing away the leftover product. When referring to "throwing away", 13 (46.4%) workers reported doing it within the garbage, 8 (28.6%) throwing it directly on the ground, 4 (14.3%) reported discarding it into the river.

Table II - Distribution of the rural workers (N=230) regarding the use of pesticides. Vitória de Santo Antão-PE, January to July 2010.

Characteristics	n=230	(%)
Use of pesticides		
No	89	38.7
Yes	141	61.3
Types of pesticides used ¹		
Insecticides	65	19.0
Herbicides	65	19.0
Don't know	63	18.4
Fungicides	20	5.8
Miticidas	4	1.2
Others	1	0.3
Indication of the products used		
Street sellers	71	20.7
Fellow in the farm	58	16.9
Sellers coming to the farm	6	1.7
State technicians	3	0.9
Fellow in the farm and street sellers	1	0.3
Goes from father to son	1	0.3
The worker himself	1	0.3
Knowledge of the products' names		
Knew some names	69	20.1
Did not know any	41	12.0
Knew all names	31	9.0
Performing of the applications		
Father	113	32.9
Son	12	3.5
"All family"	6	1.7
"All the workers"	6	1.7
Wife	2	0.6
Brother	2	0.6

¹ For this variable, the interviewees reported using more than one type of pesticide.

Table III - Distribution of the rural workers (N=230) regarding the handling of pesticides. Vitória de Santo Antão-PE, January to July 2010.

Variables	n=230	(%)
Grace period		
Don't know its meaning	97	28.3
Follow the grace period	31	9.0
Don't follow the grace period	13	3.8
Use of PPE		
Do not use	95	27.7
Use	33	9.6
Don't know what it is	13	3.8
Spot of washing the equipment		
River	80	23.3
Home	51	14.9
Well	2	0.6
The very workplace	4	1.2
"Anywhere"	2	0.6
Tanque	1	0.3
All above mentioned	1	0.3
Law of Recycling		
Unaware of the law	67	19.5
Don't obey	50	14.6
Obey the law	24	7.0
Reuse of the remaining preparation		
Save it for another day	108	31.5
Throw it away ¹	28	8.2
Garbage	13	46.4
Soil	8	28.6
River	4	14.3
Crop	1	3.6
By the house	1	3.6
By the river	1	3.6
Save it to use at home	3	0.9
Destroy it on fire	1	0.3
Avoids remainings by adjusting its amount	1	0.3
Performing the applications		
Father	113	32.9
Son	12	3.5
"All family"	6	1.7
"All the workers"	6	1.7
Wife	2	0.6
Brother	2	0.6

¹For this variable's category, the interviewees pointed out the spot where they use to discard the pesticides

DISCUSSION

In the present study, females were predominant among the vegetable producers in the communities studied, in agreement with similar studies carried out in Brazil, that have also highlighted the participation of women as responsible for the cultivated crop, even being tenants of the land where they work, performing duties such as crop care, assistance in the application of pesticides, harvesting and packing products for sale^(19,20).

Female rural workers (small farmers, squatters, artisanal fishers, gatherers, tenants, sharecroppers, partners, rural salaried employees, landless, camped, settled and indigenous) produce food and ensure the subsistence of the family, and also occupy themselves with medicinal herbs planting and crafts. Their activities merge within the various workspaces; while caring for the house, they carry water, take care of small animals (chickens, goats and pigs) and gardens as well. Besides these activities that focus primarily

on the house and the yard, they still develop work in the plantations, especially during the cultivation and harvesting periods⁽²¹⁾.

The low educational level was evidenced in the sample since 130 (57.0%) interviewees had incomplete elementary school level and 45 (19.7%) were illiterate. A study involving rural workers in other regions of Brazil has also found similar results in their sample, where 71.5% had the elementary school level⁽¹⁹⁾.

Other studies highlighted that the lack of information about the risks they are exposed to by manipulating pesticides is mainly due to poor schooling, which hinders and prevents access to information of utmost importance, both to their safety and to others directly or indirectly involved in the agricultural activity^(20,22). It is important to emphasize that the language used for informing the product characteristics and its handling is connected to the risk for the workers' health, the environment and consumers of vegetables⁽²³⁾, as the difficulty in reading the pesticides labels contributes to misapplication of the product.

The predominant age group among the workers interviewed in this study was 21-50 years. It is noted that women in this interval are in fertility, pregnancy and breastfeeding period. The concern regarding the damages caused to the human health by the pesticides lies on acute and chronic intoxications, malformations and modifications in human reproduction. Effects of pesticides have been investigated by health professionals, who have detected the presence of these substances in samples of human blood and breast milk⁽²⁴⁾, as well as the relationship between pesticides and mutations, reproduction and cancer⁽²⁵⁾.

The present study has also evidenced that 141 (61.3%) workers reported applying pesticides, corroborating similar studies⁽²⁶⁻²⁹⁾ that point out the use of pesticides by a great part of the workers. For many years, the policy on pesticides in Brazil has mainly encouraged the increased productivity and profit. Such model has rendered intoxications among the rural workers, since it is characterized by the intensive use of the agrochemicals⁽³⁰⁾.

In general, the benefits obtained from the use of pesticides are, unfortunately, simply measured by direct feedback on crop yield and profit, regardless of the harmful effects on people's lives and the environment⁽³⁾. Facing this reality, it is essential that rural development seeks sustainable agricultural production, so that health promotion and environmental quality can be given priority.

This study demonstrated that insecticides and herbicides were the types of pesticides most used by workers. The organophosphates stand out in these groups, being responsible in Brazil for the higher records of acute intoxications and deaths. This chemical group accumulates acetylcholine in nerve synapses, triggering a series of para-

sympathomimetic effects, liable to cause neurotoxicity and late peripheral neuropathies⁽³¹⁾. The data obtained in the research revealed that only 0.9% of the workers interviewed received indication of products through technicians of the State, similarly to other study, that affirms that non-qualified people advised most of the respondents⁽²⁹⁾.

Another research also shows that workers who have the seller as advisor in the purchase and use of pesticides are 73% more likely to be intoxicated, since it is not the proper person to orient on the correct use of the product⁽²⁷⁾. Corroborating previous data, it was identified in the present study the lack of knowledge with respect to the product names. That results in the misapplication of the product, increasing the risk of contamination for the worker, the environment and the consumers of agricultural products. The first and most important measure for preventing accidents and diseases related to the use of pesticides is seeking qualified technical orientation for a detailed evaluation about the existence or not of significant problems related to pests and diseases and the actual need for the use of pesticides as a controlling factor⁽²⁶⁾.

The grace period, which includes the interval in days between the last application and the harvesting, when the agricultural product is sent to consumption, is unknown by 97 (28.3%) workers and not respected by 13 (3.8%) of the ones in this research. Once more, it is evidenced the lack of knowledge and surveillance, factors that predispose to human and environmental contamination by the inappropriate use of pesticides. The non-compliance to the grace period for these products certainly enables the ingestion of toxic residues by consumers of vegetables, irrespective of carefully washing them before consumption. Previous studies on the use of pesticides also demonstrated the misuse of pesticides, with respect to the grace period, where the majority of respondents did not meet this time⁽²⁷⁾.

One of the most serious problems of the contamination is the excessive concentration of pesticide residues in food of vegetal origin, primarily due to disregard for the correct number of applications, the recommended dosages and time intervals required between the application and crop harvest⁽³⁾. The consumption of vegetables with pesticides is a serious public health problem, since it involves both the use of unauthorized products and the non-compliance with the grace period. If included in the Program of Pesticide Residues Analysis, by ANVISA, these vegetables would probably be considered unsuitable for consumption⁽³²⁾.

Concerning the use of PPE, the data collected by this study reveals that workers are even more vulnerable to harmful pesticide exposures. It was observed that 95 (27.7%) workers who reported applying pesticides do not use the equipment and 13 (3.8%) did not know about it, in agreement with other studies related to self-protection in

the application of pesticides, which have also highlighted the non-use of PPE^(20,26,29).

Farmers in developing countries consider the protective equipment not very practical and expensive, especially in tropical climates⁽³³⁾. The use of specific individual protection, besides being little adopted, has not proven its effectiveness in the socio-environmental context of agricultural activities in Brazil, and may even be an additional source of contamination^(34,35).

As to washing the equipment used in the application of pesticides, workers reported washing it in the rivers or at home. This study also found that the majority of respondents reuse the remains of liquid preparations with pesticides, saving them for the next day, while others discard them. Regarding the place pointed by the respondents, when referring to the option "throw away", most of them stated that the remains are discarded within the garbage, on the ground or in the river. The contamination of rivers, lakes and springs also occur when the residues of pesticides employed by workers in the crops run down through ditches, reaching the waters, contaminating soil, rivers and killing fish and other living things⁽²⁹⁾. Pesticides enter the workers' homes not only driven by the wind during application, but also in the work clothing, reused pesticide containers and products such as contaminated food⁽²⁰⁾.

The lack of knowledge about the appropriate disposal of the containers is reflected in the data pointed out by the present study, where it is observed that 67 (19.5%) are unaware of the Law for Recycling and 50 (14.6%) do not obey the regulation that addresses all the indications to be applied to discarding of empty pesticide containers⁽³⁶⁾. Based on these data, it is evident the need for a situational diagnosis of environmental problems, especially related to soil and rivers contamination, both due to the amount of containers disposed of unsafely, as to the incorrect disposal of the remains of preparations.

The improper use of the products, preparation of the solutions, packaging and labeling, transportation, storage, marketing, final destination of residues and containers, classification of their components and related⁽¹⁾, due to the lack of knowledge lead the small farmer to the use of pesticides in an incorrect and indiscriminate way, bringing harm to worker's health, the environment and society. It is important to emphasize that studies conducted in small and medium enterprises (12-50 acres) and 33 large companies (areas over 50 hectares) have also observed the indiscriminate use of pesticides in unsafe working conditions, affecting the health of the ones exposed⁽³⁷⁾, what does not restrict the information demonstrated here only to the small producers in familiar model.

The direct involvement of the agricultural activity with the environment reinforces the need for permanent

actions, especially related to the control of pesticide use. The economic and social importance of family farming, seen unassisted in Vitória de Santo Antão-PE by this survey, highlights the need for programs aimed at strengthening this model, both as social groups whereas a farming productive sector. The discussion concerning the implications of the agricultural policies and technological models of production on the workers' health, as well as the access to the forms of protection and health assistance, should be focused in seeking health promotion and quality of life⁽³⁸⁾.

Regarding the limitations of this study, it is noteworthy the difficulty of access to the rural communities where the research was conducted, considering there area slopes of 45° in the vegetable producing areas and access roads to these communities have deficient infrastructure.

CONCLUSION

This study highlighted the insufficient qualification of the agricultural sector in dealing with the damage caused by the use of pesticides, also observed in the work of the regulatory authorities with regard to responding to the environmental needs. The use of pesticides was reported by the majority of workers in the sample, without any kind of control, which entails risks to the health of vegetables consumers and to farm workers. These, in turn, being twice exposed to the harmful effects of pesticides.

The analysis of the pesticides use and handling allowed the observation that various deficiencies are merged in the dynamics of those communities, such as the low level of education and the absence of the state with regard to technical assistance, that were evidenced by the lack of knowledge concerning the correct indication of the product, the normalizations relevant to the use of pesticides, disposal of packaging and use of personal protective equipment.

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