

THE COMPLEX RELATIONSHIP BETWEEN HIV AND NUTRITIONAL STATUS



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The relationship between the human immunodeficiency virus (HIV) and nutritional status is complicated, multifactorial and bidirectional. For dietitians who are working with patients who have HIV, no two patients will be the same. Understanding the full clinical picture, including physical and mental health, as well as social situations, is essential.

A patient with HIV could be acutely unwell, with poorly controlled HIV, oral candidiasis and diarrhoea, requiring aggressive nutritional support. On the other hand, they may be on long-term medications with well-controlled HIV but struggling to manage metabolic complications including diabetes and hypertension.

Dietitians have a key role in the MDT approach to managing HIV at all stages. There are of course many benefits to achieving and maintaining optimum nutritional status for people with HIV, regardless of disease status. Nutritional status has been shown to be a predictor of survival after CD4 count (an indicator of disease management) has been adjusted for.¹ However, one of the major complications of HIV is malnutrition and this is multifactorial.¹

Malnutrition can be caused by HIV and its side effects but is also related to the medication regimes used to manage the virus.¹ Before we dive into this complex relationship, let's first explain what HIV is, look at how it is managed, and explain a few key terms including CD4 count and HIV wasting.

WHAT EXACTLY IS HIV?

In 2020, it was estimated that just over 100,000 people were living with HIV in the UK and the number of yearly new diagnoses is decreasing.²

HIV is a virus that attacks the immune system. The damage to the immune system can lead to acquired immunodeficiency syndrome (AIDS) if HIV is left untreated. There is currently no cure for HIV and medical treatment is aimed at managing the disease and its side effects. Daily medications are taken, with the aim of preventing virus replication and allowing the immune system to restore its function. With early diagnosis and effective treatment progression to AIDS can be prevented and people can live full lives.

A recent large-scale study found life expectancy for people with well-controlled HIV to be similar to that of people without HIV.³ Conditions such as diabetes, heart disease, liver disease and cancers, are now being seen at higher rates and often earlier in life in people with HIV.³ A healthy diet and lifestyle are a key part of living a long healthy life with HIV.

When working with patients with HIV, understanding and monitoring CD4 count is crucial. CD4 count is a measure of T cells, which are lymphocytes, and it is used to assess a patient's immunological status.⁴ CD4 count is also used to guide treatment options, including whether to start prophylactic treatment for opportunistic infections.⁴ CD4 count can be monitored to assess response to treatment. For a

REFERENCES

Please visit:
www.NHDMag.co.uk/article-references.html

person who does not have HIV, CD4 levels can be anything from 500 to 1500.⁵ A CD4 count of less than 200 is part of the criteria used by the Centres for Disease Control and Prevention for describing AIDS.⁴ From a dietetic point of view, understanding a patient's CD4 count can indicate how acutely unwell the patient may be, how immunocompromised they are and can indicate the risk of opportunistic infections, all of which could have a significant impact on nutritional status.

MALNUTRITION IN HIV

HIV wasting, chronic diarrhoea and opportunistic infections can seriously impact a patient's nutritional status. HIV wasting syndrome is a condition where patients lose 10% or more of body weight and is usually associated with chronic diarrhoea and/or fever.¹ It is thought that in developing countries up to 100% of people with HIV suffer from chronic diarrhoea; however, this is lower in developed countries.⁶ In the gut, the HIV virus will affect the enterocytes, causing atrophy and damaging their function.⁶ The virus will also destroy the immunocompetent cells in the gut, leading to side effects including diarrhoea.⁶

With a comprised immune system, the risk of opportunistic infections is high. These infectious pathogens such as *Cryptosporidium* will result in various side effects including diarrhoea.⁶ However, one of the most common opportunistic infections is oral candidiasis, also referred to as oropharyngeal candidiasis. This is often the first sign of HIV infection⁷ and can cause mouth sores, painful chewing, taste changes and even dysphagia when severe, ultimately reducing oral intake. Malabsorption due to chronic diarrhoea, repeated opportunistic infections and reduced oral intake all significantly increase the risk of malnutrition in people with HIV.¹

In HIV, the immune system function is lowered and malnutrition will worsen this further.⁸ Undernutrition is linked to increased morbidity for people with HIV and so addressing this is essential.⁸ As dietitians, it is critical that we assess all barriers to nutrition, which may include discussing the need for commencing treatment of oral candidiasis (for example, nystatin) with the medical team.

Advice for patients with oral candidiasis is for them to opt for softer foods, colder or room temperature foods and to avoid spicy foods, foods with a lot of vinegar or salt, or very hot foods. Drinking fluids may be better tolerated and oral nutritional supplements may need to be considered to meet full requirements. Yoghurts, mousses, warm smooth soups and mashed potato may also be easier to eat. It is important to encourage fortification where possible and avoid any lower calorie or lower sugar/fat versions such as low-fat yoghurt. Similarly opting for higher calorie options such as 'cream of' soups rather than broths is helpful.

Understanding your patient's social setting will also be important – do they have access to cooking facilities, what family support do they have, and what responsibilities do they have? All of this will impact what and how they eat.

METABOLIC CHANGES

Nutritional status in people with HIV is complicated by metabolic changes caused by the HIV virus. HIV is a catabolic disease and, as well as affecting the immune system, it has detrimental effects on metabolism. These include dysregulation of lipid metabolism resulting in hypertriglyceridemia, changes to glucose uptake of cells involved in immunity and changes to mitochondrial pathways.⁹

The HIV virus may have persistent effects on metabolism, even once treatment has started. One 2018 study looked at markers of metabolism in untreated vs treated people with HIV. At baseline, those with untreated HIV had signs of impaired muscle metabolism and significantly raised triglyceride profiles.⁹ Despite the fact that 12 months of treatment had succeeded in achieving viral suppression and increased CD4 count, metabolic dysregulation was still evident.⁹ This was only a 12-month study and so longer studies are needed to fully understand these effects.

MEDICATIONS

It is important to understand the medications used to manage HIV, as they too can impact significantly on nutritional status and metabolism. These medications, which must be



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taken daily, are called antiretroviral therapies (ART) and are also referred to as highly active antiretroviral therapy (HAART) or combination antiretroviral therapy (cART). As well as reducing viral reproduction and increasing CD4 count, they have been very successful in reducing incidences of HIV wasting, which will positively affect nutritional status. However, they have come with other side effects. Older antiviral therapies were associated with an increased risk of lipodystrophy, which causes harmful fat redistribution around the body.¹⁰ While these specific regimes are no longer used, levels of cardiovascular disease, hypertension and type 2 diabetes (T2DM) are still a significant issue in this cohort.

There are various different types of ART medications used today, which all work in slightly different ways to manage the HIV virus. Many of these medications have been associated with insulin resistance and impaired glucose metabolism.¹¹

Research shows higher levels of metabolic syndrome in people with HIV on ART than those with HIV and not on ART (untreated). This may indicate that the metabolic impacts of the HIV virus and ART occur through different mechanisms.¹¹ Understanding this relationship is complicated by the fact that ART is now started immediately after diagnosis in most countries. This also makes it difficult to fully understand the role ART plays vs the role the HIV virus itself

plays in increasing a patient's risk of CVD and T2DM.¹¹ We must also take into consideration the fact that people with HIV are living longer in increasingly obesogenic environments, which will independently increase the risk of CVD and T2DM.

MEDICATION ADHERENCE

Keeping a high CD4 count is paramount in the management of HIV and preventing opportunistic infections. However, this requires daily medications and strict adherence to ART regimes. It is estimated that as many as 45% of people living with HIV have low adherence to their regimes.¹² Sadly, many studies have shown that HIV stigma compromises adherence to medication regimes.¹³ It has been proposed that this may be due to concerns around accidentally exposing HIV status, reduced self-efficacy and increased susceptibility to poor mental health.¹⁴

HIV stigma undermines the essential social support that is key for medication adherence,¹³ and the effect of stigma is even more prominent when compounded with poverty, which brings its own barriers to adherence. The barriers related to poverty include food insecurity and not being able to afford transport to clinics, even when the medication itself is provided for free.¹³

Managing a chronic disease with high medication burden, dealing with the stigma and being at an increased risk of mental health

COVER STORY

difficulties creates a perfect storm for a high risk of malnutrition. Whether that manifests as undernutrition, overnutrition or poorly managed metabolic health will depend on the individual patient and their circumstances.

DIETETIC AIMS

So, what are the aims when working with patients with HIV? It's going to be highly patient-specific. Requirements for energy and protein and advice for fats and carbohydrates will all depend on a wide range of factors including the following:

- Current disease state
- The presence of opportunistic infections
- Any signs of malabsorption
- Weight history, BMI in context with fat distribution and waist circumference
- The presence of any other conditions such as (T2DM), high triglycerides and cardiovascular disease

The ESPEN guideline for wasting in HIV suggests protein of 1.2g/kg bw/day to be used in stable conditions but increase to 1.5g/kg bw/day in acute illness.¹⁵ With an immunocompromised patient population, being careful with basic food safety and food hygiene is recommended. This is to reduce the risk of opportunistic infections, especially in patients with a low CD4 count. Basic advice around food storage, avoiding mouldy/spoiled food and how to reheat food, etc, will help reduce the risk of food-borne infections. In those with

a very low CD4 count, raw meat, seafood, eggs, unpasteurised dairy, live yoghurt and probiotics should all be avoided.¹⁶ However, as with any patient population at high risk of malnutrition, avoiding excessive and unnecessary long-term restrictive diets is essential to ensure a varied nutritionally balanced diet.

CONCLUSION

The relationship between HIV and nutritional status is complex. Untreated or poorly managed HIV can result in chronic diarrhoea and allows for opportunistic infections such as oral candidiasis. It can also trigger harmful changes to metabolism, which can be longstanding. The medications taken daily can also result in harmful metabolic changes through different mechanisms. Changes in metabolism can lead to insulin resistance, weight gain, diabetes, hypertension and heart disease.

Medications must be taken daily but HIV stigma can result in mental health issues and poor medication adherence. This will mean that a patient's nutritional status could change significantly throughout their life and they may need very different advice at different stages. It is essential that as dietitians we see the big picture and understand what our patients are going through. Our advice needs to come from a place of compassion, to take into account a patient's mental health and to consider the patient's capacity to make changes in the context of living with a chronic disease and the high medication burden required to manage HIV.



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