

THE USE OF AGRICULTURAL PESTICIDES IN AGRICULTURAL PRODUCTION AND CASES OF NEUROLOGICAL DISORDERS IN MUNICIPALITIES IN THE NORTHEAST I AND II HEALTH REGIONS, GOIÁS

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ABSTRACT

The indiscriminate use of pesticides has increased dermatological, respiratory, neurological, reproductive, psychiatric, and developmental problems. Despite this, Brazil is still the country that uses the most pesticides in the world. The objective of this study is to identify the number of pesticide poisonings in the municipalities that make up the Northeast I and Northeast II health regions and the cases of neurological problems in these locations in the period 2010-2022. This is an exploratory and descriptive study that used data from SINAN and the Goiás State Health Secretariat, considering cases of poisoning by municipality, type of exposure, circumstances of exposure, and evolution, as well as the active ingredient involved in occupational poisoning. In addition, the number of hospitalizations and deaths from neurological disorders was identified. It was found that the highest number of agricultural pesticide poisonings was in the Northeast II region, compared to the Northeast I region. Most exposures were single, acute episodes, involving habitual exposure, which evolved to cure without sequelae. Neurological disorders maintain the characteristic pattern of poisoning by region. Therefore, this study is of paramount importance to the scientific community, as there is a need for more information on the consumption of agricultural pesticides and their impacts, both for farmers and the local community.

Keywords: Agrochemicals; Poisoning; Nervous System Diseases.

INTRODUCTION

Pesticides are chemical, biological, or physical products used to control disease vectors that affect humans, and are used in both urban and rural areas (INCA, 2022). The use of these products in agriculture spread after World War II in Brazil, especially in the 1960s and 1970s, encouraged by government policies that offered financial support and relaxed legal restrictions. However, in the 1990s, the Brazilian government created regulatory agencies and specific legislation to control the production and use of these substances (ALVES, 2002), due to an increase in respiratory, dermatological, and neurological diseases, among others.

Neurological diseases, particularly Parkinson's disease (PD) and peripheral neuropathies (ASSOCIAÇÃO MÉDICA BRASILEIRA, 2022), have been widely studied, including studies concerned with identifying the relationship between them and the use of agrochemicals. PD, in particular, has been extensively studied to

understand the correlation between its pathophysiology and exposure to pesticides. These substances are believed to accelerate the destruction of neurons in the substantia nigra of the brain, increasing the risk of disease development in genetically susceptible individuals (YAN et al., 2018; BROWN et al., 2024). The study by Medeiros et al. (2020) also found an intrinsic relationship between exposure to pesticides and the mortality rate in patients with PD.

Given this context, the objective of this study is to identify the number of pesticide poisonings in the municipalities of the Northeast I and Northeast II health regions, as well as cases of neurological problems in these locations.

METHODS

This is an exploratory and descriptive study. Two health regions were chosen for this study: Northeast I, which includes the municipalities of Campos Belos, Cavalcante, Divinópolis de Goiás, Monte Alegre de Goiás, and Teresina de Goiás; and Northeast II, which includes the municipalities of Alvorada do Norte, Buritinópolis, Damianópolis, Guarani de Goiás, Iaci, and Monte Alegre de Goiás, and Teresina de Goiás; and Northeast Region II, which includes the municipalities of Alvorada do Norte, Buritinópolis, Damianópolis, Guarani de Goiás, Iaciara, Mambá, Nova Roma, Posse, São Domingos, Simolândia, and Sítio D'Abadia.

To this end, data from the following information systems were used: a) Notifiable Diseases Information System (SINAN); b) Goiás State Health Department. In addition, information obtained from previous work by the author of this study was used.

The systematization took into account the period (2010-2022), cases of poisoning by municipality, type of exposure, circumstances of exposure, and evolution, as well as the active ingredient involved in occupational poisoning. In addition, the number of hospitalizations and deaths due to neurological disorders was identified.

RESULTS

According to information available on the website of the Goiás State Health Secretariat, in the health indicators section, some of the most widely used agrochemicals in agricultural production in the state between 2017 and 2020 include: glyphosate, malathion, methomyl, paraquat, picloram, profenofos, propiconazole,

thiophanate-methyl, triclopyr, thiamethoxam, and 2,4-D. However, it was not possible to identify, through secondary data available on open access platforms, the specific agrochemicals applied in the health regions analyzed in this study. Considering the exploratory nature of the study, it is assumed that the agrochemicals used are the same, since the Northeast I and Northeast II regions are composed of municipalities that produce grains (soybeans and corn) and sugarcane.

Other information that could not be obtained was the method of application of agrochemicals and the quantity applied. However, according to Tavares and Constante (2024), in Goiás, application on small farms generally occurs through backpack sprayers, both manual and mechanized.

Regarding notifications of poisoning by agricultural pesticides, according to SINAN data, two cases were recorded in the Northeast I health region and 32 in the Northeast II region between 2010 and 2022, with the highest number of notifications occurring in 2018 (eight notifications). The municipality with the highest incidence of reports was Posse/GO (16 cases), followed by Iaciara/GO (7 cases).

In the Northeast I and Northeast II health regions, acute exposure in a single episode was the most common type of exposure to pesticides. The most frequent circumstance of exposure was habitual use, followed by use in suicide attempts.

Most cases progressed to recovery without sequelae. However, analysis of the data reveals a significant failure to complete the information, with a considerable number of fields left blank or ignored.

As for the rate of hospitalizations for neurological disorders in the Northeast I and Northeast II health regions, 1,863 cases were recorded. The municipality of Posse had the highest number of hospitalizations, with 701 cases. Deaths related to these disorders totaled 85, with Posse again presenting the highest number of cases. In the Northeast II region, Cavalcante was the locality with the highest number of cases, while Campos Belos recorded the highest number of deaths.

CONCLUSION

It was found that the Northeast II region had a significantly higher number of agricultural pesticide poisonings compared to the Northeast I region. In the majority of cases, exposure was a single, acute episode occurring during normal use, resulting in

recovery without sequelae in most cases. In addition, neurological disorders followed a regional pattern similar to that of poisoning.

Therefore, this study is of great relevance to the scientific community, as it highlights the need to expand knowledge about the consumption of agricultural pesticides and their impacts, both for farmers and the local community.

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