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INTRODUCTION

Brazil has been the main consumer of pesticides since 2008, and intensive and indiscriminate use has placed the environment and human health at risk, especially the population of rural workers. The literature shows that pesticides are capable of causing genetic damage and an increase of the micronucleated cell rate is describe. The municipality of Casimiro de Abreu, located in the coastal plain of the State of Rio de Janeiro, with a predominance of family food production, has intense agricultural activity and pesticide use. The literature shows that pesticides can cause genetic damage, describing an increase of the micronucleated cell rate. The aims of the present study are to evaluate occupational and environmental exposure to pesticides and identify the genotoxic effects of this exposure.

METHODS

It is a cross section study in a farming community in Casimiro de Abreu, Rio de Janeiro state, Brazil. Epidemiological, clinical and laboratory aspects of multiple exposure to pesticides were identified in a sample of 124 farmers and 108 workers not exposed to pesticide (negative control). Exposed group is composed by three categories: Pesticides Applicators (PA, n=26), Rural Workers Exposed to pesticides (RWE, n=73) and Rural Workers Not Exposed to pesticides (RWN, n=25). This project was approved by the INCA Research Ethics Committee (CAAE: 64799217.3.0000.5274). Exposure assessment is performed using the micronucleus assay with cytokinesis block. Micronucleus test with cytokinesis block (MNCtB) occurred with a 72h culture (37°C, 5% CO₂), followed by hypotonic treatment (KCl 0.075M), fixation (methanol and acetic acid 5:1) and staining with 5% Giemsa. Slide is analyzed by microscope at a 400x zoom. The cytotoxic potential is determined by the nuclear division index (NDI) and the genotoxic potential by frequency micronuclei in binucleate lymphocytes.

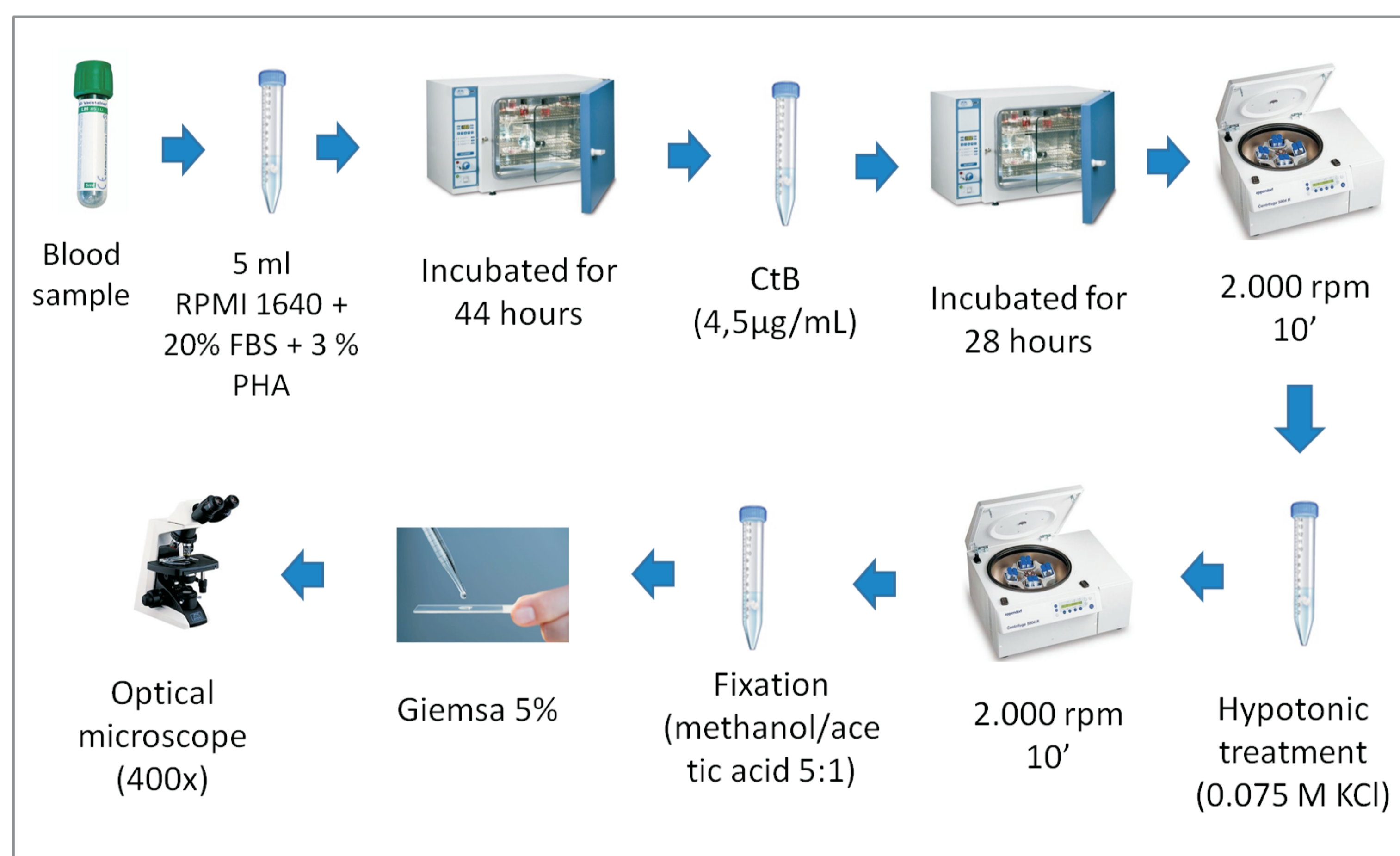
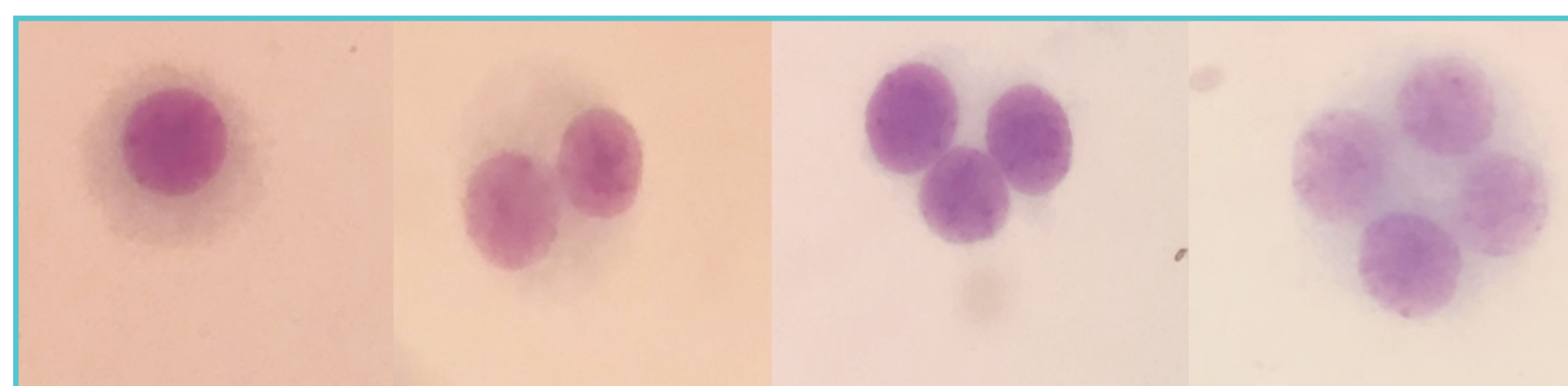


Figure 1: Methodology of the micronucleus assay with cytokinesis block



$$NDI = \frac{M1 + 2(M2) + 3(M3)}{N}$$

Figure 2: The cytotoxic potential - The nuclear division index (NDI)

RESULTS

Most of the workers are men (76%) with approximately 55 years, non-white (60%) and elementary school education (63%). In relation to workers who use or have already used agrochemicals, crop spraying was the most reported activity (67%).

Cytotoxic effects:

Partial results showed no cytotoxic effect for none of the intensities of exposure to pesticides, compared to their respective concurrent controls: PA (n=15, 1.18±0.1 versus n=23, 1.14±0.1, p=0, 25), RWE (n=17, 1.14±0.1 versus n=25, 1.14±0.1, p=0.09) and RWN (n=13, 1.13±0.1 versus n=21, 1.16±0.1, p=0.18).

Table 1: The cytotoxic potential - The nuclear division index (NDI) in different groups

	PA	CONTROL	RWE	CONTROL	RWN	CONTROL
N	15	23	17	25	13	21
NDI	1,18	1,14	1,14	1,14	1,13	1,16

Genotoxic effects:

With respect to the genotoxic potential, partial results are displayed to 3 PA workers and 3 concurrent controls.

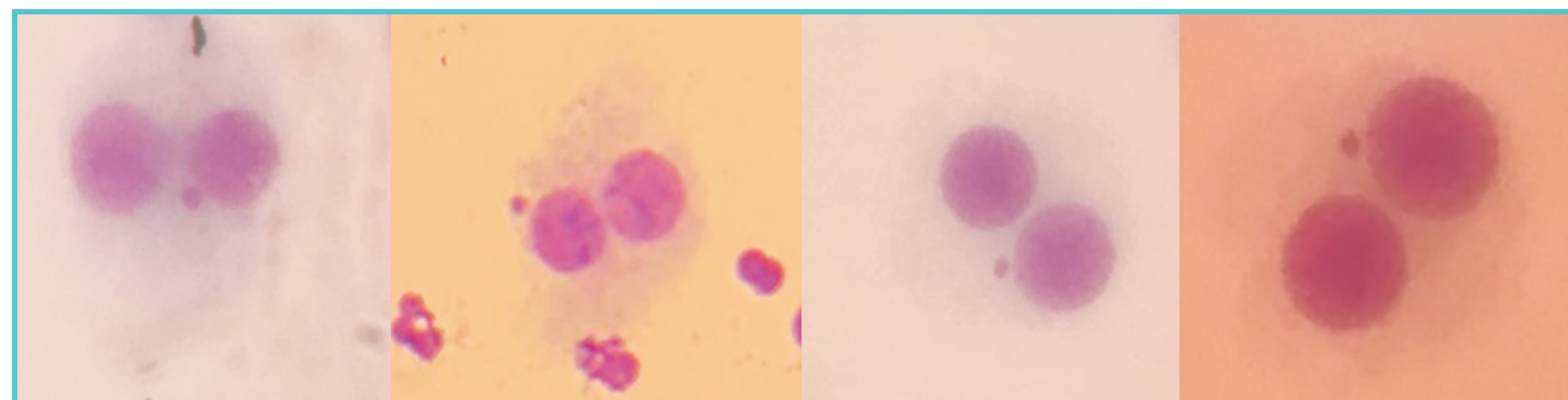


Figure 3: Micronuclei in binucleate lymphocytes

• Evaluation of Micronuclei: No statistical analysis are possible so far. At the PA group, the number of micronucleus (4,67±1,3) is more present at the exposed group than the concurrent control group (3,17±0,8).

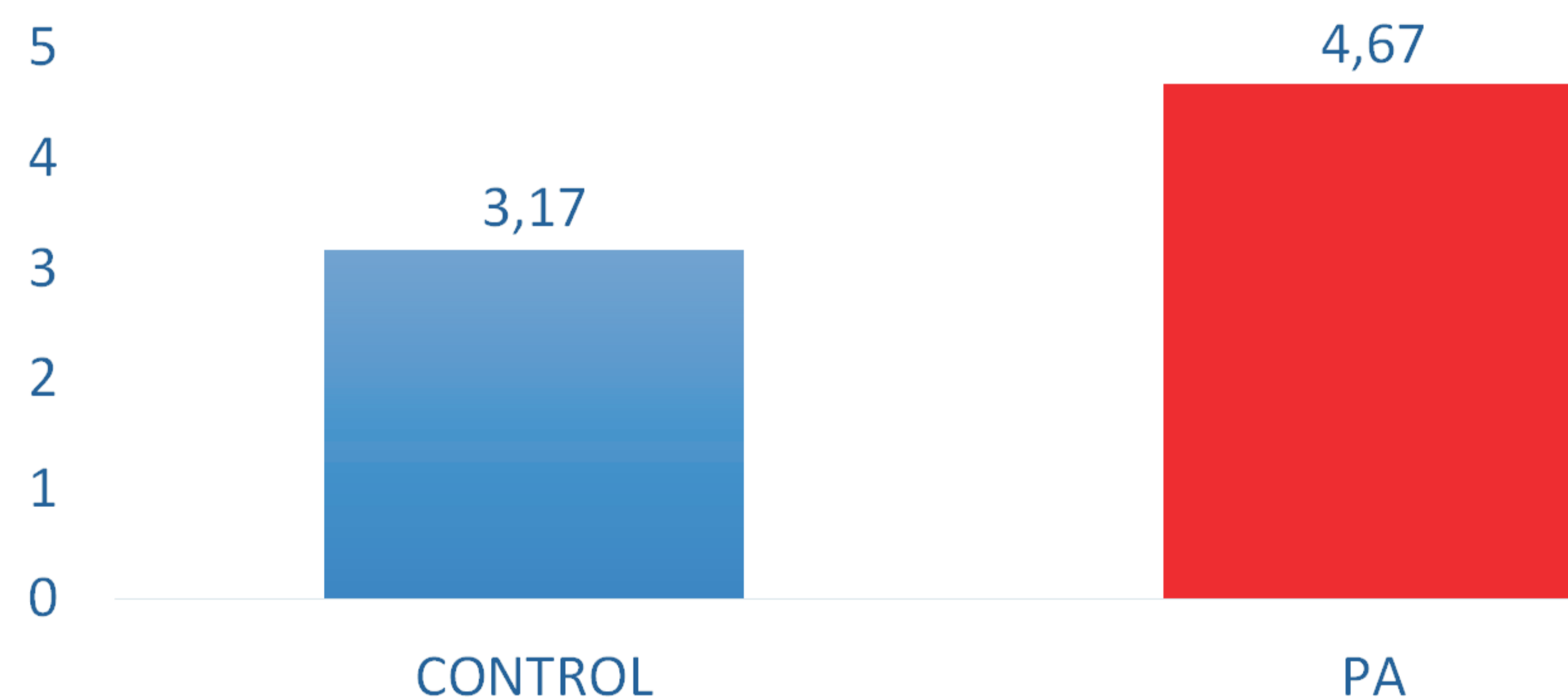


Figure 4: Frequency of genotoxic effects observed to PA and the control

RESULTS

The results are still partial, but the study intends to identify genetic damages that may contribute to the development of cancer, aiding in decision making, as early as possible.

Source of funding: PAHO