UKR Journal of Medicine and Medical Research (UKRJMMR)
Homepage: https://ukrpublisher.com/ukrjmmr/
Email: submit.ukrpublisher@gmail.com
Volume 2, Issue 6, November-December 2026 ISSN: 3107-5061 (Online)

Management of Cassava-Related Health Problems

Ibegbulem, Marcia Udodi

School of Public Health, University of Port Harcourt

***Corresponding Author**: Ibegbulem, Marcia Udodi

DOI: *https://doi.org/10.5281/zenodo.24238375*

Article History

Original Research Article

Received: 14 September 2026

Accepted: 21 October 2026

Published: 15 November 2026

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial **4.0 International License (CC BY-NC 4.0),** which permits non-commercial use, sharing, and reproduction in any medium, provided the original author(s) and source are appropriately credited.

Citation: Ibegbulem, Marcia Udodi. (2026). Management of Cassava-Related Health Problems. UKR Journal of Medicine and Medical Research (UKRJMMR), 2(6), 33-41.

Abstract

This article examined the problems and challenges of managing cassava processing in Nigeria. Based on the findings of our study, agricultural policy framework, level of mechanization, infrastructure, agricultural technical experts, and access to capital are the major factors that affect cassava processing in Nigeria, while the challenges are policy inconsistency, high cost of mechanization and inadequate capital investment in infrastructure, inadequate extension agents, as well as stringent credit facility conditions. This study, therefore, concludes that for cassava to play a major role in Nigeria's national development government must ensure that there is a full exploration of all opportunities that have the potential to yield strong advantage. This could be achieved through a holistic assessment of the cassava process that is geared toward improving the quality of life and well-being of citizens based on Nigeria's comparative advantage in cassava production and processing.

Keywords: *Cassava-Related Health Problems, Cyanide Toxicity, Cyanogenic Glycosides, Konzo, Tropical Ataxic Neuropathy, Public Health Nutrition, Food Safety and Disease Prevention.*

1.0 Introduction

Cassava (*Manihot esculenta*) is a broadleaf, evergreen, flowering perennial herb or shrub belonging to the spurge family (Euphorbiaceae), with the potential to grow up to 10 feet in height. Although it is a perennial plant, cassava is generally harvested within one year of planting because of its sensitivity to frost (Royal Botanic Gardens, Kew, 2022). The generic name originates from the Brazilian term *manioc*, while the specific epithet refers to something edible or suitable for consumption. The plant is characterized by milky latex, alternate leaves, inconspicuous flowers that may bloom throughout the year, and elongated, tuberous roots. These thickened roots constitute the primary economic part of the plant and serve as raw materials for producing cassava-based foods, tapioca, starch, and other food products. However, cassava roots contain naturally occurring toxic compounds when raw and must undergo appropriate processing and thorough cooking before consumption to ensure their safety (Royal Botanic Gardens, Kew, 2022).



Figure 1.

The culture of cassava is one of the most important staple food crops in Nigeria and other tropical countries. Raw cassava, however, is considered to be poisonous and unsuitable for human consumption due to the presence of linamarin and other cyanogenic glycosides in it that can break down and release toxic hydrogen cyanide. Cassava is the third most important source of carbohydrates especially in tropical regions after rice and maize and is a staple food for over 500 million people throughout the world. It is also of special value because of its remarkable drought resistance, and its growth and production under poor soil conditions. Nigeria is known to be the biggest producer of cassava in the world. Besides, cassava is also a key economical crop in Thailand, where dried cassava, cassava flour and starch are exported as one of the leading products in 2020.

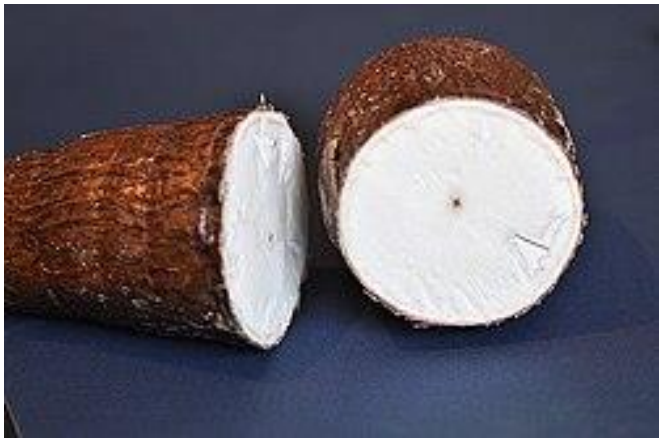

Figure 2

Cassava roots, peels, and leaves are dangerous to eat raw because they contain linamarin and lotaustralin, which are toxic cyanogenic glycosides. Cyanogenic glycosides are natural plant toxins made of a sugar molecule attached to a nitrile or cyanide containing group. They are produced by plants as a defense mechanism against herbivores and pests. These are decomposed by the cassava enzyme linamarase, releasing poisonous hydrogen cyanide, https://en.wikipedia.org/wiki/Cassava.

Cassava varieties have been classified as either bitter (high in cyanogenic glycosides) or sweet (low in the bitter compounds). Bitter cassava, which is primarily grown for starch, may contain as much as 1000 milligrams per kilogram of cyanogenic glycosides, whereas sweet cassava, which is primarily grown as a vegetable can contain as little as 20 milligrams of cyanide per kilogram of fresh roots. These toxins are particularly high in cassavas during a drought. A dose of 25 mg of pure cassava cyanogenic glucoside (2.5 mg of cyanide) would be enough to kill a rat.

In Nigeria, cassava is processed into several traditional foods, including garri, fufu, akpu, tapioca, and cassava flour. These products contribute significantly to household food security and provide income for farmers, processors, traders, and food vendor. Despite its nutritional and economic importance, cassava can present health risks when it is not properly processed. The major concern is the presence of naturally occurring substances known as cyanogenic glycosides, which can release cyanide when cassava tissues are damaged and the compounds undergo chemical breakdown.

2.0 Cassava-Related Health Problems

Cassava-related health problems are illnesses or adverse health conditions associated with consuming inadequately processed cassava, exposure to cyanogenic compounds during processing, or nutritional deficiencies that may increase susceptibility to their effects.

These problems may be acute, occurring over a short period, or chronic, developing after prolonged exposure.

2.1 Cyanogenic Glycosides

Cyanogenic glycosides are naturally occurring phytotoxins found in at least 2,000 plant species, several of which are consumed as food in different parts of the world. Among these plants, cassava and sorghum are particularly important staple food crops that contain cyanogenic glycosides (Oke, 1979; Rosling, 1987).

Cyanogenic glycosides are natural plant compounds consisting of a sugar molecule attached to a cyanide-containing group. Plants produce these compounds as a defence mechanism against herbivores and insect pests. In cassava, cyanogenic glycosides are broken down by the enzyme linamarase, resulting in the release of toxic hydrogen cyanide. Linamarin is a cyanogenic glucoside naturally present in plants such as cassava, lima beans, and flax. It is one of the major cyanogenic compounds responsible for the toxicity associated with cassava and can release hydrogen cyanide under appropriate conditions, thereby posing potential health risks to consumers. Linamarin is the predominant cyanogenic glucoside in cassava and contributes to cyanide exposure, which can interfere with normal physiological processes, including oxygen transport in the body.

2.2 Diagnosis and Treatment

The appearance of its toxic effects is usually delayed because the glycosides have to reach the gastrointestinal tract before hydrolysis releases cyanide. Tissues lose cyanide very rapidly, so samples must be analyzed quickly or frozen as soon as collected. Cyanide poisoning can be identified by measuring Hydrogen cyanide (HCN) in body fluids by the methods described above.

Cyanide poisoning is treated by binding cyanide in a harmless form using reactive chemicals. It is done by intravenously injecting solutions of sodium nitrite and sodium thiosulfate. Sodium nitrite oxidizes the hemoglobin

to methemoglobin, which binds with the cyanide to generate cyanomethemoglobin. It reactivates the cytochrome oxidase system. Sodium thiosulfate interacts with cyanide to generate sodium thiocyanate, which can be readily excreted.

Amyl nitrite is inhaled to promote respiration. Antidote kits are available that contain amyl nitrite with sodium thiosulfate or hydroxocobalamin.

2.3 Management

Cassava contains two cyanogenic glycosides, linamarin and lotaustralin, which are important factors to limit the use of cassava as food or animal feed. Conventional cassava processing, however, has been shown to decrease the level of cyanide in both tuber and leaves. Drying is a widely-used technique in many tropical countries. Sun drying has been reported to reduce the amount of cyanide in the product as compared to oven drying because the longer exposure results in increased contact between the enzyme linamarase and the cyanogenic glycosides and enhanced degradation. Likewise, soaking and boiling will lower cyanide content more than either soaking or boiling alone. Traditional African cassava products, such as gari and fufu are made by a series of processing steps that involve grating, dewatering, fermentation and roasting. About 80-95% of the cyanide can be removed at different stages of gari production. Pounding the leaves and then cooking the mashed leaves in water was deemed to be an effective approach for cassava leaves for human consumption. In addition, the process of fermentation, boiling and ensiling have been found to be effective ways of reducing cyanide levels in cassava peels (Padmaja, 1995).

2.4 Cyanide poisoning

Cyanide poisoning occurs when cyanide enters the body in an amount sufficient to interfere with normal cellular functions. Cyanide inhibits cellular respiration, preventing cells from using oxygen effectively to produce energy. Severe poisoning can rapidly become life-threatening, that is, some survivors have long-term neurological problems, *Anseeuw* et al., (2013).

Inhalation of hydrogen cyanide may lead to seizures, coma, apnea and cardiac arrest, leading to death in a few seconds. Lower doses may cause a general weakness, dizziness, headaches, vertigo, confusion, and a sense of difficulty in breathing before drowsiness and loss of consciousness. At the first stages of unconsciousness, breathing is often sufficient or even rapid, although the state of the person progresses towards a deep coma, sometimes accompanied by pulmonary edema, and finally cardiac arrest. Darkening of the cherry red skin colour may occur as a result of increased blood level of oxygenated hemoglobin in veins, Bhagavan N & Ha C (2011). Although cyanide is called the same, it does not actually cause cyanosis, Bhagavan N, Ha C (2011). The average LD50 for humans is 1.52mg/kg and the lowest known lethal dose is 0.56mg/kg. There are other sources with a lethal dose of 1-3mg/body weight for vertebrates.

There are potential sources of CP such as eating of high level of cyanogenic compounds in cassava products. This can lead to death due to high consumption cyanide poisoning. Some Smaller (non-fatal) doses of cyanide will result in acute intoxication which may include dizziness, headache, nausea, stomach pains, vomiting, seizure, loss of consciousness (severe cases), diarrhea, and cardiovascular collapse.

2.5 Management

Acute cyanide poisoning requires immediate emergency medical care.

Management includes:

- Rapid recognition: Healthcare professionals assess the history of exposure, symptoms, breathing, circulation, and neurological status.
- Emergency referral: A person with suspected poisoning should be taken immediately to an appropriate emergency facility.
- Supportive treatment: Clinicians provide appropriate respiratory and cardiovascular support.
- Specific antidotal treatment: When indicated, trained healthcare professionals administer an appropriate cyanide antidote according to established clinical protocols.
- Monitoring: The patient may require monitoring of vital signs, neurological status, and organ function.
- Investigation of the source: The suspected food should be identified so that further exposure can be prevented.
- Treatment should not be delayed while waiting for laboratory confirmation if the clinical suspicion of severe poisoning is high.

Home remedies, forced vomiting, and unprescribed treatments are inappropriate.

3.0 Konzo

Konzo is a neurological condition that can be caused by damage to the upper motor neurons of the brain, and results in acute (sudden) and permanent paralysis of the lower limbs. It affects mainly children and women of reproductive age. This paralysis is sudden, does not become increasingly severe as time passes and is permanent. The condition occurs with the prolonged ingestion of a diet mainly comprised of high-cyanide (bitter) cassava, especially by the economically disadvantaged rural population of Africa, many of whom suffer from malnutrition. Specifically,

chronic consumption of cyanide-containing bitter cassava for several weeks with low levels of protein, particularly sulphur-containing essential amino acids like methionine and cysteine, has been associated with konzo. The amino acids are important in the body's detoxification of cyanide, which involves converting it to thiocyanate that can be excreted.



Figure 3

3.1 Risk Factors

- Heavy dependence on cassava.
- Consumption of inadequately processed cassava.
- Poor dietary protein intake.
- Food insecurity.
- Environmental or economic crises that disrupt normal processing practices.

3.2 Signs and Symptoms

Clinical features may include:

- Sudden difficulty walking and performing daily activities
- Stiffness of the legs.
- Spastic weakness of the lower limbs.
- In affected individuals, neurological disability may persist

3.3 Management

Even though there is no established treatment that reliably reverses the permanent neurological damage caused by konzo. The following assistance can be rendered:

Medical assessment

A healthcare professional should assess the patient and exclude other possible causes of sudden leg weakness.

Physiotherapy and rehabilitation

Rehabilitation may help patients improve mobility, balance, independence, and participation in daily activities.

Assistive devices

Where necessary, walking aids and other assistive devices can support safer movement and independence.

Nutritional improvement

A nutrition professional should assess the patient's diet and promote adequate protein intake, dietary diversity, and correction of identified nutritional deficiencies.

Family and community support

Families may need education about disability support, safe mobility, and access to rehabilitation services.

Prevention of additional cases

Public health teams should investigate possible community exposure, improve cassava processing practices, and strengthen food security interventions.

Prevention remains the most effective strategy for reducing konzo.

4.0 Tropical Ataxic Neuropathy (TAN)

Tropical Ataxic Neuropathy (TAN), also referred to as Strachan–Scott syndrome, is a non-infectious, toxiconutritional disorder of the nervous system that primarily affects economically disadvantaged populations in tropical regions. The condition has been recognized for more than a century and has been reported in several countries across Africa, the West Indies, and India. TAN is a chronic neurological disorder, or a group of related disorders, that can cause significant disability and may contribute to increased mortality. Although its precise causes remain unclear, no universally accepted treatment has been established, and reported clinical outcomes vary considerably. The disease generally develops gradually and is most frequently observed among impoverished individuals in their fifth and sixth decades of life, while cases among children below 10 years of age are uncommon. Affected individuals are often from disadvantaged communities and typically consume diets dominated by cassava with limited dietary diversity.

TAN remains a public health concern in Nigeria, with reported prevalence reaching approximately 18–26 cases per 1,000 people in villages where cassava constitutes almost the entire diet. In contrast, the condition has not been reported in comparable yam-consuming villages. Although

chronic cyanide exposure was initially considered the sole cause of TAN, investigations by Rosling and colleagues suggest that its underlying mechanisms may be more complex. Unlike TAN, konzo is associated with acute cyanide exposure, and blood cyanide concentrations in individuals affected by konzo have been reported to be approximately 20 times higher than those observed in TAN patients. Furthermore, TAN typically develops gradually over several months or years, whereas konzo has a sudden onset and generally follows a non-progressive course. TAN predominantly affects adults with a mean age above 40 years, while konzo is more commonly observed among children and young women.

Nutritional deficiencies and other contributing factors may be involved.

4.1 Signs and Symptoms

Some features can include:

- Difficulty maintaining balance in walking
- Impaired coordination.
- Sensory disturbances.
- Visual Impairment and deafness.
- Problems with the tongue or mouth in some patients.
- The clinical presentation varies among individuals.
- Loss of sensation in hands

4.2 Management

- Medical and neurological assessment.
- Investigation of other possible causes of neurological symptoms.
- Assessment and correction of nutritional deficiencies.
- Improvement of dietary diversity.
- Reduction of exposure to inadequately processed cassava.
- Physiotherapy and occupational therapy where indicated.
- Hearing, vision, and other supportive services when needed.
- Long-term follow-up based on the patient's condition.
- Because the causes are not fully established, clinicians should not assume that every neurological problem in a cassava-consuming population is caused by cassava.

5.0 Goiter and cretinism

Goiter is an enlarged thyroid. An important gland in the front of the neck that controls energy activity in the body, the thyroid gland is shaped like a butterfly. Produces hormones that control body processes such as metabolism—the use of food for energy. In Goiter, the thyroid gland can enlarge in its entirety or one or more small areas called thyroid nodules may develop. The most common cause of goiter is iodine deficiency.

When the diet is deficient in iodine, the thyroid fails to make enough of the iodine-containing hormones and as a result goitre (swelling of the thyroid) and cretinism (short stature and severe mental retardation) are seen. The iodine deficiency disorders (IDD), such as goitre or cretinism, are a serious global health problem with approximately 500 million people affected. If cyanide ingested from cassava is converted by the body to thiocyanate which is excreted from the urine. The thiocyanate is a goitrogen, that is an iodine uptake inhibitor, of the thyroid gland. Inhalation of cyanide as a result of eating cassava thus worsens goitre and cretinism only when iodine levels are inadequate for daily consumption.

5.1 Signs and Symptoms

Possible features of thyroid disease include:

- Enlargement of the thyroid gland.
- A swelling at the front of the neck.
- Fatigue.
- Changes in weight.
- Feeling unusually cold or hot.
- Changes in heart rate.

5.2 Management

- Clinical examination of the thyroid gland.
- Thyroid function testing when indicated.
- Assessment of iodine intake and nutritional status.
- Appropriate treatment of the identified thyroid condition.
- Use of iodized salt in accordance with public health recommendations.
- Promotion of adequate cassava processing.
- Nutrition education and dietary diversification.
- People should not take high-dose iodine supplements without medical advice.

6.0 Nutritional Deficiencies and Malnutrition of Cassava

Cassava roots are a dense source of carbohydrates and dietary energy, but they suffer from significant nutritional and micronutrient deficiencies.

Major Nutritional Deficiencies in Cassava

- **Low Protein Content:** Cassava roots consist almost entirely of starch and water, containing very little protein (often less than 1% to 2% dry weight). Diets heavily reliant on cassava without complementary protein sources (such as beans,

fish, meat, or groundnuts) lead to protein malnutrition.

- **Micronutrient Deficiencies (Hidden Hunger):** Standard (white-fleshed) cassava roots have very low levels of essential vitamins and minerals:
    - **Vitamin A:** Traditional varieties lack pro-vitamin A carotenoids, contributing heavily to Vitamin A Deficiency (VAD) and related health issues like night blindness and impaired immunity in regions like Nigeria and broader sub-Saharan Africa.
    - **Iron and Zinc:** Cassava provides only a fraction of the daily iron and zinc needed for human health. Deficiencies contribute to iron-deficiency anemia, weakened immune systems, and delayed growth or cognitive development in children.
    - **B Vitamins and Other Minerals:** While cassava contains some vitamin C and potassium, it is generally deficient in essential B-complex vitamins (like riboflavin or thiamin) and minerals like calcium and iodine unless paired with other foods

7.0 Occupational Health Problems Among Cassava Processors

Cassava processing can expose workers to potentially hazardous substances, especially where ventilation and work practices are inadequate.

7.1 Management and Prevention

- Improve ventilation in processing areas.
- Use suitable equipment and safe handling procedures.
- Avoid direct contact with potentially contaminated materials.
- Maintain good personal hygiene.
- Train workers in occupational safety.
- Provide appropriate protective equipment when indicated by a workplace risk assessment.
- Ensure that food-processing areas are clean and well maintained.
- Workers who develop concerning symptoms after possible cyanide exposure require prompt medical evaluation.

8.0 Prevention of Cassava-Related Health Problems

Preventing cassava-related health problems—primarily **cyanide poisoning**, **dietary deficiencies**, and **occupational hazards** during processing—involves proper food preparation, agricultural safety, and balanced nutrition. Prevention is more effective than attempting to reverse severe poisoning or permanent neurological injury.

1. Preventing Cyanide Poisoning (Food Safety)

Raw or improperly processed cassava contains cyanogenic glycosides, which release toxic hydrogen cyanide into the body. To make cassava safe to eat:

- **Never Eat It Raw:** Always cook, soak, or ferment cassava thoroughly before consumption.
- **Peel the Roots:** The highest concentration of cyanogenic compounds is found in the outer peel and cortex; peeling removes a large portion of the toxins.
- **Soak in Water:** Soaking peeled cassava roots in water for several days breaks down and leaches out the cyanogens.
- **Thorough Cooking:** Boil, roast, or steam the roots completely until soft. Never consume the cooking water if it was used for initial boiling of bitter varieties.
- **Sun-Drying and Grinding:** For products like *garri* or flour, proper fermentation, pressing, and thorough roasting or sun-drying effectively reduce cyanide levels.

2. Preventing Nutritional Deficiencies (Goiter & Neurological Issues)

Relying heavily on a monotonous diet of improperly processed cassava—which lacks adequate protein and can interfere with iodine uptake—can lead to goiter, low iodine levels, or *tropical ataxic neuropathy*.

- **Maintain a Balanced Diet:** Combine cassava with protein-rich foods (beans, fish, meat, eggs) and iodine- or nutrient-rich vegetables. The sulfur-containing amino acids in protein help the body detoxify small amounts of cyanide.
- **Iodine Intake:** Ensure adequate dietary iodine (such as through iodized salt) to reduce the risk of goiter and thyroid issues linked to chronic cyanide exposure.

3. Preventing Environmental and Pollutant Contamination

- **Choose Safe Growing Sites:** Cassava roots can absorb heavy metals, pesticides, and industrial pollutants from contaminated soils. Avoid planting in industrial zones or near heavy traffic roadsides.

4. Preventing Occupational Hazards (For Processors)

Workers who peel, grate, mash, or dewater large quantities of cassava face risks from cumulative ergonomic strain and exposure to toxic fumes or juices.

- **Use Protective Gear:** Wear gloves, aprons, and eye protection when handling large volumes of raw, crushed cassava mash or operating traditional equipment.
- **Adopt Mechanized Processing:** Transition to modern, closed-system mechanical mashers and dewaterers to minimize direct skin contact with toxic cassava juice and reduce physical strain.

9.0 Role of Public Health Nutritionists

Public health nutritionists play an important role in preventing cassava-related health problems and improving community nutrition.

9.1 Nutrition Assessment

Nutritionists assess the dietary patterns, nutritional status, and food security conditions of individuals and communities. They may identify populations with high cassava dependence and limited access to protein-rich foods.

9.2 Nutrition Education

Nutritionists educate households about:

- Safe cassava preparation.
- Dietary diversity.
- Protein-rich foods.
- Iodine nutrition.
- Recognition of possible poisoning.
- The importance of timely medical care.

9.3 Community Mobilization

Nutritionists can work with community leaders, women's groups, farmers, market associations, and food processors to encourage safer practices.

9.4 Collaboration with Healthcare Professionals

Nutritionists should work with doctors, nurses, environmental health officers, and other relevant professionals to identify suspected cases and facilitate appropriate referrals. They should not attempt to manage severe cyanide poisoning independently.

9.5 Nutrition Surveillance

Public health professionals can monitor indicators such as:

- Cassava consumption patterns.
- Household dietary diversity.
- Food-processing practices.
- Food insecurity.

9.6 Research and Evaluation

Nutritionists can conduct studies to determine whether community education improves processing practices, dietary diversity, and knowledge of cassava-related health risks. They can also evaluate whether interventions are culturally acceptable, affordable, and sustainable.

10.0 Challenges in the Management Of Cassava-Related Health Problems

Several challenges may limit the success of prevention and management programs.

10.1 Poverty

Households experiencing poverty may lack the resources needed to obtain varied diets, clean water, and suitable processing equipment.

10.2 Limited Nutrition Knowledge

Some consumers may not understand the relationship between inadequate cassava processing and cyanide exposure.

10.3 Inadequate Processing Facilities

Limited access to water, equipment, fuel, or suitable drying areas can interfere with safe processing.

10.4 Cultural Practices

Traditional processing methods may be deeply established in communities. Education must therefore respect local knowledge while correcting unsafe practices.

10.5 Food Insecurity

During periods of food scarcity, people may depend more heavily on cassava and reduce the time spent processing it.

10.6 Limited Diagnostic Capacity

Some health facilities may lack the laboratory capacity needed to confirm particular types of cyanide exposure.

10.7 Weak Collaboration

Prevention may be less effective when healthcare professionals, agricultural extension workers, food processors, and public health authorities operate independently.

10.8 Inadequate Surveillance

Cases of cassava-related poisoning or neurological disease may not always be recognized, investigated, or reported promptly.

10.9 Strategies for Overcoming These Challenges

The following strategies can improve prevention and management:

- Provide affordable community nutrition education.

- Support access to safe processing equipment and clean water.
- Strengthen household food security.
- Encourage affordable sources of dietary protein.
- Improve collaboration between health and agricultural services.
- Train healthcare workers to recognize possible cassava-related illnesses.
- Strengthen food safety surveillance and referral systems.
- Support research on cyanogenic compounds in locally consumed cassava products.
- Develop educational materials in local languages.
- Evaluate community interventions to identify approaches that are effective and sustainable.

11.0 Public Health Significance

Cassava-related health problems are not simply a matter of individual food choice. They may reflect broader social, economic, nutritional, agricultural, and environmental challenges. A community may depend heavily on cassava because it is affordable, available, and culturally accepted. If safe processing becomes difficult because of poverty, drought, inadequate water supply, or food insecurity, the risk of exposure may increase.

Consequently, public health responses should not merely instruct people to stop eating cassava. Such advice could undermine food security without addressing the underlying causes. A more appropriate approach is to make cassava safer through effective processing, improve access to diverse foods, strengthen community education, and ensure timely healthcare.

This integrated approach is especially relevant to Nigeria, where cassava plays an important role in household diets and rural livelihoods.

Conclusion

Cassava is an important source of dietary energy and a major contributor to food security and livelihoods in Nigeria. Nevertheless, inadequately processed cassava can expose consumers to cyanogenic compounds that may cause acute cyanide poisoning and contribute to certain neurological and thyroid-related health problems.

The management of these conditions requires prompt clinical assessment, appropriate treatment, nutritional improvement, rehabilitation where necessary, and prevention of further exposure.

At the population level, the most important measures include proper cassava processing, dietary diversification, adequate protein and iodine intake, community education, food safety monitoring, and improved food security.

Public health nutritionists, healthcare professionals, agricultural extension workers, food processors, and community leaders must collaborate to ensure that cassava remains a safe and valuable component of the Nigerian diet. The central public health message is that cassava-related health problems are largely preventable through appropriate processing, adequate nutrition, effective health education, and timely medical care.

References

1. World Health Organization. *Natural toxins in food.* Available at: https://www.who.int/news-room/fact-sheets/detail/natural-toxins-in-food/
2. Food and Agriculture Organization of the United Nations. *An overview of traditional processing and utilization of cassava in Africa.* Available at: https://www.fao.org/4/x5458e/x5458e05.htm
3. World Health Organization. *Safety evaluation of certain food additives and contaminants: Cyanogenic glycosides.* WHO Food Additives Series 65. Geneva: WHO; 2012. Available through the WHO Institutional Repository for Information Sharing: https://iris.who.int/bitstream/handle/10665/44788/WHO_TRS_966_eng.pdf
4. Adewusi SR, Akindahunsi AA. Cassava processing, consumption, and cyanide toxicity. *Journal of Toxicology and Environmental Health.* 1994;43(1):13–23. doi:10.1080/15287399409531900.
5. Banea JP, Bradbury JH, Mandombi C, Nahimana D, Denton IC, Kuwa N, Tshala-Katumbay D. Control of konzo in the Democratic Republic of Congo. *Food and Chemical Toxicology.* Research on konzo prevention and cassava processing.
6. Australian National University, Research School of Biology. *Konzo and cassava.* Available at: https://biology.anu.edu.au/research/divisions/konzo-prevention-unit/konzo-and-cassava
7. Osman G, Maleta W, Masamba K, Ng'ong'ola-Manani T, Kalimbira AA. Cyanide in cassava: unveiling health risks in the lens of unsustainable food systems in Sub-Saharan Africa—a systematic review. *Frontiers in Sustainable Food Systems.* 2025;9:1636177. doi:10.3389/fsufs.2025.1636177.
8. *Anseeuw K, Delvau N, Burillo-Putze G, De Iaco F, Geldner G, Holmström P, Lambert Y, Sabbe M (2013). "Cyanide poisoning by fire smoke inhalation". European Journal of Emergency Medicine.* ***20*** *(1): 2–9. doi:10.1097/mej.0b013e328357170b. PMID 22828651.*

9. *Kuniyil P, Sreenivas C S, Mohan P V H (June 2024). "Detection of Cyanide in a Decomposed Exhumed Body: A Case Report". Cureus. **16** (6) e62108. doi:10.7759/cureus.62108. ISSN 2168-8184. PMC 11236960. PMID 38993417.*

10. *Bhagavan N, Ha C (2011). "Hemoglobin". Essentials of Medical Biochemistry. pp. 355–368. doi:10.1016/B978-0-12-095461-2.00026-6. ISBN 978-0-12-095461-2.*

11. *"Cyanide [Technical document – Chemical/Physical Parameters]". Health Canada. 6 October 2008. Archived from the original on 4 February 2009.*

12. *"Manihot esculenta Crantz, Rei Herb. 1: 167 (1766)". Plants of the World Online. Royal Botanic Gardens, Kew. 2022. Retrieved 11 November 2022.*

13. OKE, O.L. (1979). Some aspects of the role of cyanogenic glycosides in nutrition. *Wld. Rev. Nutr. Diet,* 33: 70-103.

14. ROSLING, H. (1987). Cassava toxicity and food security. Ed. Rosling. *Tryck Kontakt,* Uppsala, Sweden, 3-40.

15. Cyanide detoxification in cassava for food and feed uses. Padmaja G. Crit Rev Food Sci Nutr. 1995 Jul;35(4):299-339. doi: 10.1080/10408399509527703. PMID: 7576161 Review.