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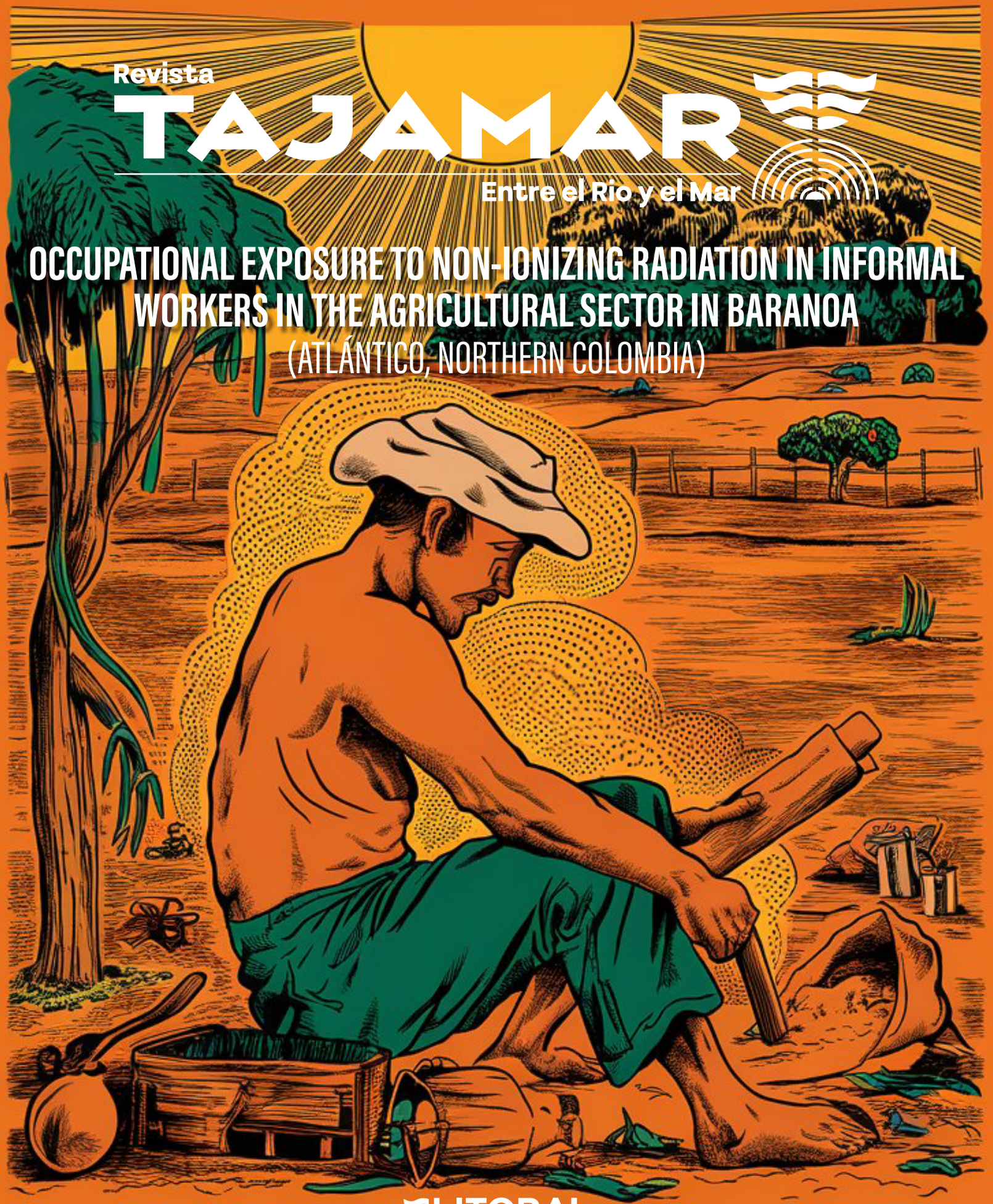
OCCUPATIONAL EXPOSURE TO NON-IONIZING RADIATION IN INFORMAL WORKERS IN THE AGRICULTURAL SECTOR IN BARANOA (ATLÁNTICO, NORTHERN COLOMBIA)



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Occupational exposure to non-ionizing radiation in informal workers in the agricultural sector in Baranoa (Atlántico, Northern Colombia)

Exposición laboral a radiaciones no ionizantes en trabajadores informales del sector agrícola en Baranoa (Atlántico, Norte de Colombia)

Exposição ocupacional à radiação não ionizante em trabalhadores informais do setor agrícola em Baranoa (Atlántico, norte da Colômbia)

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Abstract

In Colombia, the municipality of Baranoa bases its economy on the agroindustrial sector, but the majority of workers in this sector are informal and the impact of the various occupational risks to which they are exposed, especially the physical risk of non-ionizing radiation, is unknown. that can be generated by activities, especially by prolonged exposure to the sun, for which the main objective of this research is to determine the impact of the physical risk of non-ionizing radiation to which informal workers in the agroindustrial sector in the municipality of Baranoa, Atlántico, in the year 2023, through a quantitative, descriptive approach methodology. cross-sectional design, field study with primary source, where the "Solar UV Radiation Risk Assessment for Outdoor Workers: Operational Review" Questionnaire instrument was applied to a representative sample of 60 informal workers from the agroindustrial sector of Baranoa, Atlántico. the School of Occupational and Public Health, and the main conclusion is that informal workers in the agroindustrial sector of the municipality of Baranoa have a high risk of non-ionizing radiation when they carry out work related to livestock care, and have a medium risk of radiation. non-ionizing when they carry out the work of collecting cassava and growing vegetables and tubers.

Keywords: solar radiation, agricultural economy, safety at work, work environment, ultraviolet radiation.

Resumen

En Colombia el municipio de Baranoa, basa su economía en el sector agroindustrial, pero la mayoría de los trabajadores de este sector son informales y se desconocen el impacto a los diversos riesgos laborales a que están expuestos en especial al riesgo físico de radiaciones no ionizante, que puede ser generados por las actividades, especialmente por exposiciones prolongadas al sol, por lo cual el objetivo principal de esta investigación es determinar el impacto del riesgo físico de radiaciones no ionizantes a los que están expuestos los trabajadores informales del sector agroindustrial en el municipio de Baranoa, Atlántico, en el año 2023, a través de metodología de enfoque cuantitativo, de tipo descriptivo. de diseño trasversal, de estudio de campo con fuente primaria, donde a una muestra representativa de 60 trabajadores informales del sector agroindustrial de Baranoa, Atlántico, se le aplico el instrumento Cuestionario de "Solar UV Radiation Risk Assessment for Outdoor Workers: Operational Review" de la School of Occupational and Public Health, y se da como principal conclusión que los trabajadores informales del sector agroindustrial del municipio de Baranoa, tiene un riesgo alto de radiaciones no ionizante cuando realizan labor relacionada al cuidado del ganado, y tiene un riesgo medio de radiaciones no ionizante cuando realizan la labor de recolección de yuca y cultivo de hortalizas y tubérculos.

Palabras clave: radiación solar, economía agraria, seguridad en el trabajo, ambiente de trabajo, Radiación ultravioleta

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Resumo

Na Colômbia, o município de Baranoa baseia sua economia no setor agroindustrial, mas a maioria dos trabalhadores deste setor são informais e o impacto dos diversos riscos ocupacionais aos quais estão expostos é desconhecido, especialmente o risco físico da radiação. radiação ionizante, que pode ser gerada por atividades, especialmente exposição prolongada ao sol, razão pela qual o objetivo principal desta pesquisa é determinar o impacto do risco físico da radiação não ionizante a que estão expostos os trabalhadores informais do setor agroindustrial no município de Baranoa, Atlântico, no ano de 2023, através de metodologia de abordagem quantitativa, descritiva. desenho transversal, estudo de campo com fonte primária, onde o instrumento Questionário "Avaliação de risco de radiação UV solar para trabalhadores ao ar livre: revisão operacional" foi aplicado a uma amostra representativa de 60 trabalhadores informais do setor agroindustrial de Baranoa, Atlántico. Saúde Ocupacional e Pública, e a principal conclusão é que os trabalhadores informais do setor agroindustrial do município de Baranoa apresentam alto risco de radiação não ionizante quando realizam trabalhos relacionados ao cuidado do gado, e apresentam risco médio de radiação não ionizante. -ionizantes quando realizam o trabalho de coleta de mandioca e cultivo de hortaliças e tubérculos.

Palavras-chave: *radiação solar, economia agrícola, segurança no trabalho, ambiente de trabalho, radiação ultravioleta.*

Introduction

For several decades the agro-industrial sector has been a focus for several researchers worldwide, because part of their products can be raw materials to generate various products of interest, but it is also of interest in the research field the safety and health of its workers and the risks they are exposed (Saval, 2012). Given the nature of agricultural work, which often involves prolonged exposure to solar radiation and the use of machinery that emits non-ionizing radiation, these become a significant risk to the health of workers in the agro-industrial sector (Salazar, 2023).

Generally humans are exposed to an environment that generates non-ionizing radiation all over the world that comes from sunlight producing thermal and non-thermal effects caused by electrical voltage cables of all voltage measurements both in lines electric transformers that generate many high frequency effects, in the field (Parrales, 2021).

Exposure to non-ionizing radiation may have adverse effects on the physical health of agricultural workers, such as sunburn, thermal injuries, and increased risk of skin and eye diseases These risks can highlight temporary or permanent disabilities, affecting the ability of workers to maintain their livelihoods and contribute to their families and communities (Carrasco, 2023). There are also many studies of non-ionizing radiation that show carcinogenic effects associated with electromagnetic fields, as well as diseases such as neurodegeneratives and Alzheimer's disease (Márquez, & Camerino, 2009).

In Colombia the municipality of Baranoa, bases its economy on the agro-industrial sector, but most workers in this sector are informal and the impact of the various occupational risks to which they are exposed in particular to the physical risk of non-ionizing radiation is unknown (Ramírez, 2022), which can be generated by activities carried out with welding equipment, by electromagnetic fields generated by agricultural machinery, such as tractors and irrigation equipment, exposure to UV lamps in greenhouses and prolonged exposures to the sun.

Although non-ionizing radiation is generally considered safe at low levels of exposure, chronic or severe exposure can have adverse health effects, and in the agro-industrial sector poses a significant challenge for informal workers, because they often lack access to adequate protective measures and the necessary training on associated risks, they face potential health risks due to chronic exposure to such radiation during their work, either outdoors or in various agricultural production environments (Ospino, 2023).

Therefore, the main objective of this article is to determine the impact of the physical risk of non-ionizing radiation to which informal workers in the agro-industrial sector are exposed in the municipality of Baranoa, Atlántico, in 2023. This research is also relevant because it contributes to SDG 3: Ensuring a healthy life and promoting well-being for all at all ages; and 8: Promote inclusive and sustainable economic growth, employment and decent work for all.

Regarding research on the risks of exposure to non-ionizing radiation, there is the work of Araya et al. (2021), entitled: "Occupational exposure to ultraviolet radiation UVA/UVB of agricultural workers in the province of Cartago, Costa Rica", which indicate that health effects from ultraviolet radiation are mainly manifested in skin damage. They may be acute or chronic; Acute damage is what presents as a sunburn and chronic damage, which causes photo aging and formation of cortical cataracts. Among other injuries from exposure to ultraviolet radiation is skin cancer, which has had a considerable increase in its incidence, mainly by prolonged exposure to B-rays, because these penetrate the skin affecting the epidermis and, thus generating DNA damage as well as A-rays, which increase the number of dermal inflammatory cells.

Likewise, Glanz et al. (2010), outdoor workers are groups that receive solar ultraviolet radiation on a regular basis and in significant doses, which often exceed the recommended values. Against this fact, factors such as the ultraviolet index (UV index), which is a measure of ultraviolet radiation from the sun on the Earth's surface and is a quantitative indicator of the effect of this type of radiation on human skin, raise awareness among the working population of the importance of taking protective measures against exposure to UV radiation.

It is important the research carried out by Araujo et al. (2019) in relation to skin cancer due to exposure to solar ultraviolet radiation in informal workers in Bogotá, which show that studies by the National Cancer Institute show a sustained increase in the number of cases of skin cancer, almost double that of breast and cervical cancer, and four to five times more than prostate and gastrointestinal tumors.

The annual increase in skin cancer reported by the National Cancer Institute and the studies described by the Federico Lleras dermatological center in Colombia is due in large part to the lack of control, monitoring and formulating strategies to mitigate its impact. There is no comprehensive occupational health care guide for nonmelanoma skin cancer in informal workers in Bogotá; to date no record is kept because they provide their services through different forms of employment, the principal of which is work-related, making them dependent on contractual relations with third parties, which require an increase in personnel exclusively for a specific work in relation to the progress of this work, and this prevents the contractor from verifying and monitoring the possible occupational diseases they may acquire during the provision of their services.

Materials and Methods

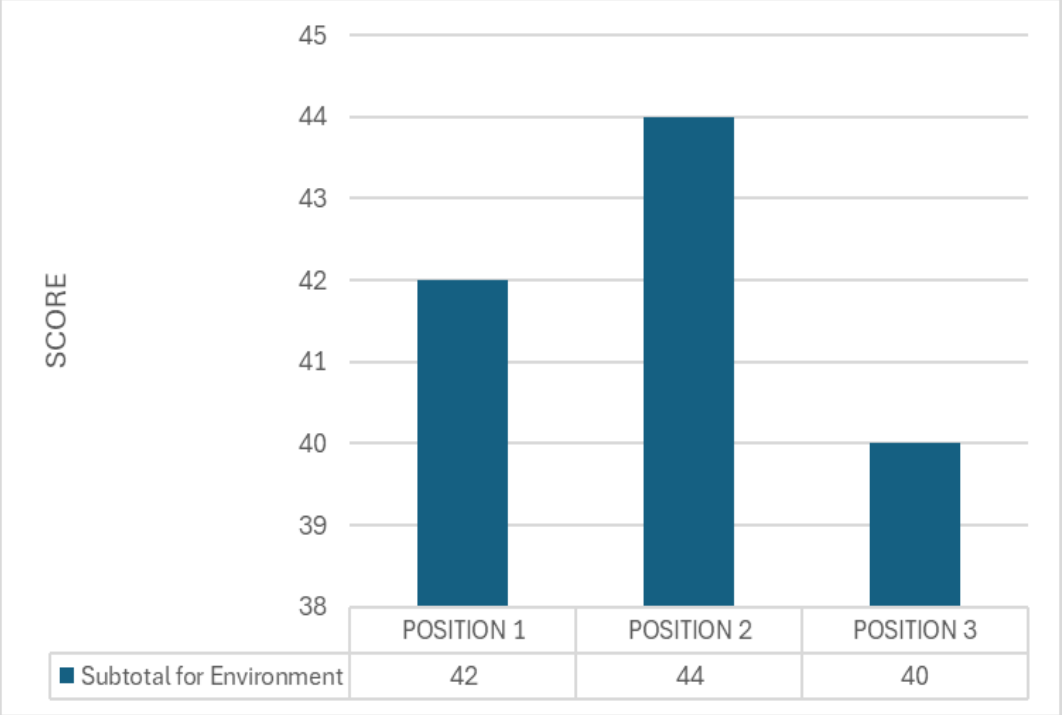
Research with quantitative approach, descriptive type, based on a field study, with transversal design, with primary sources. Where 60 informal workers of the agro-industrial sector of the municipality of Baranoa, Atlantico, were applied during 2023, the research instrument, questionnaire of "Solar UV Radiation Risk Assessment for Outdoor Workers: Operational Review" of the School of Occupational and Public Health, (Araujo et al., 2019), which evaluates exposure to solar radiation for outdoor work, in 3 positions in different spaces where they do their work. The questionnaire consists of 3 sections, which are the risk factors that can influence the worker and his task, which are: Environment, Operation and Personal Protection. Each risk factor has an assigned score, with these scores it is recognized if the risk is low, medium or high. Then you add the result between the 3 factors and you get a general risk.

Results and Discussion

Among the first results were determined the 3 main positions where the work is performed by the 60 informal workers of the agro-industrial sector of the municipality of Baranoa, which are:
Position 1: Yucca collection
Position 2: Livestock Care
Position 3: Cultivation of vegetables and tubers

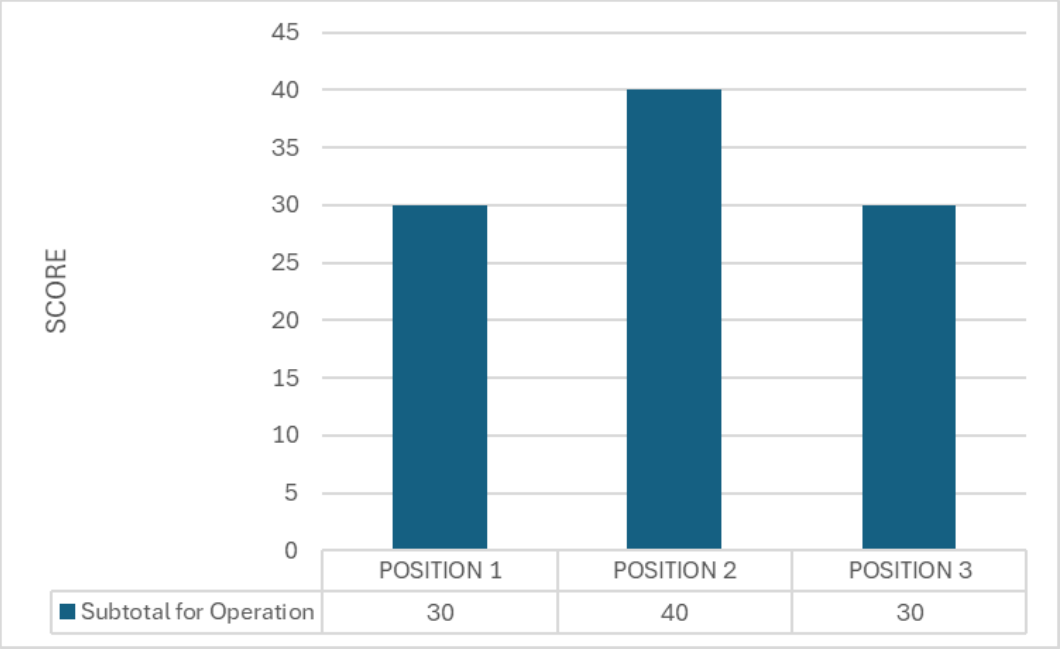
Below are the risk scores averaged from the 3 positions in different spaces where the work is performed by the 60 informal workers of the agro-industrial sector of the municipality of Baranoa, obtained by applying the questionnaire "Solar UV Radiation Risk Assessment for Outdoor Workers: Operational Review" by the School of Occupational and Public Health, (Araujo et al., 2019), through the following graphics.

Figure 1: Average environmental subtotal risk score**.**



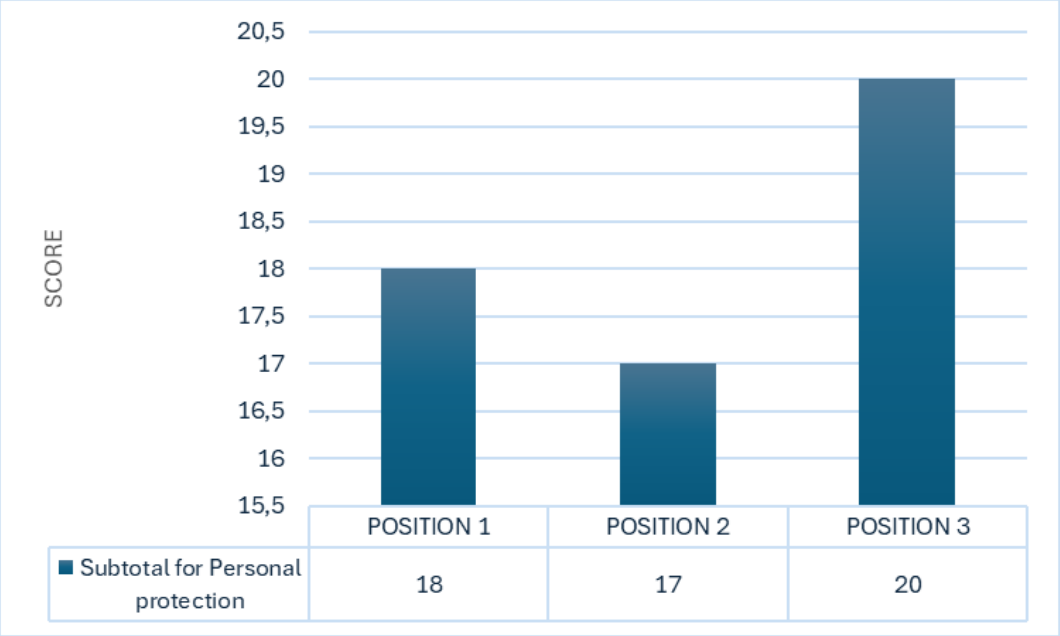
Note: own elaboration, 2014.

Figure 2: Average risk score of subtotal operation (own, 2014)



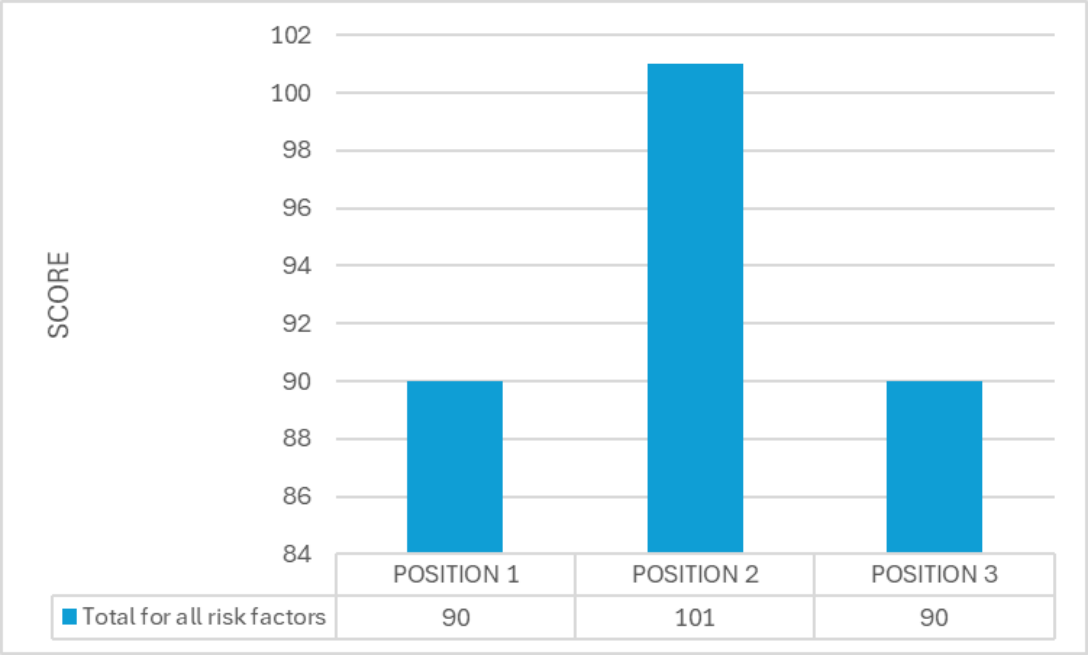
Note: own elaboration, 2014.

Figure 3: Average risk score of personal protection subtotal (own, 2014)



Note: own elaboration, 2014.

Figure 4: Averaged total score for all risk factors (own, 2014)



Note: own elaboration, 2014.

Conclusions

The informal workers of the agro-industrial sector of the municipality of Baranoa, have a high risk of non-ionizing radiation when they perform work related to the care of livestock, and has an average risk of non-ionizing radiation when harvesting cassava and growing vegetables and tubers, the possibility of informal workers of the agro-industrial sector of the municipality of Baranoa to become ill due to risk of non-ionizing radiation is evidenced, the UV index must be communicated daily to workers: This allows them to make informed decisions about their exposure to solar radiation, such as wearing protective clothing or limiting outdoor time.

You should also provide personal protection: Gloves, sunglasses, helmets, proper clothing and sunscreen help minimize direct contact with radiation. Conduct talks, training and seminars: Educate workers about the risks of exposure to non-ionizing radiation and how to protect themselves, including measures such as maintaining a healthy diet, avoiding smoking and using sunscreen. Reduce the time workers spend near radiation sources, such as power towers or power lines. Make regular measurements of radiation levels in the working environment to ensure that the established limits are met.

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