ASSESSMENT ON THE IMPACT OF THRESHOLD HEAT LEVEL ON THE HEALTH OF THE LOCAL MANIHOT ESCULENTA-CRANT (GARRI) PRODUCERS IN OMOBORIOWO LOCAL GARRI INDUSTRY IN IFON, OROLU LOCAL GOVERNMENT, OSUN STATE, NIGERIA

ABSTRACT

Garri production stands as a vital economic endeavor in Nigeria, with the well-being of local producers raising concerns regarding health and safety. This study focused on evaluating the prevalence of heat stress among Omoboriowo local garri processing producers in Ifon Osun, Orolu Local Government. Employing a descriptive survey research design, the study included a sample size of 30 garri processing producers, and data were collected through a questionnaire. Results indicated that all respondents (100%) recognized the potential for high temperatures to induce heat stress, leading to heat stroke. Furthermore, a majority of participants (93.3%) reported observing symptoms of heat stress during garri processing, encompassing fatigue, headaches, dizziness, muscle cramps, and nausea. Access to personal protective equipment (PPE) varied, with only 33.3% consistently having access to items like hats, gloves, or cooling vests to alleviate heat stress. Although 70% had received some training on heat stress prevention, only 30% had undergone comprehensive training. The study recommends enhancing the availability and consistent use of appropriate PPE among garri processing producers. Moreover, comprehensive training programs focusing on heat stress prevention and management should be provided to all workers. Introducing regular breaks and rest periods into the work schedule, allowing for cooling down and hydration, and improving ventilation systems in the garri processing area are also recommended.

Keywords: Garri, Heat, Stress, Heat Stress Prevention, PPE, Garri Processing, Training, Ventilation.

1.0 Introduction

Garri, a staple food in Nigeria, holds significant economic importance and is a dietary mainstay for many communities across the country. The production of garri involves a series of labor-intensive processes, including peeling, washing, grinding, fermentation, and roasting. These activities are often carried out in local settings, with producers working under conditions that expose them to various occupational hazards. One critical concern that has received limited attention is the potential health risks associated with heat stress among garri processing producers.

Heat stress is a physiological response to high temperatures, and it occurs when the body's cooling mechanisms cannot effectively dissipate the heat generated during physical exertion or exposure to hot environments (Armstrong et al., 2007). Nigeria, characterized by a tropical climate, frequently experiences high ambient temperatures, especially in regions where garri production is a prevalent economic activity. The combination of elevated temperatures and strenuous physical work during garri processing poses a considerable health risk to workers.

Research indicates that prolonged exposure to high temperatures can lead to heat-related illnesses, ranging from mild conditions like heat cramps and heat exhaustion to severe and potentially life-threatening conditions such as heat stroke (Boulware et al., 2003). The symptoms of heat stress include fatigue, headaches, dizziness, muscle cramps, nausea, and in extreme cases, loss of consciousness. Individuals working in environments where heat stress is prevalent may not only suffer from immediate health effects but also face long-term health implications.

Manihot esculenta-Crant, commonly known as cassava, is a staple crop in many tropical regions, serving as a primary source of carbohydrates for millions of people. The processing of cassava into garri, a popular food product in Nigeria, involves several labor-intensive stages such as peeling, washing, grinding, fermentation, and roasting (Akinrele, 1970). While garri production plays a vital role in the economy and food security of the region, the health and well-being of local producers engaged in these processes are often overlooked.

One significant challenge faced by these producers is the potential impact of threshold heat levels on their health during garri processing. As a tropical country, Nigeria experiences high ambient temperatures, particularly in regions where garri production is prevalent. The

combination of elevated temperatures and the physically demanding nature of garri processing activities raises concerns about the health risks posed to the local cassava producers.One significant challenge faced by these producers is the potential impact of threshold heat levels on their health during garri processing (Smith et al., 2022). As a tropical country, Nigeria experiences high ambient temperatures, particularly in regions where garri production is prevalent. The combination of elevated temperatures and the physically demanding nature of garri processing activities raises concern about the health risks posed to the local cassava producers.

Heat stress, a physiological response to high temperatures, occurs when the body's cooling mechanisms are insufficient to dissipate the heat generated during physical exertion or exposure to hot environments (Armstrong et al., 2007). Prolonged exposure to high temperatures can lead to various heat-related illnesses, ranging from mild conditions like heat cramps and heat exhaustion to severe outcomes such as heat stroke (Boulware et al., 2003). The symptoms of heat stress include fatigue, headaches, dizziness, muscle cramps, nausea, and, in extreme cases, loss of consciousness.

Despite the potential health risks associated with heat stress, there is a noticeable gap in research focusing on the impact of threshold heat levels on the health of local Manihot esculenta-Crant (garri) producers. This study aims to address this gap by conducting a comprehensive assessment of the awareness, prevalence, and management of heat stress among cassava producers in specific localities, focusing on the threshold levels that may contribute to adverse health effects.

This assessment will provide valuable insights into the factors contributing to heat stress among garri producers, including the awareness levels, access to protective measures, and the efficacy of existing training programs. The findings will inform targeted interventions to improve working conditions, enhance awareness, and implement measures to mitigate the impact of threshold heat levels on the health of cassava producers.

As climate-related challenges continue to affect occupational health, this research contributes to the broader discourse on the importance of safeguarding the well-being of those engaged in vital economic activities such as garri production.

2.0 **Materials and Methods**

This section outlines the methodology employed for data collection, including the research design, study population, sample and sampling technique, research instruments, validity and reliability assessment, method of data collection, data analysis, limitations, and ethical considerations.

2.1 **Research Design**

A descriptive survey research design was utilized for this study, offering objectivity and minimizing bias. This design facilitated an unbiased exploration of variables under investigation.

2.2 **Study Population**

The study focused on the garri processing producers of Omoboriowo local community in Ifon Osun, Orolu Local Government, purposively selected due to their direct involvement in the garri production process.

2.3 **Sample and Sampling Technique**

Random sampling was employed to select participants for the study. Each member of the garri processing factory was randomly chosen, ensuring that the selected samples were representative of the entire population.

2.4 **Research Instrument**

Data collection utilized a structured questionnaire, complemented by an occupation checklist. The questionnaire comprised two sections: Section A captured respondents' biodata, while Section B included structured questions aligned with the research objectives.

2.5 **Validity and Reliability of Instrument**

The questionnaire was administered directly to participants, ensuring face validity. For reliability, the instrument's consistency in obtaining accurate responses was monitored during administration.

2.6 **Method of Data Collection**

The primary method of data collection was the administration of questionnaires. Thirty copies were produced and personally distributed, with assistance from research personnel. In cases of illiterate respondents, the questionnaire was interpreted into Yoruba for enhanced comprehension.

2.7 **Data Analysis**

Data collected through the questionnaires were organized based on independent variables or research questions. Simple percentage analysis was employed to derive meaningful insights from

2.8 **Ethical Consideration**

Ethical considerations were paramount in conducting the research. Permission was obtained from the factory owner, and informed consent was sought and obtained from each participant before the commencement of the study.

3.0 RESULTS AND DISCUSSION

Table 1: Summary of Findings

Aspect	Frequency	Percentage
Section A: Demographic Information		
Gender of respondents	Male: 7, Female: 23	Male: 23.33%, Female: 76.66%
Age of respondents	18-25: 6, 26-35: 13, 36-45: 7, 46 & above: 4	20.0%, 43.33%, 23.3%, 13.3%
Years of experience	Less than 1 year: 4, 1-5 years: 9, 6-10 years: 7, More than 10 years: 10	13.3%, 30.0%, 23.3%, 33.3%
Section B: Knowledge and Health Impact		
Awareness of heat stress	Yes: 30, No: 0	100%
Awareness of heat stroke	Yes: 30, No: 0	100%
Awareness of high air temperature causing heat stress	Yes: 30, No: 0	100%
Awareness of heat stress causing heat stroke	Yes: 30, No: 0	100%
Causes of heat illness	Yes: 30, No: 0	100%
Awareness of health risks	Very aware: 15, Somewhat aware: 8, Not very aware: 4, Not aware at all: 3	50%, 26.7%, 13.3%, 10%
Impact of heat stress on productivity	1: 2, 2: 8, 3: 12, 4: 6, 5: 2	6.7%, 26.7%, 40%, 20%, 6.7%
Frying garri with firewood causing heat syncope	Yes: 25, No: 5	83.3%, 16.7%
Observing symptoms of heat stress	Yes: 28, No: 2	93.3%, 6.7%
Health effects due to heat stress	Headache: 73.3%, Fatigue or exhaustion: 90%, Dizziness or lightheadedness: 60%, Muscle cramps: 53.3%, Nausea or vomiting: 33.3%	-

Aspect	Frequency	Percentage
Observing fatigue, fever, and stroke	Yes: 20, No: 10	66.7%, 33.3%
Section C: Work Practices and Conditions		
Days worked per week	2: 5, 4: 12, 6: 7, 7: 6	16.7%, 40%, 23.3%, 20%
Knowledge of Personal Protective Equipment (PPE)	Yes: 25, No: 5	83.3%, 16.7%
Wearing apron and handglove during frying	Yes: 26, No: 4	86.7%, 13.3%
Drinking water during frying	Twice: 15, Three times: 15	50%, 50%
Taking breaks or rest periods	Regularly: 10, Occasionally: 7, Rarely: 8, Never: 5	33.3%, 23.3%, 26.7%, 16.7%
Ventilation systems in place	Always: 5, Sometimes: 10, Rarely: 12, Never: 3	16.7%, 33.3%, 40%, 10%
Access to PPE for mitigating heat stress	Always: 10, Sometimes: 8, Rarely: 7, Never: 5	33.3%, 26.7%, 23.3%, 16.7%
Training on heat stress prevention and management	Comprehensive: 9, Some: 12, Brief: 6, None: 3	30%, 40%, 20%, 10%

This summary provides a condensed view of the key findings across different aspects of the study.

3.1 **Discussion of Findings**

The findings of the survey shed light on various aspects related to heat stress among Omoboriowo local Garri processing producers. The demographic information revealed a majority of female respondents (76.66%) engaged in garri processing, emphasizing the significance of gender representation in this industry. Additionally, a substantial proportion of respondents fell within the age group of 26-35 years (43.33%), indicating that individuals in the prime of their working age are actively involved in garri production. The varying years of experience among respondents underscore the diversity within the workforce, with a notable

percentage (33.3%) having more than 10 years of experience, potentially contributing to a wealth of knowledge and skills in garri processing.

In terms of knowledge and awareness, the unanimous acknowledgment (100%) among respondents regarding the potential health risks associated with high temperatures during garri processing is a positive indication. However, the disparity in the level of awareness of health risks (50% very aware, 26.7% somewhat aware, 13.3% not very aware, 10% not aware at all) suggests a need for targeted educational interventions to ensure a comprehensive understanding of the risks posed by heat stress.

The impact of heat stress on productivity revealed a spectrum of experiences, with a notable 40% of respondents reporting a moderate impact. This underscores the need for interventions to minimize the adverse effects of heat stress on productivity, potentially through the implementation of cooling measures or optimized work schedules.

The findings related to work practices and conditions shed light on several key areas. The majority of respondents (83.3%) were aware of Personal Protective Equipment (PPE), but access varied, with 33.3% always having access, 26.7% sometimes, 23.3% rarely, and 16.7% never. This highlights the importance of ensuring consistent access to PPE to mitigate heat stress effectively.

Observations regarding the working environment indicated that adequate ventilation systems were lacking for a significant portion of the respondents (40% rarely, 10% never). This emphasizes the necessity of addressing infrastructure issues to create a safer and more conducive working environment.

The findings of this study align with and corroborate several observations reported in related research, highlighting the broader consensus on the challenges faced by garri processing producers and the implications of heat stress on their health and productivity. Similar studies have emphasized the significance of understanding the demographic composition of the workforce engaged in cassava processing, particularly the predominance of female workers (Adewuyi, et al., 2019; Njoku, et al., 2020). This consistent pattern underscores the gender dynamics inherent in the garri production industry.

The variation in awareness levels regarding the health risks associated with heat stress echoes the findings of Adewuyi et al. (2018), who reported a similar range of awareness among agricultural workers in a tropical setting. This emphasizes the need for targeted educational interventions to bridge knowledge gaps and enhance overall awareness among garri processing producers.

The impact of heat stress on productivity, as identified in our study, is a recurring theme in the literature. Research by Oluwole, et al. (2021), examining the effects of high temperatures on agricultural productivity, reported comparable outcomes, emphasizing the multifaceted challenges faced by workers subjected to elevated temperatures. Such consistency in findings underscores the universality of the impact of heat stress on productivity in tropical agricultural settings.

Furthermore, the issue of inadequate access to Personal Protective Equipment (PPE) and suboptimal working conditions resonates with the observations of Akpan, et al. (2017), who highlighted the critical role of PPE in mitigating heat stress among agricultural workers. Our study reaffirms the importance of addressing these infrastructural shortcomings to ensure the safety and well-being of garri processing producers.

The findings related to the absence of adequate ventilation systems in garri processing areas also find support in the work of Ojo, et al. (2019), who discussed the challenges of heat exposure in cassava processing units. Their study underscored the importance of proper ventilation systems in reducing heat buildup, a recommendation that aligns with the needs identified in our study.

In conclusion, the congruence between our findings and existing literature emphasizes the recurring nature of challenges faced by garri processing producers. By referencing similar work, this discussion not only strengthens the validity of our results but also contributes to the cumulative knowledge aimed at developing comprehensive interventions for improving the working conditions and overall well-being of garri processing producers.

Conclusion

The assessment on the impact of threshold heat levels on the health of local Manihot esculenta-cranti (garri) producers in the Omo-boriowo Local Garri Industry in Ifon, Orolu Local Government, Osun State, Nigeria, has illuminated critical aspects of occupational health and safety within the garri production sector. The findings underscore the substantial challenges faced by workers exposed to elevated heat levels during processing.

The study revealed that the local garri producers are subjected to significant heat stress, which has both immediate and long-term implications for their health. Prolonged exposure to high temperatures can contribute to heat-related illnesses, fatigue, and potentially chronic health conditions. The importance of addressing these health concerns cannot be overstated, as the well-being of the local garri producers directly impacts the sustainability and productivity of the industry.

Recommendations

Implementation of Adequate Ventilation Systems

Introducing effective ventilation systems within garri processing areas is crucial to dissipate heat and improve air circulation. This measure can help mitigate the impact of high temperatures on the health of the workers.

Provision of Personal Protective Equipment (PPE)

Supplying appropriate PPE, such as heat-resistant clothing, hats, and hydration solutions, is essential to safeguard the health of garri producers. Adequate protective measures can significantly reduce the risk of heat-related illnesses.

Training and Awareness Programs

Conducting regular training sessions on the risks associated with heat exposure and implementing awareness programs can empower workers to adopt preventive measures. Education on recognizing early signs of heat stress and the importance of hydration should be emphasized.

Periodic Health Check-ups

Establishing a routine health check-up program for garri producers can help identify and address health issues promptly. Regular medical assessments can contribute to the early detection of conditions related to heat exposure.

Research and Innovation

Encouraging research initiatives to explore innovative processing methods that minimize heat generation without compromising garri quality is vital. Collaborative efforts between researchers, industry stakeholders, and local communities can lead to sustainable solutions.

By implementing these recommendations, stakeholders can collectively work towards enhancing the health and well-being of local garri producers, ensuring the sustainability of the industry while prioritizing the occupational safety of its workforce.

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