How Remote Interventions Can Reduce the Impact of Disease-Related Malnutrition for Community Patients With Long-Term Conditions

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Abstract
Nutrition is a critical part of health and development but over 3 million people in the UK are malnourished or at risk of malnutrition (93% living in the community). As part of a wider nutritional clinical review program across England, this specific pilot focused on proactive nutritional reviews within 1 rural practice, to explore how exacerbation of illness for patients with long-term conditions may be prevented and quality of life improved through the avoidance of malnutrition; identified through the timely delivery of holistic clinical assessments; and managed with nutritional interventions that patients actively engage with. These objectives were of particular significance in 2020 due to the challenges posed by Covid-19 in the delivery of healthcare. Within the pilot activity, a selection of patients at the practice were identified based on predetermined criteria. The intervention was delivered remotely by a clinical pharmacist. Two methods of communication with patients were explored during the pilot—initially communicating by letter, and latterly by telephone call. From a registered patient population of 6138, 59 of these patients were flagged to the practice for assessment as required and 102 patients were prioritized for remote assessment. Following a notes review, 60 patients were contacted via telephone with no action for 39 patients; 16 patients agreeing to a “food-first” approach; and 5 patients prescribed ONS. Results from the pilot and wider program activity demonstrate that patients willingly engaged in a proactive approach to remote assessments when using appropriate communication channels. It has also demonstrated that through guidelines adherence resulting in more appropriate prescribing, there are significant cost savings to be made through the implementation of remote nutritional assessments in primary care. Further research is required to address the system-wide benefit that these reviews and the identification of adults at risk of malnutrition could deliver.

Keywords
access to care, community health, cost-effectiveness, efficiency, geriatrics, health outcomes, primary care, quality improvement, rural health

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Introduction
There are approximately 15 million people in England living with a long-term condition,1 the management of which requires careful consideration to reduce impact on acute services in the event of exacerbation or deterioration. But despite the increasing number of people living with long-term conditions, we are living longer than ever before with conditions such as cancer, dementia and cardiovascular disease.2,3 This longer lifespan needs to be considered on balance alongside quality of life; a consideration often referred to as “healthspan.” A prolonged life expectancy at the expense of a good quality of life is not a desirable outcome, so the clinical objective of caring for patients with long-term conditions should always be to extend healthspan without enhancing morbidity.4

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To support those with long-term conditions, there are national and international trends toward the development and improvement of community-based healthcare services, with the aim of providing care in the home environment wherever possible to avoid excess pressure on acute services. In particular, the provision of preventative healthcare within the community was identified as an area of focus in the NHS Five Year Forward View and is a theme which continues to take priority in the NHS Long Term Plan.

Care at home for long-term conditions is often the strongly stated preference when compared to outpatient care, hospital care and care within a nursing home environment. In addition to patient preference, there are clear economic benefits of supporting patients with long-term conditions to receive care at home, particularly during periods of ill health, where appropriate, with emphasis on avoiding acute admission. >60% of acute admissions are patients with 1 or more long-term health conditions the cost of which increases with multi-morbidity. Delivering preventative interventions wherever possible to support people in receiving care in the community, where costs are lower when compared to care received in an acute setting is therefore of high importance.

**Diagnosing Malnutrition and the Impact of Malnutrition on Health Outcomes**

Nutrition is a critical part of health and development, with disease-related malnutrition in particular having numerous detrimental physiological and clinical effects. Despite this, nutrition is often an area GPs are not sufficiently trained in or able to dedicate ample time to. In a 10-min consultation with multiple agendas, priority is often given to the first referral; and whilst the Malnutrition Universal Screening Tool (MUST) is internationally recognized as an important nutritional screening tool, some GPs are not aware of its existence.

Malnutrition is common and increases a patient’s vulnerability to disease. At any point in time more than 3 million people in the UK are malnourished or at risk of malnutrition, most (~93%) live in the community. This includes ~30% of hospital inpatients; up to 20% of hospital outpatients; up to 11% of patients presenting at their GP; and up to 40% of care home residents. This highlights the importance of those at risk of malnutrition receiving intervention at an early stage from a healthcare professional who is appropriately trained in recognizing the signs of malnutrition; able to use a screening tool effectively; and initiate any required actions resulting from the assessment. It is important to note that the completion of a malnutrition screening assessment is only effective if appropriate action is taken based on the result, and evidence suggests that interventions aren’t consistently acted on appropriately for patients with high MUST scores. Alongside a food-first approach, interventions for those with, or at high-risk of malnutrition often include the prescription of oral nutritional supplements (ONS) to provide macro and micronutrients.

In addition to the risk that malnutrition poses to health and disease vulnerabilities, it can also have a significant impact on a patient’s ability to tolerate and benefit from other healthcare interventions. For example, evidence has shown that nutritional status can have a profound impact on the treatment, as well as development of cancer. Malmourishment in these patients can lead to wastage of muscle and reduced ability to tolerate the effects of chemotherapy. Therefore, proactive intervention has the potential to markedly improve patient outcomes.

The estimated cost of malnutrition in England alone is upwards of £19.6 billion per year with the overall cost of treating a malnourished patient being 2 to 3 times more than treating a non-malnourished patient. But “simple steps” could be taken to generate in excess of £200 million of annual savings related to the problem, primarily through better guideline adherence, appropriate prescription, and use of ONS and improved continuity of care between care settings.

As a result, a long-term approach is often needed as part of the effective management of long-term conditions and prevention of crises which could lead to hospital admission. Primary care professionals can have a positive impact on reducing admission to secondary care services, and it has also been evidenced that higher continuity of care with a GP is associated with lower risk of admission.

**Remote Assessments to Enable Early Intervention**

There is an opportunity for the management of long-term conditions and prevention of or avoidance of malnutrition-related deterioration to be more effectively supported through the delivery of remote clinical assessments. Remote assessments can be effective in reducing barriers to vulnerable patients receiving the care they need, particularly when attending the surgery for an in-person appointment can be problematic due to impaired mobility or living in rural communities where the surgery is some distance away.

A holistic approach to remote assessments can also support the healthcare professional to focus on the patient as a whole, instead of centering exclusively on 1 specific issue. This can help to facilitate a wider conversation and potentially assist in flagging other issues relating to the patient’s health and wellbeing which may not have otherwise been identified. It also conveys that the clinician isn’t trying to rush the consultation and consequently makes the patient feel they are truly being cared for.
There are also mental health benefits associated with remote assessments. Loneliness among the elderly is a serious problem with more than 2 million people in England over the age of 75 living alone, and more than a million elderly people saying they go more than a month without meeting with a friend, neighbor, or family member. Covid-19 has compounded the issue of loneliness among the elderly and it is known to be having a detrimental impact on mental health, particularly for those with multiple comorbidities. Even if the primary reason for a remote consultation is to discuss a physical health issue, there are still secondary benefits for mental health, as the intervention can provide much-needed social contact.

There are several communication-, demographic-, and technology-based considerations for providing effective remote assessments. Digital literacy in particular, is a key consideration to ensure remote assessment programs do not promote health inequalities due to lack of skills or access to technology for patients. For example, a “telephone-first” approach in general practice can deliver mixed results, with some patients happy to receive same-day call backs and maintain clinical contact without leaving their home; whilst others struggle to take calls during working hours and report the need to make multiple calls to the surgery to get through to the GP. Programs therefore need to be designed around the needs of the local population.

A pre-emptive element of managing long-term conditions, avoiding malnutrition and improving overall health falls around patient education—providing patients with the knowledge required to take control and initiate changes themselves. This is supported by views expressed in the NHS Long Term Plan, which states that regarding digitally-enabled care, in the future “people will have more control over the care they receive and more support to manage their health, to keep themselves well and better manage their conditions.”

Objectives

In 2020, a pilot study took place with a sample of patients from 1 rural general practice to explore the impact of providing community patients at risk of disease-related malnutrition in adults with holistic, remote assessments. The objectives of delivering the intervention were 2-fold: to prevent exacerbation of long-term illnesses which could lead to hospital admission; and to improve the nutritional status of patients identified within the COVID vulnerable risk groups, as defined by NHS England.

Within the patient population served by the practice, there are many long-term conditions with significantly higher incidence compared to the national average—namely heart failure (690.5% against national average), COPD (222.9% against national average), and stroke and transient ischemic attacks (TIA) (190.6% against national average). Patients aged 66 to 75 years account for 18.3% of the patient population served, with patients aged 76 and above accounting for 12.5% (30.8% combined for patients aged 66 years and over).

Methodology

Prior to the pilot, ONS support started at the practice in 2018 with on-site reviews of patients currently prescribed ONS—reviewing their ongoing nutritional need, product type and dose suitability. Referrals to dietetic services were facilitated where required in line with local formulary, NICE, Malnutrition Pathway, and BAPEN guidance. Subsequent to this, in 2019 the practice worked with an clinical pharmacist from an independent clinical services provider to pilot a case finding tool seeking to identify patients at risk of malnutrition based on risk factors as per NICE, BAPEN, and Malnutrition Pathway guidance.

The initial pilot was simply to address the functionality of the tool and the appropriateness of the patients identified. The initial pilot process involved:

1. Configuration of the case finding tool using a subset of the 30 available clinical markers to identify a significant number of patients relevant to the practice’s priority areas (eg, care home residents or declining BMI) or of their area of clinical interest (eg, COPD, stroke, or elderly with recent hospital discharge).

2. Identification of the overlapping risk factors relevant to the local population including low recorded BMI and cancer diagnosis in the last 12 months as well as COPD patients to determine the study cohort.

3. Distribution of a letter to patients advising them to arrange an appointment with a practice nurse to attend for a nutritional review (feedback from the practice and the nurse was that response to this communication was low and some patients suggested the content of the letter was not relevant to their nutritional status or need).

4. Delivery of the therapy review service face to face when patients made contact with the practice.

Following on from this initial pilot, the emergence of COVID-19 in early 2020 impacted on access to healthcare and the redeployment of colleagues across the NHS (including dietitians) and as such, there was an increasing demand for remote service provision. In the absence of dietetic and nutrition specialists during this time, due to the redeployment of clinical staff and direction by NHS England to halt all non-urgent appointments, the onus was on primary care physicians and staff to support the nutritional health of the local population.
The pilot was extended to follow a new process over a period of 4 weeks as follows:

1. Re-configuration of the case finding tool to align risk factors with the NHS England “COVID vulnerable” markers, overlayed with any other original risk factor or patient demographic within the patient record (eg, weight, height, BMI, and therefore BMI trend).
2. Proactive telephone calls to patients (rather than requesting the patient to make an appointment by letter as had been trialed previously). A telephone consultation was selected over a video consultation to remove any digital literacy barriers that may occur with the use of new technology.
3. Delivery of the therapy review service via a secure remote capability that allowed for continued patient care and support to primary care practice. The practice followed emerging guidance around completing nutritional assessments remotely from The British Dietetics Association (BDA), BAPEN, and ESPEN.
4. Notes-based reviews and assessments were completed where clinically indicated.

The pilot was delivered by an independent clinical pharmacist with referrals made to the GP when clinically indicated. For patients requiring referral to a dietitian these were highlighted and noted for when dietetic service provision was resumed or urgent remote advice sought. The GP partners were involved in the approval of the case finding criteria and process sign off. Within the practice, the dispensing pharmacist involved in the program had gained an MSc in Nutritional Medicine and could be consulted where required. It is acknowledged that this would not be the case in many other practices. The pilot extension was therefore designed to deliver simple nutritional interventions in the absence of a dietitian, making clinical interventions where necessary and appropriate in line with guidance at the time for such unique circumstances where resources were stretched and limited.

The format of each remote consultation was as follows:

1. The reason for the proactive call was explained
2. Verbal consent was obtained from the patient to proceed with the discussion.
3. The significance of optimal nutritional status was explained to the patient with relevance made to their clinical conditions, for example, COPD or declining mobility.
4. A nutritional review was carried out using “MUST” and “SARC-F” screening tools (standard protocols used in the UK for malnutrition and sarcopenia assessments) as a basis with either objective or subjective criteria used in accordance with the patient’s ability to provide the necessary information.
5. Current symptom control of any underlying condition was assessed through patient discussion, review of current medications in use, and compliance with the prescribed regime.
6. The opportunity was also taken to check patient awareness of COVID-19 symptoms and their understanding of what to do in the event of feeling unwell.

**Patient Identification**

The ONS reviews were delivered by an independent clinical pharmacist working under direction of an agreed protocol authorized by the GP clinical lead at the practice. The protocol approved segmentation of patients to cohort groups for prioritization and were categorized by (1) current prescribing of an ONS product, (2) prescribing of ONS in the last 4 to 12 months or (3) those identified as at risk of malnutrition. Secure remote access to the clinical system was authorized to enable the pharmacist to carry out system interrogation and population of a data sheet to allow for the stratification of patients. The pilot study looking at the case finding element of malnutrition was the focus of the work in 2020 and as such any patients falling into the first 2 cohorts were highlighted to the practice for review within current workstreams. Of the patients identified within cohort 3 (case finding), they were further prioritized into;

- A. patients identified as coded with 1 or more “COVID vulnerable” events,
- B. patients with a last recorded BMI $<20$ kg/m$^2$
- C. patients identified as coded with 1 or more “COVID vulnerable” events and whose BMI is either last recorded within the last 12 months and greater than 20 or shows recent increase in trend toward healthy BMI.

Patients identified to be at end of life, pregnant or recent post-partum, current eating disorder, current hospitalization, tube-fed, or actively under the care of a dietitian (and therefore ONS prescription supplied via secondary care) were excluded from the segmentation.

**Results**

At the time of project commencement, the practice had a registered patient population of 6138 and following the data extraction, patients were identified within the cohort groups as follows:

1. Currently prescribed ONS (within last 3 months)—33 patients
2. Recently prescribed ONS (within last 4-12 months) —13 patients
3. Potentially at risk of malnutrition (no current or recent ONS prescribing)—977 patients
Of those patients within cohort 3, further segmentation created priority groupings:

A. 102 patients identified as coded with 1 or more “COVID vulnerable” events
B. 40 patients with a last recorded BMI <20 kg/m²
C. 19 patients identified as coded with 1 or more “COVID vulnerable” events and whose BMI is either last recorded within the last 12 months and greater than 20 or shows recent increase in trend toward healthy BMI

Forty patients within group A had a decreasing trend in BMI but last recorded metrics calculating a BMI >24 kg/m². Although a decreasing BMI trend can suggest unintentional weight loss, especially when coupled with 1 or more of the COVID vulnerable risk factors, these 40 patients were passed to the practice team for review internally.

Group C were not deemed priority and so were highlighted to the GP clinical lead for assessment as required.

Notes based review and where required, telephone consultations were completed for the remaining 102 patients (made up of 62 patients from group A and 40 patients from group B) with the resulting outcomes and actions (Figure 1). It was established at this time that by moving from a letter-based communication approach to a telephone-first approach, patient participation increased exponentially.

The average age of the patients in the 102 for review was 59 years with a range of 18 to 94 years, 68 were female, and 34 males. Of the 30 different risk factors contributing to malnutrition risk, the average number per patient within the review group was 2.3, but ranged from 1 to 7 per patient.

A final group of 60 patients formed the consultation group and were contacted via telephone. Given the imposed restrictions of many patients within this cohort due to self-isolation guidance some had found, on consideration of the questions asked, that they had experienced weight loss based on relatives’ comments, looser fitting dentures, clothes fitting more loosely, reduced appetite, etc., and, as well as this some confirmed that they had reduced mobility over recent weeks due to the lack of access to outside space or cessation of their usual errands, likely to have been impacted by loss of muscle mass. Of the 60 patients, following assessment, 39 agreed that no action was required and their current clinical status along with available accurate height and weight detail recorded. Following the first telephone consultation, 16 patients agreed to a “food-first” approach (Figure 2) for 1 month and although home scales are not deemed as accurate as clinical scales, it was requested that the patient noted their weight on that day and again in 4 weeks in readiness for the follow up discussion. This allowed for a reference point and consideration of any future amendments to treatment to be informed.

The “food-first” advice included attempting to obtain skimmed milk powder and adding 4 teaspoons into 1 pint of...
full fat milk per day and consuming this, whether that be as part of their dairy usage for example on cereal or hot drinks in addition to. Some patients were also given advice about dietary fat choices, dessert options, and simple ways to increase calorie and protein intake. Seven of the 16 patients at follow-up 1 month later had gained weight to a more suitable level and were advised they could stop the active use of the skimmed milk but to be mindful of monitoring their weight over coming weeks and to notify the practice of any concerns. The remaining 9 were also reassessed with decision and agreement made to commence ONS. There were 5 patients of the 60 consulted that were deemed to require ONS initiation at first discussion. They ranged in age group from their 20s to 80s with the lowest recorded BMI being 15 kg/m². This included patients who had last recorded BMI >25 kg/m² but a declining trend, underlying health condition risk factors, and recent periods of hospitalization due to a positive COVID-19 diagnosis and although now discharged was struggling with recovery had lost >10% body weight during the admission. They had not been prescribed ONS as part of their inpatient stay or discharge plan.

Patients were provided with directions on how to use their ONS and like the “food-first” approach were given dietary optimization advice and requested to note current weight to be reviewed in 1 month’s time. At the follow up stage, all 5 patients continued with ONS support for a further month, but some had product changes in line with changing clinical situations or compliance with previously prescribed products (Figure 3).

Fourteen patients remained in the project and were followed up for a third time after another 4 weeks (Figure 4). After reviewing the patients’ current clinical position and any changes in status, 4 patients had an increase in their ONS prescription, either by daily dose increase or product type change to provide the additional uplift required in calories and protein whilst maintaining compliance in the most cost-efficient way for the practice and locality. It was suggested to 1 patient that although they hadn’t reached their ideal weight, they had made significant progress since commencing the ONS and so suggested a decrease to a more standard shake preparation to help maintain the gained weight for a further month. The patient was wanting to instead trial without and understood it could be reinstated if he found he needed that support. One patient had additional medical complications during the month and so was now presenting with intermittent dysphagia following a stroke event and so was referred to the dietetic team. All patients otherwise were advised to continue on the current ONS regime and scheduled tasks were created within the clinical system for them to be followed up in a further month.

It was explained to patients that ONS is for short term support only and ongoing use (more than 4 months) would
suggest the need for referral to a dietitian. This detail was noted in the patients’ electronic health record (EHR) such that prescriptions didn’t continue to be issued without appropriate review or referral for more specialized support.

GP direction for ONS initiation was in line with local formulary to adopt shake-based products as first line and based on patient factors or clinical needs (ie, greater calorie or protein needs), alternatives could be used. Where ONS products were prescribed there was a range of ONS types. See Figure 5 for a summary of patient interventions at each review stage where initiated at initial consultation.

**Conclusion**

Results from the pilot at the practice and wider program activity demonstrate that patients are engaged in a proactive approach to remote assessments when using the right channels.

The program demonstrated formulary adherence to a “food-first” approach followed by appropriate prescribing and clinically appropriate amends as required at review with referral to dietitians where longer term ONS support is required. Adherence, along with the inherent improvement in the continuity of care that a proactive program of this nature provides, has a direct correlation with reduced hospital admission and therefore the potential to improve patient outcomes and generate cost savings for the NHS. This is of particular significance in the context that this pilot was carried out at a time when many people were fearful of seeking help for their health which exacerbated the need for preventative interventions. It is clear from both the literature review and the economic outcomes of the wider collaboration that there are significant cost savings to be made as a result of implementing structured and remote nutritional assessments in primary care.

With the increasing burden of malnutrition across the health and care system, funded reviews of this nature can provide the opportunity to augment, expand or enhance existing capacity within primary care; enabling practices to take a balanced approach in the consideration of how to best identify patients at risk and ensure they receive optimal care. The fact that the remote nature of this program is aligned with the vision in the NHS Long Term Plan for digitally-enabled healthcare to be an area of focus and future growth enables primary care practices to expedite the delivery of personalized care within their local populations.

The involvement of an independent clinical pharmacist with previous experience of implementing similar protocols also provided the opportunity to upskill the practice workforce through knowledge transfer and raised awareness of the importance of nutrition to an audience that has not previously been focused on this area.

The simplicity of the MUST and SARC-F nutritional screening tools reduced the need for dietetic involvement during first line consultations at a time where this resource was scarce. However, the protocol was designed to ensure that a dietetic referral was made where either long-term ONS was required or where there were complexities with a patient that required secondary care support.

From this small sample, the practice team and clinical pharmacist received positive feedback demonstrating an improved patient experience. However, more robust analysis on a wider sample and further research is required to address the system-wide benefit that these reviews and the

**Figure 5. Summary of patient interventions at each review stage where initiated at initial consultation.**
identification of adults at risk of malnutrition could deliver. There is the opportunity for development of a more sophisticated model to quantify opportunities around the role of these remote assessments in the prediction of negative health outcomes and prevention of adverse events.

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