

TERRITORY, AGROCHEMICALS, AND THE HEALTH-DISEASE PROCESS: STUDY OF THE USE OF PESTICIDES IN AGRICULTURAL PRODUCTION AND ADVERSE EFFECTS ON REPRODUCTIVE HEALTH IN THE RESIDENT POPULATION OF MUNICIPALITIES IN THE NORTHEAST I AND NORTHEAST II HEALTH REGIONS, GOIÁS (2010–2022)

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ABSTRACT

The study analyzed the relationship between the use of pesticides in agricultural production (sugarcane, soybeans, and corn) and adverse effects on the reproductive health of the population residing in the Northeast I and Northeast II health regions of Goiás between 2010 and 2022. The objective was to identify agricultural producing municipalities and cases of reproductive disorders associated with exposure to agrochemicals. The research was exploratory and descriptive, using data from Ministry of Health information systems, such as SINAN. The analysis included information on exogenous intoxications, type of exposure, and case progression. In addition, the prevalence of reproductive disorders, such as infertility, spontaneous abortions, and hormonal changes, was investigated. The results revealed that most poisonings in the regions studied were acute, although chronic cases were also reported. Exposure to agrochemicals was associated with significant reproductive disorders in both men and women, with emphasis on interference with fertility and gestational complications. There was a higher incidence of poisoning due to suicide attempts and habitual use, highlighting the precariousness of pesticide management. The study concludes that there is a need for greater regulation and control of agrochemical use, as well as the implementation of more effective prevention policies to protect the reproductive health of the exposed population.

Keywords: Agrochemicals; Poisoning; Reproductive Health.

INTRODUCTION

Brazil is among the countries that consume the most agrochemicals in the world. However, indiscriminate use without adequate protection puts public health and rural workers at risk due to the toxicity of pesticides, which varies according to the active ingredient, dose, and form of exposure. Continuous exposure can cause acute and chronic poisoning, with chronic poisoning resulting in cumulative damage, including genetic changes that affect reproductive health, reducing fertility and causing hormonal disorders and complications in pregnancy (ASSIS, 2020; DUTRA *et al.*, 2020).

This work is the result of research developed in scientific initiation; therefore, it is part of a larger project entitled "Region, agrochemicals, and the health-disease process: study of the use of pesticides in agricultural production and cases of neoplasms, neurological disorders, and reproductive disorders in the population residing in municipalities in the regions of health-disease: study of the use of pesticides in agricultural production and cases of neoplasms, neurological disorders, and reproductive disorders in the population residing in the municipalities of the Northeast I and Northeast

II health regions, Goiás (2010–2022).”

The initial work plan aimed to identify the municipalities that produce sugarcane, soybeans, and corn in these health regions, in addition to verifying cases of reproductive disorders among residents and the relationship with the use of agrochemicals. These objectives were achieved. However, the plan also aimed to identify the types of agrochemicals used and their consequences for the environment, which was not possible to accomplish. Thus, the objective of this study is to analyze the relationship between the use of pesticides in agricultural production (sugarcane, soybeans, and corn) in the Northeast I and Northeast II health regions of Goiás, identifying the producing municipalities and cases of reproductive disorders in the local population.

METHODOLOGY

This is an exploratory study with a qualitative and quantitative approach. The period investigated was 12 years (2010 to 2022). Data from digital information systems of the Mauro Borges Institute, the Toxicological Information Center of Goiás (CIT-GO), the National Toxicological and Pharmacological Information System (SINITOX), the Goiás State Health Information System, the Cancer Information System (SISCAN), the Mortality Information System (SIM), and the Notifiable Diseases Information System (SINAN).

The collected data were analyzed beforehand to understand and compile, whenever possible, the data obtained. Subsequently, descriptive and non-parametric statistical analysis was performed. After the surveys mentioned, descriptive and spatial statistics were used. After tabulating the data, it was analyzed considering bibliographic readings on the use of agrochemicals and reproductive disorders in order to characterize the health-disease process.

RESULTS

According to Table 1, it can be inferred that most agrochemical poisonings in the regions studied are acute; however, 23 poisonings were chronic, which can include neurological and neoplastic problems, as well as endocrine and reproductive disorders.

Table 1. Exogenous poisoning – Notifications by type of exposure according to Health Region (CIR) of notification. Period: 2012-2022

Health Region (CIR) of notification	Ign/White	Acute–single	Acute–repeated	Chronic	Acute on top of chronic	Total
52006 Northeast I	34	61	20	17	3	135
52007 Northeast II	76	97	20	6	2	201
Total	110	158	40	23	5	336

Source: Ministry of Health/SVSA - Notifiable Diseases Information System - Sinan Net

The lack of notification and registration of reproductive health damage is a factor that hinders the assessment of the extent of the impacts of pesticides on human health, resulting in the obscuration of the specific characterization of acute and chronic harm. As a consequence, effective prevention and health care actions are not developed (ABRASCO, 2024).

Table 2. Exogenous Poisoning - Notifications by Evolution according to Health Region (CIR) of notification. Period: 2012-2022

Health Region (CIR) of notification	Ign/Blank	Cure without sequelae	Cure with sequelae	Death due to poisoning Exogenous	Loss of follow-up	Total
52006 Northeast I	54	74	3	3	1	135
52007 Northeast II	81	108	5	6	1	201
Total	135	182	8	9	2	336

Source: Ministry of Health/SVSA - Notifiable Diseases Information System - Sinan Net

Table 2 shows that eight people recovered with sequelae after agrochemical poisoning in the health regions analyzed. The sequelae of these exogenous poisonings vary according to the substance and the severity of exposure. Agrochemicals have the potential to disrupt the endocrine system, resulting in sexual hormone changes and damage to the reproductive system, such as breast, ovarian, testicular, and prostate cancer, menstrual irregularities, infertility, reduced semen quality, and malformations of the reproductive organs (CREMONESE, 2014).

Table 3. Exogenous poisoning – Notifications by sex according to Health Region (CIR) of notification. Period: 2012-2022

Health Region (CIR) of notification	Male	Female	Total
52006 Northeast I	61	74	135
52007 Northeast II	116	85	201
Total	177	159	336

Source: Ministry of Health/SVSA - Notifiable Diseases Information System - Sinan Net

This distribution suggests that, although there is a variation in the prevalence of cases by sex between the two regions, overall, men were more affected by exogenous poisoning than women in the period analyzed. This may reflect differences in occupational activities, exposure to toxic agents, or other socioeconomic and behavioral factors that vary between regions and sexes. These data are essential to guide public health policies and prevention strategies specific to each demographic group and region (THAMMACHAI *et al.*, 2022).

Table 4. Exogenous poisoning – Notifications by Health Region (CIR) and Circumstance. Period 2012-2022

Health Region (CIR) of notification	Ign/Branco	Habitual use	Accidental	Ambiental	Administrative error	Self-medication	Abuse	Food intake	Suicide attempt	Abortion attempt	Violence /homicide	Other	Total
52006 Nordeste I	15	28	12	1	-	4	16	8	46	2	1	2	135
52007 Nordeste II	36	30	45	2	7	5	6	9	57	-	-	4	201
Total	51	58	57	3	7	9	22	17	103	2	1	6	336

Source: Ministry of Health/SVSA - Notifiable Diseases Information System - Sinan Net

Although the research objective did not include identifying the circumstances of agrochemical poisoning, it is relevant for data correlation and public policy development to note that in the Northeast I region, attempted suicide was the main circumstance of poisoning, with 46 notifications, followed by habitual use (28) and abuse (16).

CONCLUSION

The study on the use of pesticides in the Northeast I and Northeast II regions of Goiás revealed acute and chronic poisonings that affect the reproductive health of the local population, exposing rural workers to high risks, resulting in neurological, endocrine, and reproductive damage. The lack of adequate reporting limits the comprehensive assessment of impacts and hinders the implementation of preventive actions. Both men and women are affected, with regional and sex variations, with poisoning due to suicide attempts being the most common, followed by habitual and accidental use. The study highlights the need for better regulation, safe practices, and effective public policies to protect the reproductive and general health of the exposed population.

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