



Research Article

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Early Malnutrition Detection in Conflict Zones: A Critical Knowledge Gap and Proposed Syndromic Scoring System

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Abstract

Malnutrition remains a significant public health threat, particularly among Internally Displaced Persons (IDPs) residing in conflict zones. Disruptions to food security, healthcare access, and sanitation create a dire situation for these vulnerable populations. Early detection of malnutrition is crucial for timely interventions and improved health outcomes. Traditional anthropometric methods for malnutrition assessment can be impractical in resource-constrained settings. This paper addresses this gap by developing a rapid syndromic scoring system specifically tailored for IDP communities. This paper proposes the development, validation, and evaluation of a user-friendly syndromic scoring system for early malnutrition detection in IDP communities.

Keywords: Malnutrition, Syndromic, Conflict zone

Introduction

Malnutrition, in its various forms, presents a significant challenge and raises serious concerns on individuals and societies. The United Nations Sustainable Development Goal (SDG) 2: Zero Hunger, directly addresses this issue. This ambitious goal aims to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture” by 2030, fostering a world where everyone has access to the food needed for a healthy and productive life [1]. Target 2.1 of SDG 2 specifically focuses on ensuring year-round access to safe, nutritious, and sufficient food for all, particularly the most vulnerable populations. Additionally, Target 2.2 targets malnutrition itself, aiming to eradicate all forms, including stunting and wasting in children under 5, while emphasizing the nutritional needs of adolescent girls, pregnant and lactating women, and older persons [2].

Challenges in Conflict Zones

Acute malnutrition remains a significant global public health concern, with a particularly high prevalence in conflict zones. In

ternally displaced populations in these environments experience disruptions to fundamental well-being elements, including food security, healthcare access, and sanitation [3]. Armed conflict presents distinct early warning indicators: displaced farmers are unable to cultivate land, often leading to the abandonment of agriculture and loss of livestock, a vital source of animal protein. Disruptions to food distribution networks further exacerbate the problem as access to essential dietary supplies becomes limited. Coupled with potential disruptions to essential healthcare services like antenatal care and well-baby clinics, these factors significantly elevate the risk of malnutrition among affected populations. Children and pregnant women are especially vulnerable in such settings [4].

Early Detection is Paramount

Early detection of malnutrition is crucial for effective and timely interventions, ultimately leading to improved health outcomes [5]. However, traditional diagnostic methods like anthropometry (body measurements) and biochemical assays rely on specialized



equipment and laboratory facilities, hindering their application in resource-constrained conflict zones (Tables 1 and 2). While established anthropometric methods like weight-for-height and mid-upper arm circumference offer effective assessment tools, their use becomes limited in these settings due to a lack of equipment or trained personnel. Additionally, interpreting anthropometric data

can be confounded by factors like edema or other illnesses [3]. These limitations severely restrict the use of traditional methods in conflict zones, ultimately hindering timely malnutrition detection and leading to poorer health outcomes and increased mortality among vulnerable populations (Tables 1,2).

Table 1: Assessment Methods in Rapid Nutritional Assessments.

Assessment Techniques employed in RNAs:
<ul style="list-style-type: none"> • Dietary Assessment:
<ul style="list-style-type: none"> o Food Frequency Questionnaires (FFQs): These questionnaires provide insights into dietary patterns and potential deficiencies, although susceptible to recall bias. o 24-Hour Recalls: While offering more detailed dietary information, 24-hour recalls are similarly affected by recall bias.
<ul style="list-style-type: none"> • Anthropometric Assessment:
<ul style="list-style-type: none"> o Weight-for-Height (WHZ) Z-Scores: This method identifies wasting (acute malnutrition) in young children based on weight-to-height ratios. o Mid-Upper Arm Circumference (MUAC): This approach measures wasting in children using arm circumference measurements.
<ul style="list-style-type: none"> • Clinical Assessment:
<ul style="list-style-type: none"> o This technique involves identifying visible indicators of early malnutrition, such as edema, hair changes, skin lesions, and appetite loss.
<ul style="list-style-type: none"> • Community-Based Surveillance:
<ul style="list-style-type: none"> o Key informant interviews provide valuable information about food availability, healthcare access, and prevalent health issues within the community. o Focus group discussions allow for exploration of experiences with food insecurity, feeding practices, and perceived health problems.
<ul style="list-style-type: none"> • Dietary Assessment:
<ul style="list-style-type: none"> o Food Frequency Questionnaires (FFQs): These questionnaires gauge dietary patterns and potential deficiencies, although susceptible to recall bias. o 24-Hour Recalls: While offering more detailed dietary information, 24-hour recalls can also be affected by recall bias.
<ul style="list-style-type: none"> • Anthropometric Assessment:
<ul style="list-style-type: none"> o Weight-for-Height (WHZ) Z-Scores: This method identifies wasting (acute malnutrition) in young children. o Mid-Upper Arm Circumference (MUAC): MUAC is another method for identifying wasting in children using arm circumference.
<ul style="list-style-type: none"> • Clinical Assessment: This approach looks for visible indicators of early malnutrition, including oedema, hair changes, skin lesions, and appetite loss.
<ul style="list-style-type: none"> • Community-Based Surveillance:
<ul style="list-style-type: none"> o Key Informant Interviews: Interviews with community leaders provide insights into food availability, healthcare access, and health issues. o Focus Group Discussions: These discussions explore experiences with food insecurity, feeding practices, and perceived health problems.
<ul style="list-style-type: none"> • Vitamin A deficiency
<ul style="list-style-type: none"> • Haemoglobin level among pregnant and lactating women
<ul style="list-style-type: none"> • Others

Early Indicators (Syndromic)		
These indicators are readily observable signs and symptoms that may suggest malnutrition, allowing for early intervention. However, they are not definitive diagnoses and require further evaluation.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Vitamin A deficiency (General)	<p>Early detection: Allows for prompt intervention to prevent severe vitamin A deficiency and its complications (blindness, xerophthalmia)</p> <p>Feasibility: Can be used in resource-limited settings without specialized equipment.</p>	<p>Lack of specificity: Can be caused by other conditions besides vitamin A deficiency.</p> <p>Subjectivity: Interpretation may vary depending on the observer.</p> <p>Need for further evaluation: Require confirmation with other methods like blood tests (serum retinol levels).</p>
Night blindness	Relatively specific to vitamin A deficiency. - Can be detected through simple tests.	May not be readily reported by individuals. Can be caused by other conditions (cataracts).
Conjunctival xerosis (dry, thickened conjunctiva)	Can be a sign of early vitamin A deficiency.	Requires trained personnel for accurate diagnosis. - Can be caused by other eye conditions.
Bitot's spots (raised, white lesions on the conjunctiva)	Highly specific for vitamin A deficiency.	Relatively rare symptom. - May not be present in all cases.

Dry, scaly skin (follicular hyperkeratosis)	Easy to observe. - Can be a sign of vitamin A deficiency.	Can also be caused by other skin conditions (dry weather, eczema).
Late Indicators (Biochemical):		
This indicator relies on a blood test to measure vitamin A levels directly. It's a definitive diagnosis but requires laboratory facilities.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Serum retinol levels	Definitive diagnosis of vitamin A deficiency. Objective: Provides a clear picture of vitamin A levels.	Requires blood tests and laboratory facilities. May not reflect recent changes in vitamin A status. Resource-intensive: Requires blood tests and laboratory facilities. Limited feasibility: May not be practical in all settings.

RNAs employ a multifaceted approach, combining various techniques to gain a comprehensive picture of nutritional status.

Table 2: Anaemia in Pregnancy: Early Detection Matters.

Early Indicators (Clinical)		
These indicators are readily observable signs and symptoms that may suggest anemia, allowing for early intervention. However, they are not definitive diagnoses and require further evaluation.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Fatigue and weakness	Common and easily reported by the pregnant woman. - Can be an early sign of anaemia.	Can also be caused by other factors like pregnancy itself or lack of sleep. May not be specific enough.
Pale skin, mucous membranes	Relatively easy to observe. - Can be a sign of reduced red blood cells.	Can be subjective and influenced by factors like skin tone. - May not be readily apparent in all cases.
Shortness of breath	May be reported by the pregnant woman. - Can indicate difficulty delivering oxygen to tissues.	Can also be caused by other factors like exertion or respiratory issues. - May not be specific enough.
Rapid heartbeat (palpitations)	Can be detected during a physical exam. - The body may try to compensate for reduced oxygen by pumping blood faster.	Can also be caused by anxiety or other medical conditions. May not be present in all cases of anaemia.
Anaemia (General)	Early detection: Allows for prompt intervention to prevent complications like preterm birth or low birth weight babies. Feasibility: Can be used in resource-limited settings without specialized equipment.	Lack of specificity: Can be caused by other conditions besides anemia. Subjectivity: Interpretation may vary depending on the observer. Need for further evaluation: Require confirmation with a blood test (hemoglobin level).
Late Indicator (Biochemical):		
This indicator relies on a blood test to measure hemoglobin levels directly. It's a definitive diagnosis but requires laboratory facilities.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Hemoglobin level	Definitive diagnosis of anaemia in pregnancy. - Established thresholds for normal and anaemic levels. Objective: Provides a clear picture of haemoglobin levels.	Requires blood tests and laboratory facilities. May not reflect recent changes in iron stores. Resource-intensive: Requires blood tests and laboratory facilities. Limited feasibility: May not be practical in all settings.

The proposed research on developing a syndromic scoring system can potentially incorporate some of these early clinical indicators for vitamin A deficiency to provide a more comprehensive assessment tool in resource-limited settings. Anemia During Pregnancy: Early and Late Indicators.

Learning from the Past: Early Indicators in Food Insecurity

The devastating 1983-1984 Sudan famine, triggered by drought, serves as a compelling case study for early warning signs of food insecurity and severe malnutrition. A crucial observation during this crisis was the early sale of livestock and sheep by pastoral communities. This behavior stemmed from the increased cost of animal feed (fodder) due to scarcity and depletion of grazing lands, followed by a drop in the market value of livestock. These actions preceded the full-blown famine, highlighting the potential for early detection strategies.

The Need for a Feasible and Accessible Solution

The recent success in developing rapid diagnostic tests for emerging diseases with high sensitivity and specificity demonstrates the potential for similar advancements in malnutrition detection. A syndromic scoring system, specifically tailored for conflict settings, offers a promising solution.

Syndromic Scoring System for Early Malnutrition Detection in Conflict Zones: A Proposed Solution:

This paper proposes a novel solution: the development and validation of a syndromic scoring system specifically designed for early malnutrition detection in conflict zones. This system would leverage readily observable signs and symptoms of malnutrition, such as:

- a) Weight loss
- b) Fatigue
- c) Edema (swelling)
- d) Skin lesions

The core design principles of the system are:

- a) **Simplicity:** Easy to use with minimal training and no specialized equipment.
- b) **Rapid assessment:** Enabling quick evaluation of individuals suspected of malnutrition.
- c) **Feasibility:** Applicable in resource-limited conflict zones.
- d) **Accessibility:** Providing wider screening access for vulnerable populations.

Addressing Potential Limitations and Optimization

While a syndromic scoring system may not be as specific as

traditional methods, its advantages – rapid assessment, feasibility, and accessibility – are particularly valuable in conflict zones. To further optimize the system, the paper will explore establishing cut-off points within the scoring system to achieve optimal sensitivity and specificity for malnutrition detection in this specific context. Validation of this syndromic scoring system would address a critical knowledge gap and equip healthcare workers in conflict zones with a powerful tool for early malnutrition detection. This approach has the potential to significantly improve health outcomes, particularly for children and pregnant women, in conflict-affected populations worldwide. By bridging the gap between existing limitations and the urgent need for accessible solutions, this paper aims to contribute to a more effective public health response and save lives.

Proposed Research Methodology

Syndromic Scoring System for Malnutrition Detection in Conflict Zones

Rapid assessments employing syndromic scoring systems offer a promising approach for early malnutrition detection in resource-constrained settings, particularly conflict zones. This project leverages insights from the 1983-1984 Sudan famine and the unique challenges posed by armed conflicts. By developing and validating a rapid, syndromic scoring system for malnutrition assessment, we aim to significantly improve the effectiveness of malnutrition detection and intervention efforts in these vulnerable regions.

Addressing the Gap: A Rapid Syndromic Scoring System Approach

Current limitations associated with traditional anthropometric methods (weight-for-height, mid-upper arm circumference) necessitate alternative approaches for malnutrition assessment in resource-constrained settings (Table 3). This paper proposes the development and validation of a rapid, syndromic scoring system to address this critical gap. This system will focus on readily observable clinical signs and symptoms of malnutrition, allowing for rapid assessment without the need for specialized equipment. The scoring system will not only consider individual signs and symptoms but also broader indicators of malnutrition risk within conflict zones. These may include changes in livestock sales patterns by pastoral communities, disruptions in agricultural activity levels, and the availability of essential healthcare services. By implementing this system, humanitarian organizations and governments would be equipped to identify populations at risk of malnutrition at an earlier stage, enabling earlier intervention and potentially mitigating the severity of food insecurity and malnutrition before they reach critical levels (Table 3).

Table 3: Early and Late Indicators of Malnutrition with Strengths and Weaknesses.

Early Indicators (Syndromic):		
These indicators are readily observable signs and symptoms that may suggest malnutrition, allowing for early intervention. However, they are not definitive diagnoses and require further evaluation.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Visible edema (swelling)	Easy to identify without equipment. - Can be an early sign of protein deficiency.	Can also be caused by other medical conditions. - May not be present in all cases of malnutrition.
Hair changes (thinning, discoloration)	Relatively easy to observe. - Can indicate protein or micronutrient deficiencies.	Can be caused by other factors like genetics or medications. - May not be readily apparent in all cases.

Skin lesions	Can be a sign of vitamin or mineral deficiencies.	Specific types of lesions are required for accurate interpretation. - Can be caused by other skin conditions.
Appetite loss or poor feeding practices	- Reported by caregivers or observed directly. - Can be an early indicator of malnutrition.	Can be caused by other factors like illness or teething. - May not always be reliable information.
	Early detection: Allows for prompt intervention to prevent severe malnutrition. Feasibility: Can be used in resource-limited settings without specialized equipment. Acceptability: Relatively easy for healthcare workers and caregivers to understand.	Lack of specificity: Can be caused by other conditions besides malnutrition. Subjectivity: Interpretation may vary depending on the observer. Need for further evaluation: Require confirmation with other methods like anthropometry.
Late Indicators (Anthropometric): These indicators are traditional methods using measurements to assess nutritional status. They are considered definitive but require specific equipment and trained personnel.		
Indicator	Strengths (Pros)	Weaknesses (Cons)
Weight-for-Height (WHZ)	Standardized and widely used method. - Identifies both wasting (acute) and stunting (chronic) malnutrition.	Requires accurate measurement of weight and height. - May be affected by recent illness or edema.
Mid-Upper Arm Circumference (MUAC)	Easy to measure with a simple tool. - Useful for identifying wasting (acute) malnutrition.	Requires training and proper technique for accuracy. - May be influenced by muscle mass.
Weight-for-Age (WFA)	Identifies underweight status, a risk factor for malnutrition. Relatively simple to measure. Standardized and Objective: Measurements are reliable and comparable. Definitive Diagnosis: Provides a clear picture of nutritional status. Widely Used: Established benchmarks for interpretation.	Does not differentiate between wasting and stunting. Can be affected by age estimation errors. Resource-intensive: Requires equipment and trained personnel. Limited feasibility: May not be practical in all settings. Delayed detection: Malnutrition may already be advanced by the time these indicators are evident.

Early Malnutrition Detection in IDP Communities: A Syndromic Scoring System Approach

Malnutrition poses a significant public health threat to Internally Displaced Persons (IDPs) residing in conflict zones [6]. Resource limitations, disruptions to healthcare access, and food insecurity create a breeding ground for malnutrition, particularly among children and pregnant women. Early detection is crucial for timely intervention and improved health outcomes.

Objectives

This paper proposes the development, validation, and evaluation of a user-friendly syndromic scoring system for early malnutrition detection in IDP communities. The system will be designed for ease of use by healthcare workers with limited resources, specifically targeting this vulnerable population.

Research Methodology

The research will follow a four-step approach:

Identifying Relevant Syndromic Indicators

This step involves identifying readily observable clinical signs and symptoms (syndromes) associated with malnutrition within the specific context of IDP communities. These indicators should be easily detectable by healthcare workers with limited resources.

Developing and Validating a Scoring System

Based on the identified syndromic indicators, a user-friendly scoring system will be designed for rapid malnutrition assessment.

The system will then undergo validation to ensure its accuracy and effectiveness in identifying malnutrition compared to established anthropometric methods (weight-for-height and mid-upper arm circumference).

Comparative Effectiveness Evaluation

The sensitivity, specificity, and accuracy of the newly developed scoring system will be compared with traditional anthropometric methods in these settings. This comprehensive evaluation will determine the effectiveness of the scoring system for malnutrition detection.

Feasibility and Acceptability Assessment

The study will assess the feasibility of implementing the scoring system within existing healthcare practices in IDP communities. Additionally, the acceptability of the system among both healthcare workers and IDP communities will be evaluated. This final step ensures successful integration of the scoring system into routine healthcare practices within these environments.

Advantages of a Syndromic Scoring System

A syndromic scoring system offers several advantages for early malnutrition detection in IDP communities:

Early Detection

The system can identify malnutrition at an early stage, enabling prompt intervention and potentially mitigating the severity of complications associated with malnutrition, such as increased risk of infections and mortality.

Feasibility

The scoring system is designed for ease of use by healthcare workers with limited resources. This is particularly advantageous in resource-constrained settings like IDP communities, where access to specialized equipment and personnel may be limited. The system's reliance on readily observable clinical signs and symptoms minimizes the need for complex equipment, making it more readily deployable.

Standardization Potential

A well-designed syndromic scoring system can be standardized for consistent application across different healthcare settings within IDP communities. This standardization can improve the reliability and comparability of malnutrition assessments, aiding in resource allocation and program planning.

Complementary Approach

The scoring system can serve as a complementary approach to traditional anthropometric methods. While anthropometry provides valuable data, it may not always be feasible in resource-limited settings. A syndromic scoring system can offer a rapid and readily implementable tool for initial assessment, potentially facilitating earlier identification of malnutrition cases.

This paper aims to develop, validate, and evaluate a syndromic scoring system for early malnutrition detection in IDP communities. This approach has the potential to significantly improve public health outcomes by enabling earlier intervention and improved nutritional support for this vulnerable population.

Proposed Approach: A User-Friendly Syndromic Scoring System

This paper proposes the development, validation, and evaluation of a user-friendly syndromic scoring system for early malnutrition detection in IDP communities. The system will be designed for ease of use by healthcare workers with limited resources, specifically targeting this vulnerable population.

Research Methodology

The research will follow a four-step approach:

Identifying Relevant Syndromic Indicators

The first step involves identifying readily observable clinical signs and symptoms (syndromes) associated with malnutrition within the specific context of IDP communities and conflict zones. These indicators should be easily detectable by healthcare workers with limited training or equipment.

Developing and Validating the Scoring System

Based on the identified syndromic indicators, a user-friendly scoring system will be designed for rapid malnutrition assessment. The system will then undergo validation to ensure its accuracy and effectiveness in identifying malnutrition compared to established anthropometric methods (weight-for-height and mid-upper arm circumference).

Comparative Effectiveness Evaluation

The sensitivity, specificity, and accuracy of the newly developed scoring system will be compared with traditional anthropometric methods in these settings. This comprehensive evaluation will determine the effectiveness of the scoring system for malnutrition detection.

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This paper aims to develop, validate, and evaluate a syndromic scoring system for early malnutrition detection in IDP communities. This approach has the potential to significantly improve public health outcomes by enabling earlier intervention and improved nutritional support for this vulnerable population.

Research Methodology

Development and Pilot Testing

Literature Review and Expert Consultation: A comprehensive review will identify established syndromic indicators of malnutrition in conflict settings. Public health experts, nutritionists, and healthcare professionals experienced in IDP settings will be

consulted using the Delphi method to gather consensus on the most relevant indicators.

Focus Group Discussions: Discussions with IDP community members will gather insights into easily recognizable signs and symptoms of malnutrition from their perspective.

Pilot Testing: Based on the collected information, a preliminary scoring system will be developed and pilot tested in a small sample of IDP communities to assess feasibility, effectiveness, and ease of use.

Validation and Evaluation

Study Population: A representative sample of IDPs residing in conflict zones and camps will be recruited. Sample size will be determined statistically to ensure generalizability.

Data Collection: Trained healthcare workers will administer the scoring system alongside standard anthropometric assessments (weight-for-height, mid-upper arm circumference). Data collection will also encompass factors influencing malnutrition, such as access to food, healthcare, and sanitation.

Data Analysis: Statistical analysis will assess the sensitivity, specificity, and accuracy of the scoring system compared to anthropometric methods. Feasibility and acceptability among healthcare workers and IDP communities will also be evaluated.

Expected Outcomes

Validated Syndromic Scoring System

A user-friendly, rapid tool for early malnutrition detection in resource-constrained settings.

Enhanced Public Health Surveillance

Improved capacity for identifying malnutrition cases in IDP settings, facilitating timely interventions.

Optimized Resource Allocation

Targeted identification of high-risk individuals for more efficient resource allocation in malnutrition prevention and treatment programs.

Evidence-Based Practices

Valuable evidence to inform evidence-based public health interventions and policies for reducing malnutrition in IDP settings.

The proposed syndromic scoring system complements existing frameworks used by organizations like UNICEF and WHO. It focuses on early clinical indicators and can be used alongside broader child health and well-being indicators for a comprehensive picture. Early detection allows for timely interventions, potentially preventing malnutrition progression and its associated health complications. This approach is particularly valuable in resource-constrained settings.

Context and Rationale for Rapid Assessment

Rapid Nutritional Assessments (RNAs) are essential for understanding a community's nutritional status in emergencies or resource-limited settings. They prioritize speed and efficiency to gather preliminary data for immediate interventions. While anthropometric methods are effective, they may not be readily available

due to equipment and training limitations. RNAs typically employ a combination of techniques:

- a) Dietary assessment (Food Frequency Questionnaires & 24-Hour Recalls) [7]. Anthropometric assessment (Weight-for-Height & Mid-Upper Arm Circumference)
- b) Clinical assessment (visible signs)
- c) Community-based surveillance (interviews & discussions)

Data analysis using percentages, proportions, and mapping helps identify high-risk groups and areas with higher malnutrition prevalence. While rapid assessments offer valuable strengths, they can lack detail, be susceptible to bias, and require further evaluation. Seasonality, morbidity data, and vulnerability factors must also be considered for comprehensive intervention planning.

The Importance of Early Warning and Famine Differentiation

Early identification of both famine and acute food insecurity is crucial for prioritizing interventions and allocating resources effectively. Famine and acute food shortage represent distinct points on the food insecurity spectrum, differing in severity and underlying causes. Distinguishing between them requires specific criteria and helps guide appropriate responses.

Understanding Hunger Crises: Famine vs. Acute Food Shortage

Famine represents the most extreme form of hunger, a devastating humanitarian crisis characterized by severe food deprivation across a large region. Defined by specific criteria, a famine is declared when at least 20% of households face extreme food shortages and lack basic necessities, or over 30% of children under five suffer from acute malnutrition. The daily mortality rate exceeds 2 deaths per 10,000 people due to starvation or malnutrition complications [8]. Unlike temporary disruptions, famines typically arise from a convergence of multiple factors over extended periods. Prolonged conflicts disrupt food production, markets, and distribution networks. Climate extremes; e.g., droughts and floods devastate agricultural production, leading to severe food shortages. On the other hand, economic collapse (Hyperinflation or currency devaluation) makes food unaffordable for many. Government Policies are geared to price controls, export bans, or trade restrictions can distort markets and limit access to food.

The consequences of famine are widespread and devastating. They include malnutrition and death from starvation and malnutrition-related illnesses, social unrest and displacement, and the economic and social effects hinder development and recovery efforts [9].

Acute Food Shortage: A Temporary Disruption

Acute food shortage is a temporary situation characterized by limited food availability in a specific region. Unlike famine, it arises from temporary disruptions rather than long-term factors; e.g., seasonal fluctuations (lower food availability before the next harvest),

localized disasters (floods, droughts, or pest outbreaks disrupt food production in a specific area) and market disruptions (sudden price spikes due to temporary supply chain issues or localized economic factors). While serious, the impacts of acute food shortages are typically less severe than those of famines: Increased food prices strain household budgets and dietary diversity may decrease. Hunger and malnutrition, particularly among vulnerable populations, may rise, but the severity and extent are lower compared to famine scenarios.

Early Warning and Intervention Strategies

Understanding the distinction between famine and acute food

Table 4: Differences between famine and acute food shortage.

Feature	Famine	Acute Food Shortage
Severity	Most extreme form of hunger	Limited food availability
Underlying Causes	Multiple converging factors over time	Temporary disruptions
Food Deprivation Level	Extreme	Moderate
Malnutrition Rates	Over 30% of children under 5	Increased, but lower rates
Mortality Rates	Over 2 deaths per 10,000 per day	May increase, but lower
Duration	Prolonged	Temporary

The Link Between Poverty and Famine

While poverty creates vulnerabilities to famine, not everyone living in poverty experiences famine. Poverty is a complex issue with various contributing factors, including lack of education, limited economic opportunities, and social and political factors. These factors contribute to chronic food insecurity, but they don't necessarily lead to the extreme food deprivation that defines famine. Famine and poverty are intricately linked but distinct issues. Famine requires a coordinated global response, while addressing poverty through economic development, social safety nets, and education. Early warning systems combined with appropriate intervention strategies are critical to prevent famine and protect the most vulnerable populations.

Terminology

Acute Food Shortage: Temporary lack of food availability in a specific region.

Food Insecurity: Limited or uncertain access to food, encompassing various degrees (chronic/temporary).

Starvation: Physiological state caused by prolonged lack of food intake (consequence of famine/severe food insecurity).

Malnutrition: Deficiency, excess, or imbalance of nutrients in the diet.

Hunger: Physiological sensation caused by a lack of food.

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None.

shortage is crucial for prioritizing interventions (Table 4). Early identification allows for timely action to prevent famine and mitigate the effects of acute food shortages. International Non-Governmental Organizations (NGOs) rely on various data sources and methodologies to assess famine risk and coordinate responses, working with organizations like the Food and Agriculture Organization (FAO) and the World Food Programme (WFP). The proposed syndrome early warning systems is expected to incorporate weather forecasts and local observations to anticipate potential crises (Table 4).

Competing Interests

None.

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