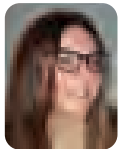


The Use of Complete Vitamin and Mineral Supplementation in Chronic Health Conditions



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Many adults in the United Kingdom (UK) may be at risk of vitamin and mineral deficiency.

Some minerals are required in smaller amounts than others and for that reason are sometimes termed as being 'trace elements' in the scientific literature and in prescribing guidance. It is important to note that a mineral being classified as a trace element does not mean it is less significant to human health, the term 'trace' is used to imply that a smaller amount is required than other minerals.

For the purpose of this article 'trace elements', including iron, selenium, copper, zinc and iodine, will be classified under the term of minerals.

In March 2018, the most recent National Diet and Nutrition Survey (NDNS) data was published from the years 2014-2015 and 2015-2016 combined. This indicated that on average only 31-32% of men and women aged 65-74 years of age and 18-20% of men and women aged 75 and over achieved their '5 A Day' target of fruit and vegetables.¹

Fruit and vegetables are known to be rich sources of many vitamins and minerals in varying proportions, such as vitamins A, C, folate, magnesium and selenium.²

The NDNS also demonstrated that 57% of women of childbearing age had a serum folate level below the clinical threshold for a possible folate deficiency. Ninety-one per cent of this age-group of women had a red blood cell folate level below the threshold, which indicates an increased risk of neural tube defects if they were to conceive.¹

This is just a snapshot of the NDNS data, which indicates that the dietary intake of several vitamins and minerals may be insufficient in the general population.

This article will focus on the risk of vitamin and mineral deficiency in chronic health conditions due to the additional condition burden, such as increased physiological needs, micronutrient malabsorption and the impact of medication to treat the condition. These increased demands, in the context of a diet which may be insufficient, often presents the need for complete vitamin and mineral supplementation.

Gastrointestinal (GI) conditions and surgery

GI conditions may increase the risk of vitamin and mineral deficiency due to restrictive diets (e.g. a low residue) or self-imposed dietary restrictions due to symptoms, malabsorption due to the condition or surgery required to manage the condition, and the increased physiological needs due to certain medications (e.g. steroid treatment).

Inflammatory bowel disease

The European Society of Parenteral and Enteral Nutrition (ESPEN) Guideline for Clinical Nutrition in Inflammatory Bowel Disease was updated in 2017 and stated that when nutrition support is offered, micronutrient supplementation should also be given.³ Nutrition support is often required within the inflammatory phase.

When the conditions are not in an inflammatory or 'flare' acute phase, sometimes termed as being 'in remission', those diagnosed with the condition remain at chronic risk of vitamin and mineral deficiency.⁴ Statistically lower levels of beta carotene and vitamin C have been found in men and women with Crohn's disease in remission compared to controls, with women also having statistically lower levels of vitamin B6 and magnesium.⁴ The same study concluded that there were sufficient macronutrients provided in the habitual diet,⁴ suggesting only vitamin and mineral supplementation may be indicated.

The ESPEN guidelines highlight the need for calcium and vitamin D to be monitored and supplemented if required when treated with steroids, due to the increased risk of osteopenia and osteoporosis.³ Where there is a concern of other micronutrient deficiencies (as steroids are often required during an inflammatory phase), a complete vitamin and mineral may negate the need for the burden of multiple vitamin and mineral tablets, except in the case of overt deficiency where a specific correctional dose may also be indicated.

Bariatric surgery and surgery for upper gastrointestinal (UGI) cancers

Whilst the clinical reasoning for bariatric surgery and surgery for cancers affecting the upper part of the gastrointestinal tract are different, as they impact the same parts of the anatomy the implications for meeting micronutrient needs are similar.

Bariatric surgery

Lifelong multivitamin and mineral supplementation is recommended following all types of bariatric surgery.⁵

Although many procedures cause malabsorption it is still important not to dismiss other impacts; like vomiting, which can occur with non-malabsorptive procedures such as the gastric band or balloon, that may impact on vitamin and mineral intake. Malabsorptive procedures may require additional iron and calcium supplementation over that supplied by a complete vitamin and mineral.

The National Patient Safety Agency (NPSA), in 2012, issued an alert following the death of a patient who had a gastric bypass.⁶ The patient had micronutrient deficiencies that led to pressure ulcers and increased risk of infection, which the coroner concluded led to the death by sepsis. The patient had been lost to follow up and, therefore, the alert highlighted both the need for life-long follow up and monitoring and that multivitamin, iron and calcium supplements should continue to be taken life-long.⁶

It is interesting to note a study in the *Journal of Nutrition and Dietetics* that followed-up patients for a year after a sleeve gastrectomy, which showed high rates of non-compliance with micronutrient supplementation.⁷ Twenty per cent cited cost as a reason for non-compliance.⁷ As over the counter vitamins and minerals may be regulated under different legislation (as a food supplement) to medically prescribed preparations of vitamins and minerals, and if cost may present a barrier to compliance with the recommendation of long-term supplementation, it may be prudent to consider a medically prescribed vitamin and mineral.

Surgical treatment of upper GI cancers

In the UK, there is varying practice in different tertiary centres and secondary oncology care providers post-surgery. Research shows that up to 73% of patients following curative resections for oesophageal and gastric surgeries have malabsorption, and vitamin and mineral supplementation may be required.⁸ This can be exacerbated in the presence of pancreatic exocrine insufficiency and pancreatic enzyme supplementation may be required alongside vitamin and mineral supplementation.⁸

Human immunodeficiency virus (HIV)

HIV has been associated with an increased prevalence of micronutrient deficiencies.⁹ This is linked with multiple factors, such as changes in metabolism due to the condition, malabsorption and gut infection.⁹

Initial data had raised concerns that micronutrient supplementation may have a negative impact on HIV progression, before antiretroviral therapy was introduced.¹⁰ An extended data collection has now established a beneficial impact of multivitamin and mineral supplementation on patients with HIV not taking antiretroviral therapy, showing a significant slowing of disease progression.¹¹ Whilst there is less peer-reviewed evidence available, to date, research on people with HIV that are prescribed antiretroviral therapy shows that multivitamin and mineral supplementation is stimulatory to the immune deficiency and may reduce mortality.¹¹

Antiretroviral therapy itself has been associated with reduced bone density and vitamin D deficiency.¹² It is not yet known what the optimal dose for vitamin D and calcium may be. In clinical practice, gender (as women experience a decline in bone density twice as rapidly as men),¹² dietary assessment of intake, biochemical markers and assessment of bone density, such as a DEXA bone scan, may guide if further additional calcium and vitamin D are required above the level provided by a complete multivitamin and mineral.

Wound care and pressure ulcers

Pressure ulcers have in recent years received significant attention in the National Health Service (NHS) since they reduce quality of life, especially in older adults.

The 2014 Joint American (NPUAP) and European (EPUAP) pressure ulcer advisory panel advises that once a pressure sore has developed patients should be referred to a dietitian, or interprofessional nutrition team, for early assessment of and intervention for nutritional problems.¹³

Historically, many clinicians have recommended vitamin C and zinc supplementation in the prevention or treatment of pressure ulcers. However, close inspection of the literature finds little to support the sole importance and/or supplementation of vitamin C and zinc. Neither the 2009 nor 2014 (current)

editions of the NPUAP and EPUAP specifically advise that only vitamin C or zinc should be administered to patients with or at risk of pressure ulcers.¹³ It is concerning that this recommendation remains prevalent in practice and was suggested that they were particularly important to those at risk of pressure ulcers on the NHS Choices website until the author requested that the content editor review the evidence presented. As a result, the website has been updated to state that a range of vitamins and minerals are important.¹⁴

It should be noted that there is clinical evidence for the topical application of zinc within wound dressings, the usage and recommendation of which is beyond the scope of this article, but that oral zinc should not be recommended except in the case of proven biochemical deficiency.

Multivitamin and mineral supplementation is recommended for those at risk of, or who have developed pressure ulcers when dietary intake is poor, or deficiencies are confirmed or suspected.¹³ More specifically, when a Grade 3 or Grade 4 pressure ulcer is present or there are multiple pressure ulcers, and needs cannot be met with high calorie and protein supplements, high protein, arginine and micronutrient supplementation are recommended.¹³

For other wounds, whilst there is a consensus of the importance of nutrition, including micronutrients, there is a scarceness of research in comparison to that of pressure ulcers.

Last year, a systematic review of studies to May 2017 on the association between nutrition and venous leg ulcers found that only 20 met the criteria for inclusion, and sample sizes were relatively small.¹⁵ Vitamin D and folic acid were linked with some benefits on wound healing and as such it was concluded that micronutrients may benefit those with leg ulcers.¹⁵ If this cannot

be met through dietary sources, a complete micronutrient supplement may be taken in to consideration as part of the dietary management.

For diabetic foot ulcers, deficiencies in magnesium and vitamin D have been linked to delayed wound healing.¹⁶ Supplementation of vitamins A, C and E, zinc and iron have been linked to an improvement in response to wound care management.¹⁶ Currently there is insufficient evidence to recommend multivitamin and mineral supplementation to all patients with a diabetic foot ulcer, especially as there is a lack of baseline measurement in the current literature base. However, Vas *et al.*'s recent editorial, similarly to pressure ulcers, advises for patients to receive dietetic consultation.¹⁶ Dietitians may consider following individualised assessment, including baseline biochemistry, if complete multivitamin and mineral supplementation may be an appropriate treatment option.

Summary

There are a significant number of gastrointestinal conditions including inflammatory bowel conditions, and post-surgery to the gastrointestinal tract (such as bariatric or upper gastrointestinal oncological surgery), where complete vitamin and mineral supplementation may be necessary, or in the case of bariatric procedures is mandatory post-surgery.

Patients with life-long conditions which impact on micronutrient status, such as HIV and chronic skin conditions such as pressure ulcers, should, following dietetic assessment, have complete vitamin and mineral supplementation considered as part of their nutritional management. Further research is indicated to direct clinicians if all patients with such conditions may benefit from complete vitamin and mineral supplementation.

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