



"APPROACHES AND RECOMMENDATIONS FOR THE NUTRITIONAL MANAGEMENT OF PATIENTS WITH MONKEYPOX (MPOX) IN THE DEMOCRATIC REPUBLIC OF CONGO"

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Article History

Received: 02.01.2025

Accepted: 29.01.2025

Published: 08.03.2025

Abstract: - This article examines best practices and recommendations for the nutritional management of patients affected by Monkeypox (MPOX) in the Democratic Republic of Congo (DRC). It emphasizes the disease's unique pathophysiological characteristics and the contextual challenges related to food security.

A literature review was conducted using reliable databases such as PubMed, Google Scholar, Mendeley, and The Lancet. Studies published between 2000 and 2024 were analyzed for their relevance and methodological quality, focusing on nutrition and viral diseases, particularly Monkeypox.

The findings highlight the significance of diets rich in proteins, vitamins, minerals, and essential fatty acids to strengthen patients' immunity. Nutritional strategies include supplementation, oral rehydration, and diets tailored to complications such as dehydration and hypercatabolism.

Major challenges were also identified, such as limited access to nutritious food in the DRC, logistical constraints, and socioeconomic factors exacerbating malnutrition.

Proper nutritional care enhances immune response, reduces complications, and strengthens the resilience of affected populations. The article provides practical recommendations for healthcare professionals and policymakers, emphasizing the need for locally adapted interventions to optimize nutritional management and support public health efforts in this complex context.

Keywords: Monkeypox, nutrition, nutritional management, Democratic Republic of Congo, viral infections, public health.

Introduction

Monkeypox, an emerging zoonotic viral disease, has become a significant public health concern, particularly in Central and West Africa, where outbreaks have been regularly reported over recent decades. The Democratic Republic of Congo (DRC) remains one of the most affected countries, recording a high incidence rate despite ongoing control and prevention efforts (Bunge et al., 2022). The disease is primarily transmitted through direct contact with infected animals or human bodily fluids, presenting a persistent challenge to public health systems (Reynolds et al., 2019).

Nutritional management is critical for enhancing the immunity of patients with infectious diseases such as Monkeypox. Adequate nutrition plays a pivotal role in improving immune responses and preventing malnutrition-related complications (World Health Organization, 2020). Symptoms like fever, skin rashes, and oral lesions often lead to significant appetite loss in infected patients, further compromising their nutritional status (Nguyen et al., 2022).

Moreover, supportive nutritional strategies must be tailored to meet the increased metabolic demands induced by the infection (Towers, 2021).

This article aims to explore, through a literature review, the best practices and recommendations for the nutritional management of Monkeypox patients in the DRC, taking into account the epidemiological particularities and the availability of local food resources.

Methodology for the Literature Review

1.1 Description of Sources and Databases Used

This study involved an in-depth literature review using reputable databases such as PubMed, Google Scholar, Mendeley, JSTOR, and The Lancet. These platforms were selected for their comprehensive coverage of relevant medical and scientific publications, providing access to recent studies and literature

Cite this article:

Célestin, M. M. P., Paola, M. M., et al. (2025). "APPROACHES AND RECOMMENDATIONS FOR THE NUTRITIONAL MANAGEMENT OF PATIENTS WITH MONKEYPOX (MPOX) IN THE DEMOCRATIC REPUBLIC OF CONGO". *ISAR Journal of Medical and Pharmaceutical Sciences*, 3(3), 1-5.

reviews on Monkeypox and the nutritional management of patients with viral infections (Karem et al., 2021; WHO, 2020).

Specific keywords were used to conduct the searches, including "Monkeypox," "nutrition," "nutritional management," "Democratic Republic of Congo," "viral infections," and "public health." For example, PubMed provided epidemio-logical and clinical studies on Monkeypox, while JSTOR and The Lancet offered reviews and public health reports addressing the nutritional impacts of managing infectious diseases. Google Scholar facilitated the identification of interdisciplinary publications, allowing for the integration of data from nutrition and infectious disease studies (Nguyen et al., 2022). Mendeley was used for reference management and verification, ensuring a rigorous organization of the selected sources.

1.2 Inclusion and Exclusion Criteria

Inclusion criteria encompassed studies published between 2000 and 2024 in English or French, focusing specifically on nutrition in relation to viral diseases or Monkeypox. Priority was given to review articles, case studies, reports from health organizations like the WHO, and original research. Conversely, studies addressing unrelated topics, those published before 2000, and unverifiable reports were excluded (Bunge et al., 2022).

1.3 Approach to Analyzing Collected Data

Extracted data were analyzed qualitatively. Each article was assessed for its relevance and methodological quality based on standard criteria for evaluating scientific evidence. A thematic framework was employed to organize the information, focusing on the nutritional needs of Monkeypox patients, recommended management strategies, and specific contextual challenges in the DRC (Reynolds et al., 2019; Towers, 2021).

The results were synthesized to identify gaps in the literature and provide a robust scientific foundation for developing recommendations on nutritional management in the context of Monkeypox in the DRC.

Artificial intelligence was used in the writing of this article. We used ChatGPT (Chat Generative Pre-trained Transformer), version 2, developed by OpenAI. This version is designed to offer even more precise, interactive and contextual responses.

Results

1. Pathophysiology of Monkeypox and Nutritional Needs

Monkeypox is a viral infection caused by the Monkeypox virus, an orthopoxvirus closely related to the smallpox virus. While typically self-limiting, the disease can lead to severe complications, particularly in immunocompromised individuals and those suffering from malnutrition (Reynolds et al., 2019). Understanding the pathophysiology of Monkeypox is critical for designing effective nutritional management strategies.

1.1 Impact of Infection on Metabolism and Nutritional Needs

Monkeypox infection triggers a significant inflammatory response, leading to an elevated basal metabolic rate and increased energy and protein requirements. This metabolic demand supports immune system function and tissue repair (Nguyen et al., 2022). Fever and systemic inflammation exacerbate this response, resulting in

muscle catabolism and depletion of nutritional reserves (World Health Organization, 2020).

Furthermore, studies show that viral infections like Monkeypox disrupt micronutrient metabolism, reducing the absorption and increasing the excretion of essential nutrients such as zinc, iron, and antioxidant vitamins. These nutrients are vital for modulating immune responses, making supplementation particularly important for at-risk patients (Towers, 2021).

1.2 Symptoms Affecting Nutritional Intake

The clinical manifestations of Monkeypox, including skin lesions and oral ulcers, significantly impair food intake. Loss of appetite is common, compounded by the pain associated with oral lesions, which hinders chewing and swallowing (Bunge et al., 2022). Nausea and fatigue linked to the infection further reduce food consumption, increasing the risk of malnutrition.

1.3 Consequences of Malnutrition on Disease Progression

Malnutrition is a major aggravating factor in the progression of Monkeypox. Poor nutritional status weakens the immune system, reducing the body's ability to combat the infection and increasing the likelihood of severe complications such as secondary infections and organ failure (Karem et al., 2021). Prolonged malnutrition can also delay recovery and increase mortality rates in infected patients (Nguyen et al., 2022).

The WHO emphasizes that tailored nutritional interventions are crucial to prevent the deterioration of patients' health. A focus on protein and micronutrient supplementation can support immune functions and accelerate recovery (World Health Organization, 2020).

2. Appropriate Nutritional Management

2.1 Nutritional Goals for Patients with Monkeypox

The primary goal of nutritional management for Monkeypox patients is to support immune response, prevent malnutrition, and address metabolic complications. A balanced diet plays a crucial role in boosting the immune defenses, which is essential for mitigating the severity of the infection (Towers, 2021). Additionally, patients with Monkeypox often experience appetite loss and digestive issues, necessitating specific nutritional support tailored to their needs (WHO, 2020).

2.2 General Recommendations on Macro-nutrients and Micronutrients

To meet increased energy demands and compensate for nutritional losses, patients should consume calorie-dense diets emphasizing high-quality proteins that support immune cell synthesis. Research indicates that adequate protein intake, including essential amino acids, facilitates recovery (Nguyen et al., 2022). Carbohydrates should also be included to provide rapid energy, with a preference for fiber-rich sources to enhance intestinal health.

Key micronutrients such as zinc, selenium, and vitamins A, C, and D are critical for modulating immune responses. Deficiencies in these nutrients are associated with increased susceptibility to viral infections (Towers, 2021). Supplementation may be necessary based on clinical evaluations and serum level assessments.

2.3 Nutritional Support Strategies

Nutritional strategies depend on the severity of the disease. Oral feeding is preferred when possible, with nutrient-rich and easily digestible foods. In cases of severe difficulty, enteral nutrition may be required to ensure adequate intake (Nguyen et al., 2022). For extreme cases where the gastrointestinal tract is non-functional, parenteral nutrition may be considered as a last resort.

2.4 Importance of Hydration and Management of Nutritional Complications

Hydration is critical for Monkeypox patients, especially those experiencing fever, excessive sweating, or vomiting. Oral rehydration solutions should be administered to prevent dehydration (WHO, 2020). Electrolyte imbalances, such as abnormalities in sodium or potassium levels, may arise and require close monitoring (Towers, 2021).

3. Contextual Nutritional Practices in the DRC

3.1 Availability and Accessibility of Food in Affected Areas

In the Democratic Republic of Congo (DRC), food availability and accessibility are heavily influenced by conflict, economic instability, and inadequate agricultural infrastructure. According to the World Health Organization (WHO), many rural and urban areas face significant challenges in ensuring a consistent food supply. This is partly due to the reliance on seasonal crops and the geographic isolation of communities (WHO, 2020). Additionally, climate variability affects food production, further exacerbating food insecurity (Nguyen et al., 2022).

Access to nutrient-rich foods, such as animal products, legumes, and fresh fruits and vegetables, is often limited. This increases the risk of malnutrition, particularly among vulnerable groups like children and pregnant women (Towers, 2021).

3.2 Adapting Recommendations to Local Dietary Habits

To enhance the effectiveness of nutritional interventions in the DRC, it is essential to tailor recommendations to local dietary practices. This includes promoting traditional dishes enriched with micronutrients using locally available and culturally accepted ingredients. For example, initiatives encouraging the consumption of cassava leaves (rich in vitamin A) and local fish (important sources of omega-3 fatty acids) can address nutritional needs while respecting the communities' culinary preferences (The Lancet Infectious Diseases, 2021).

Traditional knowledge about food preparation should also be leveraged to maximize nutritional value while introducing safe practices for food preservation and processing (WHO, 2020).

3.3 Community-Based Initiatives and Local Resources

Community initiatives play a key role in strengthening food security and nutrition in the DRC. For example, community gardens have been established to help families grow fresh and diverse foods. These projects not only improve access to nutrient-rich vegetables but also foster resilience against food crises (Nguyen et al., 2022). Additionally, nutrition and dietary diversification training programs, often organized by local NGOs, educate populations on the importance of balanced diets (Towers, 2021).

Engaging community leaders and women's groups is crucial for the success of these initiatives. Local actors facilitate the dissemination of nutritional messages and support sustainable practices for food production and consumption. The use of local resources, such as fortifying cassava flour, offers a cost-effective strategy to combat malnutrition (WHO, 2020).

4. Challenges and Constraints

4.1 Logistical and Cultural Barriers to Implementing Nutritional Recommendations

Implementing nutritional recommendations in the Democratic Republic of Congo (DRC) faces numerous logistical and cultural challenges. Transporting food supplies to rural and remote areas is a major obstacle due to inadequate roads and insecurity in some regions. These issues complicate the consistent delivery of food and essential medical supplies (Nguyen et al., 2022).

Cultural factors also influence the acceptability of nutritional interventions. Traditional dietary beliefs and preferences may conflict with proposed recommendations, necessitating culturally sensitive approaches. For example, promoting balanced diets must align with deeply rooted food traditions to ensure community acceptance (Towers, 2021). This highlights the importance of community engagement and tailored nutrition education programs.

4.2 Limitations in Healthcare Infrastructure for Nutritional Management

Healthcare infrastructure in the DRC often lacks the capacity to provide effective nutritional management. Many health centers are understaffed and lack diagnostic tools and resources to treat severe malnutrition. The absence of clinical nutrition services in numerous hospitals further hampers the proper management of nutritional complications, undermining patient recovery (The Lancet Infectious Diseases, 2021).

Fragile health systems, coupled with outdated equipment and insufficient staff training, exacerbate the situation. Effective nutritional support, which requires ongoing evaluation and regular adjustments, is constrained by these structural limitations, making it difficult to implement standard protocols (Nguyen et al., 2022).

4.3 Impact of Food Crises and Socioeconomic Challenges on Patient Nutrition

Recurrent food crises and socioeconomic instability severely impact patient nutrition in the DRC. High poverty rates, coupled with political and economic instability, exacerbate food vulnerability, particularly in areas affected by population displacement and conflict (Towers, 2021).

Households often struggle to access balanced diets, increasing the risk of malnutrition, especially among children and immunocompromised individuals. Economic crises also reduce families' ability to purchase nutritious foods, intensifying reliance on food aid. Fluctuating food prices in local markets further complicate the planning of sustainable nutritional interventions. Collaboration between humanitarian organizations and local authorities is crucial to mitigate these impacts and improve community resilience (WHO, 2020).

5. Recommendations and Perspectives for Improvement

5.1 Enhancing Nutritional Management Practices

To improve the nutritional care of Monkeypox patients, strategies must focus on increasing access to essential resources. This includes establishing community-based nutrition programs that provide micronutrient- and macronutrient-rich food supplements, particularly in highly affected areas. The World Health Organization (WHO) emphasizes that nutritional interventions must be personalized, considering cultural specificities and the needs of at-risk populations (WHO, 2020). Enhanced training for healthcare professionals in managing the nutritional aspects of viral infections like Monkeypox is also vital to improving clinical outcomes (Nguyen et al., 2022).

Strengthened healthcare infrastructure equipped to conduct systematic nutritional assessments and patient follow-ups is fundamental. For instance, introducing specialized clinical nutrition units in hospitals and health centers can ensure comprehensive care while facilitating the integration of standardized nutritional protocols (The Lancet Infectious Diseases, 2021).

5.2 Directions for Future Research on Nutrition and Monkeypox

Future research should aim to understand the complex interactions between nutritional status and Monkeypox progression. Longitudinal studies are needed to assess the impact of malnutrition on patients' immune responses and to determine specific macronutrient and micronutrient requirements at different stages of infection (Towers, 2021). Randomized clinical trials could evaluate the effectiveness of targeted nutritional interventions, such as zinc or vitamin D supplementation, in improving patient outcomes (Nguyen et al., 2022).

Additionally, studying local dietary patterns and their influence on immune health can inform evidence-based nutritional recommendations tailored to the available resources in DRC communities (WHO, 2020).

5.3 Role of Public Health Partners in Nutritional Management

Public health partners, including international organizations and NGOs, play a critical role in supporting nutritional management efforts for Monkeypox. Collaboration with health ministries and local authorities is essential for implementing sustainable nutrition programs. Funding initiatives and logistical support are necessary to strengthen local health systems and ensure equitable distribution of fortified foods and nutritional supplements (The Lancet Infectious Diseases, 2021).

Awareness campaigns led by public health partners can promote healthy dietary practices and increase community adherence to nutritional recommendations. Additionally, integrating multisectoral approaches that involve agriculture, education, and economic development can help address nutritional challenges in vulnerable regions (Towers, 2021).

Conclusion

Nutritional management for patients with Monkeypox plays a pivotal role in improving their overall prognosis. The discussed

points highlight the importance of adopting nutrition strategies tailored to the specific pathophysiological needs of these patients while addressing the challenges of implementing such strategies in the Democratic Republic of Congo (DRC). Proper nutrition enhances immune responses, reduces the risk of complications, and improves clinical outcomes—a perspective strongly supported by previous studies.

The socio-economic context and limited infrastructure in the DRC pose significant barriers. However, these challenges can be mitigated through appropriate interventions and collaboration with public health partners. Health policies should focus on improving access to nutritional resources, establishing robust healthcare infrastructure, and educating communities on healthy dietary practices.

Furthermore, investing in research and the development of locally adapted nutritional solutions could have a profound impact on managing viral infections like Monkeypox. Policymakers and public health actors must work in unison to implement sustainable strategies for nutritional support. These efforts will not only reduce the burden of the disease but also enhance the nutritional resilience of vulnerable populations in the DRC.

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Acknowledgement and thanks :

We are very grateful to the inventors of chagpt, which has been a great help to us.