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Health risks from rural workers exposed to pesticides

Riesgos de salud del trabajadores rurales expuestos a plaguicidas

Riscos à saúde do trabalhador rural exposto ao agrotóxico

ABSTRACT

The aim is to analyze the prevalence of risk factors for the health of rural workers exposed to pesticides. This is a cross-sectional, observational study, which took place from March to August 2019 and whose sample consisted of 60 rural workers from the municipality of Casimiro de Abreu, in the state of Rio de Janeiro. It was identified that the rural worker had 30.1 years of contact with pesticides, and 54.3% of the participants reported having some intoxication symptoms (headache, dyspnea, itchy body, nausea and sinusitis). Glyphosate is the most widely used pesticide in the municipality and most of the workers interviewed do not use adequate Personal Protective Equipment when handling agrochemicals. The need for alternative mechanisms for cultivation practices in agribusiness was highlighted, as well as care for the health of workers exposed to the use of pesticides through the adoption of educational and preventive measures. Public agencies are recommended to implement specific programs for rural workers, with the unique perspective of remaining in the agribusiness ranking, but with practices to promote the integral health of this vulnerable rural population in its entirety.

DESCRIPTORS: Pesticides; Environmental Exhibition; Rural Worker's Health.

RESUMEN

El objetivo es analizar la prevalencia de factores de riesgo para la salud de los trabajadores rurales expuestos a pesticidas. Este es un estudio transversal, observacional, que tuvo lugar de marzo a agosto de 2019 y cuya muestra consistió en 60 trabajadores rurales del municipio de Casimiro de Abreu, en el estado de Rio de Janeiro. Se identificó que el trabajador rural tuvo 30.1 años de contacto con pesticidas, y el 54.3% de los participantes informaron tener algunos síntomas de intoxicación (dolor de cabeza, disnea, picazón en el cuerpo, náuseas y sinusitis). El glifosato es el pesticida más utilizado en el municipio y la mayoría de los trabajadores entrevistados no utilizan equipos de protección personal adecuados cuando manipulan agroquímicos. Se destacó la necesidad de mecanismos alternativos para las prácticas de cultivo en los agronegocios, así como el cuidado de la salud de los trabajadores expuestos al uso de pesticidas mediante la adopción de medidas educativas y preventivas. Se recomienda que las agencias públicas implementen programas específicos para los trabajadores rurales, con la perspectiva única de permanecer en el ranking de agronegocios, pero con prácticas para promover la salud integral de esta población rural vulnerable en su conjunto.

DESCRIPTORES: Pesticidas; Exposición Ambiental; Salud del Trabajador Rural.

RESUMO

O objetivo é analisar a prevalência de fatores de risco à saúde do trabalhador rural exposto ao agrotóxico. Trata-se de estudo transversal, observacional, que ocorreu no período de março a agosto de 2019 e cuja amostra foi constituída de 60 trabalhadores rurais do município de Casimiro de Abreu, no estado do Rio de Janeiro. Identificou-se, que o trabalhador rural tinha um tempo de contato com agrotóxicos de 30,1 anos, e 54,3% dos participantes relataram apresentar algum sintoma de intoxicação (cefaleia, dispneia, prurido pelo corpo, náusea e sinusite). O glifosato é o agrotóxico mais utilizado no município e a maioria dos trabalhadores entrevistados não utiliza Equipamento de Proteção Individual adequado durante a manipulação dos agroquímicos. Evidenciou-se a necessidade de mecanismos alternativos para as práticas de cultivo no agronegócio, e de cuidado com a saúde do trabalhador exposto ao uso de agrotóxicos por meio da adoção de medidas educativas e preventivas. Recomenda-se aos órgãos públicos a implantação de programas específicos para o trabalhador rural, na perspectiva única de permanecer no ranking do agronegócio, porém com práticas de promover a saúde integral desta população rural vulnerável em sua totalidade.

DESCRIPTORIOS: Agrotóxicos; Exposição Ambiental; Saúde do Trabalhador Rural.

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Angélica Pinto da Silva

Sanitary Pharmacist. Master student. Academic Program in Health Care Sciences. Aurora de Afonso Costa Nursing School. Federal Fluminense University - UFF/RJ. <https://orcid.org/0000-0002-1872-2162>

Alessandra Conceição Leite Funchal Camacho

Nurse. Doctor. Professor in the Academic Program in Health Care Sciences. Aurora de Afonso Costa Nursing School. Federal Fluminense University - UFF/RJ. <https://orcid.org/0000-0001-6600-6630>

Harlon França de Menezes

Nurse. PhD student. Academic Program in Health Care Sciences. Aurora de Afonso Costa Nursing School. Federal Fluminense University - UFF/RJ. <https://orcid.org/0000-0001-9884-6511>

Ana Cláudia Felipe Thomaz dos Santos

Nurse. Master. Academic Program in Health Care Sciences. Aurora de Afonso Costa Nursing School. Federal Fluminense University - UFF/RJ. <https://orcid.org/0000-0001-8960-4545>

Marcela de Abreu Moniz

Nurse. Doctor. Professor at the Residency in Collective Health Nursing in the area of Environment, Health and Work. Aurora de Afonso Costa Nursing School. Federal Fluminense University - UFF/RJ. <https://orcid.org/0000-0002-8481-7258>

Rene Dias dos Santos

Pharmaceutical. Specialist in Clinical Pharmacy. Municipal Pharmaceutical Assistance Coordinator. Casimiro de Abreu/RJ. <https://orcid.org/0000-0002-3645-9062>

Ottassano de Souza Panetto

Biologist. Master of Science. Auditor of the Regional Council of Engineering and Agronomy. Rio de Janeiro - RJ. <https://orcid.org/0000-0002-3645-9062>

INTRODUCTION

The notorious advance of agribusiness inevitably brought about profound changes in the rural production process, which aim to meet economic competitiveness in recent decades. Such changes involve the mechanization of crops and the implementation of techniques associated with increased use of chemical agents, that is, the pesticides used in pest control, known in the literature as pesticides⁽¹⁾.

The globalization process accelerated commercial relations, and Brazilian agribusiness gained prominence in the progressive economic transformations due to the dynamism in exports, becoming indispensable to the economic project of Brazilian growth⁽²⁾. This process brought a significant change from the point of view of sociocultural life, modifying traditional culture as the urbanization and internationalization of modern societies, including rural workers, ranking Brazil as the largest consumer of pesticides in the world. In this way, agricultural workers are subject to health monitoring and surveillance, since pesticide poisoning is considered a public health problem.⁽³⁾

According to Law No. 7,802, of July 11,

1989, still in force, pesticides are products and agents of physical, chemical or biological processes, intended for use in the cultivation, storage and processing of agricultural products, to alter the composition of flora or fauna, in order to preserve them from the action of harmful living beings⁽⁴⁾. Used on a large scale in agriculture, pesticides are substances, to which rural workers, through their handling, are potentially exposed in their work routine.⁽⁵⁾

It is often observed clinical symptoms caused by acute intoxications due to the use of pesticides, such as: headache, irritability in the eyes and skin, itching, nausea, chest pain, tachycardia, vertigo, dizziness and breathing difficulty. There are refutations about the relationship between cancer in the rural population exposed to numerous environmental and occupational risk factors to the use of pesticides. Most of the agricultural population reports experiencing toxicological clinical symptoms to chemical agents, but medicine is still studying and evaluating long-term impacts on human organisms⁽⁶⁾.

The chronic effects related to health risk factors of the rural population handling chemical agents are: cancer, depression, forgetfulness, severe respiratory

problems, sleep disorders, malfunctioning kidneys and liver, thyroid hormone imbalance, sexual impotence, fetal impairment, of the intellect and physical^(7,8).

Poisoning by pesticides, which occur at the place of work, during the journey or in commuting related to the service, are classified as work accidents. They correspond to intentional or unintentional poisonings resulting from ingestion, inhalation or dermal absorption of these chemicals⁽⁹⁾.

Large agricultural producers are observed to be located in the vicinity of communities of small farmers who receive pesticides, by contiguity, in their homes and in the production places as follows: by the water from the irrigation channels, which is the same offered by the municipality to residents; by air, when the time for aerial spraying comes; contaminated food; and for the clothes of workers who, despite the legal prohibition, are washed at home, which increases the domiciliation of risks⁽¹⁰⁾.

For this reason, knowledge about the theme becomes relevant, with the purpose of creating subsidies aimed at education, assistance and research for health professionals, in addition to stimulating critical perspectives, capable of acting in health

care, the rural community, and the contribution to planning and professional strategies for the prevention and promotion of that community.

As a guiding question, the following was chosen: What are the risk factors for the health of rural workers resulting from the use of pesticides? The objective of this study is to analyze the prevalence of risk factors for the health of rural workers exposed to pesticides.

METHODOLOGY

This is a descriptive, observational, cross-sectional study, where the study participants were resident rural workers, active in agricultural production, in the municipality of Casimiro de Abreu, located in the State of Rio de Janeiro. The research municipality has a rural population of 6,826 residents active in agricultural production⁽¹¹⁾, and from a sample calculation, 60 participating rural workers residing in 03 municipal agricultural areas were selected, previously chosen by the Coordination of Occupational Health Surveillance (VISAT): Varjão, Serra and Ribeirão.

Inclusion criteria were established: rural workers over the age of 18, being a rural worker for more than one year in agricultural territory and residing in the city where the study was carried out. The exclusion criteria were impaired speech and/or hearing.

For data collection, a semi-structured questionnaire was used, prepared by the main researcher, where the study participant answered the questions previously formulated and, when necessary, the interviewer read the questions out loud, without intervening in the answers. The study made it possible to obtain data prepared and adapted by the main researcher, based on previous studies, and was approved by the Research Ethics Committee (CEP) of Hospital Universitário Antônio Pedro (HUAP) under opinion No. 3,036,922. CEP forwarded the approved project to the National Research Ethics Committee (CONEP) to complete the approval process due to the complexity of

the chemical agents used and the relevance of public health to rural workers, with their approval described in opinion No. 3,445.242/2019.

This is a descriptive, observational, cross-sectional study, where the study participants were resident rural workers, active in agricultural production, in the municipality of Casimiro de Abreu, located in the State of Rio de Janeiro.

As requested by CONEP, the data collection instrument was adapted to a sim-

ple and clear approach to the interviewee, consisting of the following variables: profile of agricultural work and risk factors: types of pesticides, type of Personal Protective Equipment (PPE), observation of some toxicological clinical effects caused by pesticides. The following variables for this study were identified and analyzed: profile of rural work and risk factors: types of pesticides, type of PPE and clinical toxicological effects caused by pesticides.

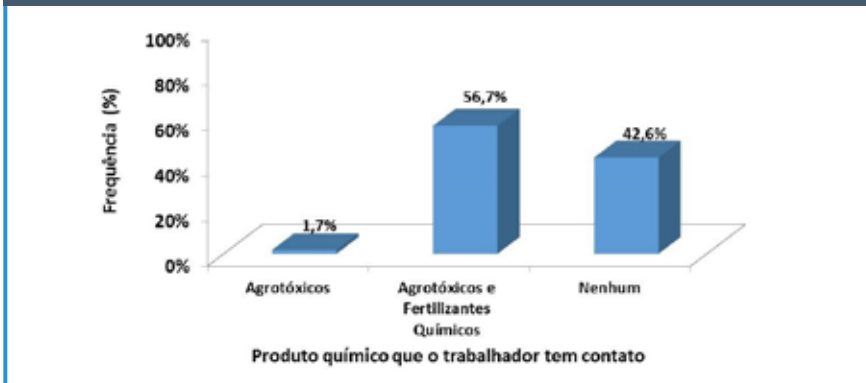
This stage was developed during home visits, with the participation of two community health agents collecting data during visits to farmers' rural properties.

At the beginning of the research, the researcher informed the rural worker about the research, its objectives, ethical aspects, risks and benefits. At that moment, the interviewee was aware of all the relevant aspects added to the development of scientific research, showing a desire or not to participate in it. There was no refusal to participate in the research, which failed to generate prejudice and constraints due to the infeasibility of applying the instrument related to data collection proposed in this study.

The descriptive analysis was based on the construction of tables and figures of the frequency distributions and calculation of descriptive statistics (proportions of interest for all variables and calculation of minimum, maximum, average, median, standard deviation, coefficient of variation - CV) for the quantitative variables. The variability in the distribution of a quantitative variable was considered low if $CV < 0.20$, moderate if $0.20 \leq CV < 0.40$, and high if $CV \geq 0.40$.

To check the association between a qualitative factor and the occurrence of symptoms after the use of pesticides or fertilizers, the Chi-square test was used or, when this proved inconclusive, Fisher's exact test. In the inferential analysis of quantitative variables, the comparison of two independent groups was performed using the Mann-Whitney non-parametric test, due to the small sample size of the groups compared.

Figure 1. Chemical products that the rural worker declared to have contact within the agricultural activity. Casimiro de Abreu, RJ, Brazil, 2019.



RESULTS

Of the 60 rural workers interviewed, only one (1.7%) declared that he had contact only with pesticides, 34 (56.7%) had contact with both pesticides and 25 (42.6%) had neither contact with pesticides nor with chemical fertilizers, as shown below.

Table 1 characterizes the contact of rural workers with pesticides or chemical agents. The purchase of these products is typically made in agricultural products stores (90.9%); storage is done in warehouses (97.1%), with Roundup being the most used product (97.1% of those who claim to use chemical products). The typical age of onset of contact with pesticides is 15 to 20 years (37.1%) and it is more frequent that workers have had contact with chemical agents for 30 to 45 years (37.1%). The workers prepare pesticides with their hands using a glove (45.7%) and often use PPE (88.6%), with emphasis on the use of hand sprayers (65.7%) and Boots (54,3%).

As for the clinical effects, a group of 19 workers reported feeling some symptom after working with pesticides, which results in a prevalence of 54.3% among workers who work with chemical agents. The prevalence of each symptom is described in Figure 2. The most relevant symptoms are headache, shortness of breath, itchy body, nausea and sinusitis that affect more than 10% of workers who have contact with pesticides in their occupational environment.

It was investigated whether there is any risk factor associated with the prevalence of symptoms after the use of pesticides. Table 2 shows the prevalence of symptoms in the groups formed according to the presence and absence of factors that had a relevant frequency distribution in this research. The occurrence of symptoms in rural workers after the use of chemical agents is not significantly associated with males (p -value = 0.347 of Fisher's exact test), nor with the fact that the farmer can read (p -value = 0.677 of the exact test of Fisher), nor to the fact that the rural producer is a consumer of alcoholic beverages (p -value = 0.087 of Fisher's exact test), or smoker (p = value = 0.379 of Fisher's exact test).

The prevalence of symptoms in groups of rural workers who use and workers who

Table 1. Frequency distribution of aspects related to the health of rural workers participating in the research. Casimiro de Abreu, RJ, Brazil, 2019.

VARIÁVEL	FREQUÊNCIA	
	N	%
Aquisição		
Lojas de produtos agrícolas	30	90,9
Compra de outros agricultores	3	9,1
Armazenamento		
Galpão	33	97,1
Varanda	1	2,9
Agrotóxicos e Fertilizantes usados		
Roundup	33	97,1
2 Por 10	1	2,9
Potássio	2	5,9
Outros	1	2,9
Idade que começou a ter contato com agrotóxicos		
10 – 15	5	14,3
15 – 20	13	37,1
20 – 25	5	14,3
25 – 30	3	8,6
30 – 35	0	0,0
35 – 40	4	11,4
Tempo de contato com os agrotóxicos		
0 – 15	9	25,7
15 – 30	7	20,0
30 – 45	13	37,1
45 – 60	5	14,3
60 – 75	1	2,9
Como prepara os agrotóxicos		
Mão sem luva	9	25,7

Mão sem luva	9	25,7
Mão com luva	16	45,7
Pães	3	8,6
Baldes	7	20,0
Usa pelo menos um EPI	31	88,6
Pulverizador manual colocação nas costas	23	65,7
Botas	19	54,3
Calça impermeável	9	25,7
Máscara	8	22,9
Blusa impermeável	7	20,0
Óculos de proteção	5	14,3
Luvas de proteção	5	14,3
Pulverizador estacionário com motor	2	5,7
Trator pulverizador	1	2,9

do not use back spray equipment (p-value = 0.311), boots (p-value = 1,000), gloves (p-value = 0.460), waterproof pants (p-value = 0.700) and masks (p-value = 1,000). The groups determined by the use of boots, gloves, waterproof pants and masks when handling pesticides have lower prevalence of symptoms than the groups of respectively complementary rural producers who have not used such products, however such differences are not significant from the point of view. statistical.

The only significant association found in this investigation with the factors was that of the prevalence of symptoms with the non-use of the waterproof jacket: the prevalence of symptoms in the group that used the waterproof jacket was 14.3%. In the group that did not use the impervious blouse, the prevalence of symptoms was significantly higher, 64.3%. The difference between these proportions is statistically significant (p-value = 0.032 from Fisher's exact test). The odds ratio is equal to 0.09 and is significant since its confidence interval (0.01-0.882) does not have a value of 1. Therefore, the use of impervious blouse during the use of pesticides is a significant protective factor to the prevalence of symptoms after handling chemical agents: the chance of a rural worker wearing the impermeable shirt to present any symptoms after the use of pesticides is 0.09 times the chance of a rural producer who does not use the impervious shirt to present any symptoms after the use of pesticides in their crops.

Figure 2. Prevalence of symptoms declared by farmers that occurred after contact with pesticides. Casimiro de Abreu, RJ, Brazil, 2019.

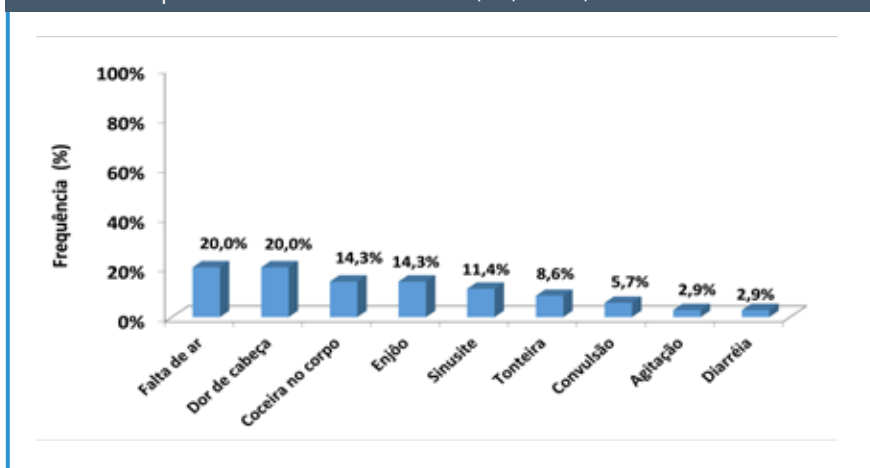


Table 2. Analysis of the association between qualitative factors and the prevalence of some symptom after the use of pesticides. Casimiro de Abreu, RJ, Brazil, 2019.

FATOR	GRUPO COM AUSÊNCIA DO FATOR			GRUPO COM PRESENÇA DO FATOR			P-VALOR DO TESTE EXATO DE FISHER COMPARANDO AS PREVALÊNCIAS NOS DOIS GRUPOS	OR	INTERVALO DE CONFIANÇA DA OR AO NÍVEL DE 95% DE CONFIANÇA
	TAMANHO DO GRUPO	NÚMERO DE CASOS COM SINTOMAS NO GRUPO	PREVALÊNCIA DE SINTOMAS	TAMANHO DO GRUPO	NÚMERO DE CASOS COM SINTOMAS NO GRUPO	PREVALÊNCIA DE SINTOMAS			
Sexo Masculino	5	4	80,0%	30	15	50,0%	0,347	0,25	0,03-2,5
Sabe ler	7	3	42,9%	28	15	57,1%	0,677	1,78	0,33-9,48
Consome bebida alcoólica	15	11	73,3%	20	8	40,0%	0,087	0,24	0,06-1,04

Fuma	29	17	58,6%	6	2	33,3%	0,379	0,35	0,06-2,25
Uso de Pulverizador de costas	12	5	41,7%	23	14	60,9%	0,311	2,17	0,53-9,02
Uso de Botas	16	9	56,2%	19	10	52,6%	1,000	0,86	0,023-3,29
Uso de Luvas	9	6	66,7%	26	13	50,0%	0,460	0,50	0,10-2,44
Uso de blusa impermeável	28	18	64,3%	7	1	14,3%	0,032	0,09	0,01-0,882
Uso de Calça impermeável	26	15	57,7%	9	4	44,4%	0,700	0,59	0,12-2,7
Uso de máscaras	27	15	55,6%	8	4	50,0%	1,000	0,80	0,17-3,89

The results show that the presence of symptoms after the use of pesticides is significantly associated with the age of the worker (p -value = 0.034 of the Mann-Whitney test). Comparing the statistics of the two groups, it is concluded that the workers who show symptoms after the use of chemical agents are significantly younger than the workers who do not show symptoms after their use, the difference in the average age of the two groups is 11 years.

The presence of symptoms after the use of pesticides is also significantly associated with the time of exposure of the worker to these chemicals in their occupational environment (p -value = 0.031 of the Mann-Whitney test). Comparing the statistics of the two groups, it is observed that farmers who show symptoms after the use of pesticides have a significantly shorter exposure time to the products than the experience time of workers who do not show symptoms after the use of chemical agents in their crops, the difference in the meantime of exposure of the two groups is 10.7 years. There is no significant association between the presentation of symptoms and the age that the rural worker started to work (p -value = 0.257 of the Mann-Whitney test) nor between the presentation of symptoms and the age that the farmer started to work with pesticides (p -value = 0.451 of the Mann-Whitney test).

There was a significant difference in some symptom between the groups of workers who used the impervious blouse (64.5%) and those who did not use such clothing (p -value = 0.03).

It is evident that the use of impervious blouse during the use of pesticides or chemical fertilizers is a protective factor for the health of rural workers. The chance of a worker who wears the impermeable shirt to present any symptoms after the use of pesticides is 0.09 times greater than the chance of a worker who does not wear the impervious shirt to present any clinical symptoms.

A significant association found in this investigation with the risk factors presented was the occurrence of toxicological clinical symptoms, described by the interviewee, after the use of pesticides with the non-use of the impermeable shirt: the prevalence of clinical symptoms in the group that used the impermeable shirt was 14.3%. In the group that did not wear the impervious blouse, the clinical toxicological symptoms reported were significantly higher, 64.3%.

The difference between these proportions is statistically significant (p -value = 0.032 from Fisher's exact test). The odds ratio is equal to 0.09 and is significant since its confidence interval (0.01-0.882) does not have a value of 1. Therefore, the use of impervious blouse during the use

of pesticides or chemical fertilizers is a factor significant protection against the prevalence of clinical toxicological symptoms caused by pesticides. The chance of a worker who wears the impervious shirt to present any symptoms after the use of pesticides is 0.09 times the chance of a worker who does not wear the impervious shirt to present any clinical symptoms.

The results show that the presence of clinical toxicological symptoms after the use of pesticides is significantly associated with the age of the worker (p -value = 0.034). Comparing the statistics of the two groups, it is concluded that workers who show clinical toxicological symptoms caused by pesticides are significantly younger than workers who do not show symptoms, the difference in the average age of the two groups is 11 years. The presence of toxicological clinical symptoms caused by pesticides is also significantly associated with the time the worker is exposed to these products (p -value = 0.031).

Comparing the statistics of the two groups, it can be observed that workers who have toxicological clinics caused by pesticides have a time of exposure to these products significantly shorter than the time of experience of workers who do not show symptoms, the difference in the means of exposure time for the two groups is 10.7 years.

DISCUSSION

To guarantee the “health of the fruits” and increase their productivity, agribusiness workers are exposed, daily, to high volumes of multiple toxic agents, but do not have information about the health risk factors for the use of these substances⁽¹²⁾. Analyzing the prevalence of risk factors for the health of rural workers exposed to pesticides was the objective of this research, resulting in the reports that, 56.7% have contact with pesticides and / or chemical fertilizers, 42.6% had no contact and only 1,7% declared to use pesticides. These data reveal the lack of knowledge about the chemical agents applied, as well as the grace period, the recycling law, the use of PPE, and operated in rivers to clean equipment^(13,14).

The results showed that rural workers start contact with crops between 15 and 20 years of age, and their working hours are 35 to 40 years of occupational exposure. There is a high prevalence of time of exposure to various chemical agents and occupational risk factors, through the main routes of absorption of these toxic substances: respiratory, cutaneous, digestive and placental⁽¹⁵⁾. The picture is more worrying and serious when it comes to the effects of chronic intoxication due to occupational or environmental exposure to pesticides, which are less known and more challenging in establishing the links and their relationships. Analysis addressed to farmers working on planting reveals that, in each harvest, an average of 12 different types of pesticides are used⁽¹⁶⁾.

Of the survey participants, 45.7% frequently used some type of PPE in the preparation of agrochemicals, with the highlight being the use of boots in 54.3%, the use of waterproof pants in 25.7% of workers, 22.9% wearing masks and only 20% reported wearing waterproof blouses, which leads us to a refined reflection on the issue. Bearing in mind that the health problems affecting the respiratory system were indicated and represented by chronic and acute changes, such as: shortness of breath, allergic rhinitis, asthma and chro-

nic obstructive disease, this system being the most affected in the literature, as illness factor, the disuse or misuse of PPE⁽¹⁵⁾.

These collaborators are obliged to re-enter the cultivation areas without respecting, for example, the time after spraying. They often enter these areas without carrying the Personal Protective Equipment (PPE), which is minimally necessary, pointing out a quick task, and without the freedom to refuse unsafe work, little protected by the union and harassed by authoritarian hierarchical relations⁽¹⁶⁾.

Pesticides are highly volatile when inhaled via the airways, however, the scientific academy observes the nervous system as the most affected⁽¹⁷⁾. There are studies that reveal dermal intoxication by the direct contact of the hands in the preparation of chemical agents, by not wearing appropriate clothes, as well as, by the PPE being contaminated by residues of the chemicals used in planting⁽¹⁸⁾.

Among the illnesses narrated by the workers, we saw: headache, dizziness, convulsion, agitation, and even peripheral neuropathy, since chemical compounds can enter through the dermal or respiratory pathways and perform the inhibition of acetylcholinesterase (ACE), that is, achieve nerve endings, a factor related to PPE that intensifies the problem. The importance of using PPE is in the inhibition of ACE, since there is an accumulation of neurotransmitters of acetylcholine (AC) in the synapses, showing that there are losses in the central nervous system of exposed human beings^(18,19).

The intense mobilization of society has generated public hearings; debates; production and expanded dissemination of information; and the ban on aerial spraying in some municipalities. These civil movements constitute not only concrete actions, which public government policies are unable to carry out, but are also recognized for their important role in protecting public health⁽¹⁸⁾.

The purchase of these products is typically made at 90.9% in agricultural products stores by the worker without presenting a specific prescription for the

purchase of this chemical agent, normally issued by an agronomist, as mentioned in the current legislation. Consequently, adequate information is omitted due to the absence of this trained professional, directly impacting the correct demonstration of use, the appropriate dosage of these chemicals, and the exposure time^(20,21). However, the financial question refers to a limitation in the acquisition of PPE, knowing that the vast majority of farmers have a family income between two and three minimum wages⁽²²⁾.

Epidemiological studies, which were carried out with exposure to pesticides and within vitro and in vivo tests, demonstrated that herbicides and insecticides act, with a margin that varies between 05 and 10 cases, in the relevant carcinogenicity mechanisms⁽²³⁾. This data is relevant for the analysis of the problem in question, since herbicides⁽²²⁾: “Glyphosate and 2,4, D” were the pesticides mentioned in this research and are used concomitantly with legal authorization, in rural and urban areas, in addition to the formulation of commercial products⁽²⁴⁾.

According to the Pesticide Information System of the National Health Surveillance Agency, of the 10 most used active ingredients, five are considered highly toxic (Toxicological Class II); one is considered extremely toxic (Toxicological Class I); two, moderately toxic (Class III); and two, slightly toxic (Class IV). The chemical agent most cited in this research was the herbicides “glyphosate and 2,4, Dinitrophenol”, presented respectively, Class IV and Class II⁽²⁵⁾.

In the short term, the denial of risks characterized as a defensive strategy serves as a possible “protection” for the mental health of these farmers, who come to believe that there are no direct risks to their health⁽²⁶⁾, however much the evidence and information available show them otherwise. In the medium and long term, however, these defensive strategies end up leading workers to voluntarily put themselves at risk in the face of the dangers of work, which constitutes a situation of difficult management for health surveillance, in the case of there is no

full understanding of how these defensive strategies are formed within these specific population groups⁽²⁴⁾.

It is important to emphasize that these data presented are not only used for the planning of mitigating actions and risk management, but also in the construction of educational policies that prioritize communication of risk associated with the use of pesticides with clarity and effectiveness, aimed at promoting health of these exposed populations in the country.

About risk analysis⁽²⁷⁾, there is relevance in continuing education in the knowledge of risk factors, the more they become familiar with it, usually, there is a greater tolerance with them. This is particularly worrying, because when you are very familiar with the risks, your perception is generally reduced and, consequently, the safety and control procedures are reduced.

In the daily contact with situations that are potentially harmful to health and the environment, there is an attitude of tolerance on the part of rural residents⁽²⁸⁾. In turn, the residents of the urban area, despite not having a direct relationship with the use of pesticides, show great concern with the sanitary and environmental conditions, about exposure.

CONCLUSION

The study was able to assess the risks of exposure to the health of rural workers through the handling of pesticides in

a municipality in the coastal lowlands of the State of Rio de Janeiro. Results have been shown that corroborate the profile of occupational exposure of farmers, with an emphasis on the use of multiple chemicals of high toxicity for a prolonged period, workers devoid of the use of the proposed PPE and, disregarding the time of reentry, mainly for harvest.

There is a 54.3% higher incidence in farmers who declared to have any symptoms after using pesticides, and the most relevant symptoms of intoxication, among them: headache, shortness of breath, itchy body, nausea and sinusitis; and a lower incidence of symptoms than groups that did not use such products.

Only observing the vulnerability to the indiscriminate use of pesticides and the relation of health risks to agricultural work exposed to the handling of pesticides cannot be minimized just by raising awareness of the proper use of specific PPE during the workday. There is an urgency in looking at health promotion actions for rural workers by the government, institutions, pharmaceutical industries and public bodies, regarding the prevention of occupational risks related to the indiscriminate use of pesticides, in accordance with the preservation of the environment. The problems related to pesticides should be readily recognized, valuing the context of social fragility, of environmental and human exposure to pesticides.

Approaches are needed that consider

all risk factors of damage to the health of the population in research, which implies the implementation of specific policies and actions to promote health and education of the farmer, such as: information on food, leisure time, sports, decent working conditions and the formation of social groups in rural communities.

The indiscriminate approvals for the use of numerous pesticides need to be reassessed jointly by the competent authorities, overcoming personal interests, as well as the hegemonic discourse for the disuse of pesticides. An immediate and effective adaptation of public policies is distinguished, in which society has an important role on the legal, financial and agroecological aspects, which values economic growth, social equity and environmental protection.

Finally, the diversification of professionals, such as those from the environment, agriculture, education, social action, among others, is of great value for social and preventive development; they must act more in partnership with health, and it is essential to plan actions, training and information about health care and the prevention of diseases related to the use of pesticides in agriculture. Public agencies are recommended to implement specific programs for rural workers, with the unique perspective of remaining in the agribusiness ranking, but with practices to promote the integral health of this vulnerable rural population in its entirety. ■

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