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# Developing a consensus to support health and social care professionals and patients manage nutrition in the context of COVID-19 recovery

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## Abstract

**Background:** The long-term effects on people who have had COVID-19 affect nutrition and can be influenced by diet conversely. Specific nutritional guidelines, however, were scarce at the beginning of 2020, and empirical literature was also lacking. Conventional research methodologies needed to be adapted to review the available literature that could be relevant to the United Kingdom and policy documents as well as collect the views of health and care staff. The aim of this paper is to describe the method to develop consensus statements from experts to address the necessary nutritional support and what emerged from this.

**Methods:** A nominal group technique (NGT) was adapted to the virtual world; we purposefully selected a range of professionals (dietitians, nurses, occupational therapists, etc.) and patients with long-term effects of COVID to present them with the most updated evidence and aim to reach key guidelines to address COVID-19 recovery.

**Results:** We were able to reach consensus statements that were developed and reviewed by relevant healthcare staff at the front line to address the nutritional needs of patients recovering from COVID-19 and those suffering from its long-term effects. This adapted NGT process led us to understand that a virtual repository of concise guidelines and recommendations was needed. This was developed to be freely accessed by both patients recovering from COVID-19 and health professionals who manage them.

**Conclusions:** We successfully obtained key consensus statements from the adapted NGT, which showed the need for the nutrition and COVID-19 knowledge hub. This hub has been developed, updated, reviewed, endorsed and improved across the subsequent 2 years.

## KEYWORDS

long COVID, nominal group technique, nutrition, nutritional guidelines

### Highlights

- It is feasible to use a nominal group technique in a virtual environment with a wide range of stakeholder groups.
- Consensus statements are useful in the development of recommendations for nutritional support for COVID-19 recovery.
- The online adapted technique enabled successful engagement with patients suffering from symptoms of long COVID (e.g., fatigue, brain fog).

## INTRODUCTION

COVID-19 infection has left millions of people with symptoms after the acute infection sometimes for prolonged periods extending to months or even years, now referred to as post-COVID or long COVID. The best estimates for the proportion of people suffering long COVID symptoms are 10%–35% for people at home and up to 80% for those who were hospitalised.<sup>1</sup> Many of these symptoms affect nutritional status and can be addressed with dietary strategies.<sup>2–4</sup> Symptoms that may directly impact what and how much people eat include breathlessness, coughing, taste changes and gut symptoms. Other symptoms impact dietary intake indirectly, such as loneliness, depression and pain. Yet other symptoms may affect a person's ability to manage his or her diet and food purchases because of fatigue, 'brain fog' and social isolation.

At the start of the pandemic there was a need to provide evidence-based concise advice to support both professionals and patients. The project described in this study evolved during the pandemic to meet this need. Here we describe the consensus process used to create and develop a nutrition and COVID-19 recovery knowledge hub.

COVID-19 is a novel topic, where the body of evidence was poor or non-existent before 2020. To define the problem and reach a consensus for the most effective way to support nutritional professionals to deliver the best care, it was important to use a multidisciplinary perspective, enable a rapid and concise analysis and take a systematic approach. It was also essential to conduct this research online to meet the restrictions of infection control. Nominal group technique (NGT) could be adapted to all these needs.

Given the lack of studies at the time delineating nutritional guidance for COVID-19 recovery, an approach was needed that drew on a wide range of experts from different fields, who may need to provide nutritional advice or support. It was also essential to include the voice of the patients to ensure that their concerns and experiences were addressed. A consensus process was needed to collate the varied views and opinions into practical information to support the nutritional care of this new disease. NGT has been used widely among healthcare professions to delineate clinical guidance,<sup>5</sup> validate assessment instruments,<sup>6</sup>

produce judgement criteria for assessments<sup>7</sup> and determine treatment recommendations.<sup>8</sup>

This study describes the process, using an adapted NGT and thematic content analysis, to reach consensus statements to aid nutritional support for adults in the United Kingdom recovering from COVID-19 during an unprecedented pandemic context.

## METHODS

The University of Plymouth approved the project (REF: 20/2466). Informed consent was obtained from each panel member through an online questionnaire, which is the ethics committee's sanctioned method to obtain consent in non-face-to-face situations.

NGT aims to achieve a general agreement or convergence of opinion around a particular topic in a democratic fashion. It can be used to solve problems, generate ideas or determine priorities.<sup>9</sup> It is a structured approach to ensure balanced participation of all group members, avoiding power imbalances. It is designed to empower participants to voice their opinions which are then considered by the others. It comprises four key stages: silent generation, round robin, clarification and voting (ranking or rating).<sup>10</sup> Silent generation gives panel members time to review and consider relevant information to the topic and generate their own ideas to express to others in the round-robin stage. Clarification involves all panel members having the chance to ask questions and discuss the issues to vote upon. Finally, voting is when each idea is ranked by all participants independently. The results from voting are presented for a final clarification to reach consensus.<sup>9</sup>

### Selection of information

For the silent generation phase of NGT two essential sources of information were used to inform panel discussions.<sup>11,12</sup> First, a survey of UK-based dietitians<sup>13</sup> showed that pathways of nutritional care for patients with COVID-19 had been developed and implemented, but not universally, and that dietitians had adapted to new ways of working to manage nutritional care in patients prior to and after discharge

from hospital after COVID-19 infection. Second, a rapid systematic review<sup>11</sup> mapped the most updated evidence, guidelines or consensus statements on nutritional care for patients with COVID-19 or for similar respiratory diseases. It found that older patients are deemed at particular risk of malnutrition. Many expert groups recommended the use of nutritional management strategies applicable to other acute conditions. Traditional screening and implementation techniques need to be modified to ensure infection control measures were maintained. There was little evidence to support nutritional interventions or the nutritional management post-discharge to support long-term recovery. In addition to these two packages of work, more research and policy literature on COVID-19 recovery was sought through our professional networks (e.g., Contact, Help, Advice and Information Network [CHAIN], British Dietetics Association [BDA] and British Association of Enteral and Parenteral Nutrition [BAPEN]).

This information was organised using the structure of the nutrition care process (assessment, diagnosis, planning intervention, implementation, monitoring and evaluation<sup>14</sup>), as well as operational challenges, and presented to the panel members. The patient panel received the same information but rephrased into lay language, and information on operational challenges of service delivery was omitted.

Prior to sharing this information, the research team reviewed it and identified questions that could not be answered with research or policy evidence and needed a consensus from experts in the topic. The full list of questions can be found in Supporting Information, Table A.

## Selection of participants

Two purposefully selected expert groups were recruited, one by professional background (those supporting people with COVID-19 from health and social care) and the other by experience (patients who have had

COVID-19); both perspectives were of value in developing a resource.<sup>7</sup> Our operational definition of ‘professional’ was a health or social care professional caring for COVID-19 patients before and/or during the recovery stage. Additionally, some professionals represented important stakeholders (e.g., BAPEN and BDA Specialist interest group). An expert by experience was someone who had suffered COVID-19 infection (regardless of testing, vaccination or onset status) or had cared (outside the clinical setting) for such a person.

The criteria for inclusion on the expert panels are presented in Table 1. Both professionals and patients were recruited using an expression of interest sent out via social media or email (either via personal networks or in organisations’ communications). Professional groups targeted included occupational therapy, speech and language therapy, nursing, dietetics, physiotherapy, home carers, general practitioners and other third-sector workers. Patients were recruited through established COVID-19 support groups (e.g., social media channels, websites or online groups). The aim was to ensure that the expert panels were diverse and representative of professionals who may potentially offer dietary advice or nutritional assessment in the care of patients with COVID, and a range of patients suffering from COVID (e.g., males and Black, Asian and Minority Ethnic Communities [BAME] groups). We avoided duplicating representation from a particular professional group. We excluded professionals working in intensive care (as the most acute stage of the infection), focusing instead on rehabilitation and recovery phases.

We received 18 responses from professionals and 13 responses from patients; all were sent formal invitations to join the panels. They were asked to fill in a short online form providing basic demographic information and stating their experience and background in detail to enable us to select a diverse group for the panels. Initially, joining the expert panels was voluntary and unpaid. However, by the third meeting we were able to secure funding to offer an honorarium to those who participated in the form of cash or voucher.

**TABLE 1** Inclusion and exclusion criteria for sitting on the expert panels required for the nominal group technique.

	Professionals	Patients
Inclusion criteria	<ul style="list-style-type: none"> <li>• Direct contact with patients recovering from COVID-19 or involved in the coordination of care for these patients</li> <li>• Belonged to a specialist or stakeholder group (e.g., BDA)</li> <li>• Availability for more than one virtual meeting</li> </ul>	<ul style="list-style-type: none"> <li>• Had suffered COVID-19 infection or had cared for such a person</li> <li>• Symptoms started more than 4 weeks before the first panel (recovery phase)</li> <li>• Availability for more than one virtual meeting</li> </ul>
Exclusion criteria	<ul style="list-style-type: none"> <li>• When current experience was not directly with patients or was not involved in the recovery stage</li> <li>• Unavailable for meetings during December–March</li> </ul>	<ul style="list-style-type: none"> <li>• No access (by their own report) to an electronic device supporting online meetings and/or an unstable internet connection</li> <li>• Contracted the infection less than 4 weeks before the first meeting to prevent overburdening people with a serious illness</li> </ul>

## Adapted NGT

An adapted form of NGT, comprising five stages, was used (see Figure 1). This was designed to enable the conduct of the groups online and incorporate two groups: professionals and patients.

A summary of the selected information (see previous section) was sent to panel members prior to the panel meeting. Sending this beforehand was particularly important for patients, many of whom suffered ‘brain fog’ and/or fatigue and needed additional time to ‘silently generate’ ideas. This adaptation of silent generation has been used before<sup>6</sup> and not only helped patients but also supported professionals’ involvement, because many were under extreme clinical work pressures related to the pandemic. The questions each panel was asked to consider were similar but phrased appropriately for patients and professionals. For example, ‘How useful (and applicable to your situation) did you find the available information on dietary advice, and were there any gaps?’ was asked to patients versus ‘What are the gaps in nutrition advice where nutrition is relevant?’ asked to the professionals. Full details can be found in Supporting Information, Table A.

The panel meetings were held virtually (on zoom.us, Zoom Video Communications Inc., San Jose, CA, USA), recorded (all participants provided consent) and stored securely to support analysis. The meeting started with a brief presentation describing the highlights of the selected information. Participants were then asked to consider the nominal question (see section on selection of information) and to prepare to share ideas during the ‘round robin’ phase. One of the authors chaired each panel and

invited participants to share in turn. After the ‘round robin’, participants were invited to ask questions of each other's ideas during the ‘clarification’ phase. One of the authors kept notes and grouped ideas as they were expressed, and this grouping was also checked in the ‘clarification’ stage. Participants were then asked to rank ideas based on what they considered most important and highest priority to be included in a nutrition support resource. Ranking was completed using [Mentimeter.com](https://www.mentimeter.com) (Mentimeter AB, Stockholm, Sweden), which enabled anonymous voting. The results were presented to all participants to start the ‘discussion’ phase, but included only the top-three-ranked ideas, to then reach consensus for each nominal question. To help us develop consensus statements from the discussion, the recordings were listened to and transcribed, and thematic content analysis was completed.

## Data analysis

We produced two sets of data: the results of the nominal group process, including the voting and prioritisation; and recordings of the discussion of these findings held at subsequent meetings. The first was the series of ideas, ideas grouping and ranking results for each question. The second was a series of discussions to clarify the prioritised ideas and to reach consensus statements based on these. This data was analysed concurrently to data collection. The set of ideas described in ‘round robin’ stages were transcribed independently by two researchers (M.H. and Y.A.T.H.), and one team member (Y.A.T.H.) transcribed and thematically analysed the final discussions.

### Nominal Group Technique process used

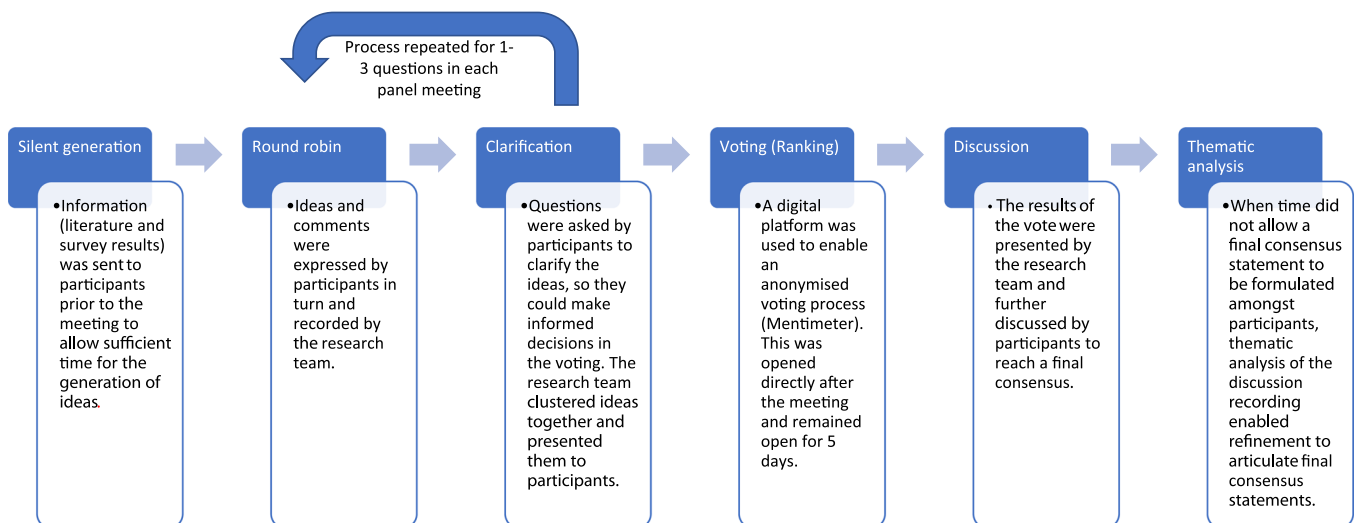


FIGURE 1 Adapted nominal group technique process.

TABLE 2 The composition of the panels.

Demographic	
<i>Patient panel</i>	
Total number	10
Gender: F:M	8:2
Age range (years)	30–59
BAME (number)	2
Level of education	
College	1
University	4
Postgraduate	5
Carers or patients	2:8
Onset of COVID-19 symptoms (earliest to latest)	February 2020 to April 2020
State financial support pre-pandemic <sup>a</sup>	1
<i>Professionals</i>	
Total number	13
Gender: F:M	12:1
Area of work <sup>b</sup>	
Academic	2
Acute	4
Community	7
Charity/patient advocate	2
Profession or health sector	
Nutrition and dietetics <sup>c</sup>	5
Nursing (representing BAPEN and Royal College of Nursing [RCN])	1
Occupational therapy	1
Speech and language therapy	1
Pharmacy	1
Psychology	1
Social care <sup>d</sup>	2
Patient representative <sup>e</sup>	1

Abbreviations: MRC, Medical Research Council; NICE, National Institute for Health and Care Research; NIHR, National Institute for Health and Care Excellence; UKRI, UK Research and Innovation.

<sup>a</sup>Housing benefit, pension credit, universal credit and so forth.

<sup>b</sup>Some participants had dual roles; therefore, these numbers add up to more than 13.

<sup>c</sup>Leading the management of COVID-19 patients, prescribing support and older adults, representative of BDA, nutrition support and other acute specialities, private practice including community and hospice care settings.

<sup>d</sup>Food provision charity and care home representative.

<sup>e</sup>Had sat on panels as a patient representative for NICE, MRC, NIHR and UKRI.

Votes were quantitatively analysed according to McMillan<sup>9,15</sup> and Foth<sup>16</sup>; we found relative homogeneity in our patient and professional groups, who were asked similar questions but from different perspectives. To reach a consensus and following other authors,<sup>9,16,17</sup> we selected the top-three-ranked ideas to prompt discussions. These discussions enabled the formulation of consensus statements, and then thematic analysis, using content analysis,<sup>18,19</sup> of the discussion recording enabled refinement to articulate the final consensus statements (see Figure 1). The data analysis was iterative and informed the questions asked to both panels; the analysis slightly modified the questions after each panel and before the next. An example of this was a recurring theme within the patient panel: the lack of consistency of advice provided by healthcare professionals. After this analysis, a question was developed by the research team to ask the professional panel how they thought consistency in the advice could be achieved. In this way, the patient meetings informed what we asked professionals and vice versa.

## RESULTS

### Description of participants and panel meetings

Table 2 presents the characteristics of each panel. Of the 13 patients invited, 3 withdrew due to illness. Although efforts were made to recruit participants from high-risk groups (e.g., older, male, multiple morbidity and BAME) and carers as well as patients, our patient panel was relatively homogenous. Most were female and white British, contracted COVID-19 at the start of the pandemic, were highly educated and middle aged. All patients had long COVID. This does not wholly represent those documented to suffer most severely with COVID, those who are males, those with co-morbidities and older adults. Nevertheless, more recent evidence suggests that females are more likely to develop long COVID health issues.<sup>20</sup>

Of the 18 professionals invited, 5 withdrew due to competing commitments. This panel was professionally diverse, with eight professional groups represented. We were unable, although we tried repeatedly, to get a general practitioner or physiotherapist, probably due to extreme work pressures at the time. We, therefore, included additional dietitians, who had an obvious interest and expertise in the provision of nutritional care, to join the panel. Three panel members also had suffered COVID-19 infection and so had a patient perspective as well. The professionals were involved in caring for COVID-19 patients either



TABLE 3 The final questions asked to the panels to rank and their top-ranked responses.

Professional panel		Patient panel	
Question	Top-ranked responses	Question	Top-ranked responses
Select three ideas that you think are most clinically impactful and useful to include as part of the design of the pathway of nutritional care	<ol style="list-style-type: none"> <li>1. Outcomes should be patient centred and holistic (more than just nutritional outcomes)</li> <li>2. Person-centred nutritional care (not just malnutrition risk)</li> <li>3. Self-screening and self-assessment of nutritional risk and swallowing, (e.g., EAT-10)</li> </ol>	Please prioritise and rank the following items regarding aspects of care related to nutrition for COVID-19 recovery	<ol style="list-style-type: none"> <li>1. Focus on finding and addressing underlying mechanisms (causes) instead of addressing symptoms</li> <li>2. Use a comprehensive battery of tests and methods (not only routine or traditional) to screen and assess symptoms that are linked to nutrition and diet</li> <li>3. Keep a record or (a user-friendly) app focused on tracking symptoms' fluctuations (hourly or daily) to reach a decision on how to address them</li> </ol>
Select three ideas that you think are most clinically impactful and useful to include as part of the implementation of the pathway of nutritional care	<ol style="list-style-type: none"> <li>1. Whole systems approach – role of champions in care homes and other settings</li> <li>2. Support to enable social care and the voluntary sector to deliver nutritional care</li> <li>3. Pathway implementation should incorporate best practice and evidence</li> </ol>	Please prioritise and rank the following items regarding barriers for nutritional support in COVID-19 recovery	<ol style="list-style-type: none"> <li>1. Health Practitioners offer contradictory and inconsistent advice, and only a few advocate for patient care and referral</li> <li>2. There is little or no follow-up to issues, tests, types of treatments (i.e., diets) and a symptomatic (and one at a time) approach</li> <li>3. Access to post (long) COVID clinics and virtual support is still limited</li> <li>4. Addressing your mental health concerns should be considered and linked to long COVID rather than treated as symptom and dismissing patients</li> </ol>
		Please prioritise and rank the following items regarding strategies and enablers to nutritional support in COVID-19 recovery	<ol style="list-style-type: none"> <li>1. All HCPs, particularly those seeing long COVID patients, must apply national protocols, clear pathways and NICE guidelines, in a coordinated way</li> <li>2. To provide patients with reputable information on pathways, and advice to request and raise concerns with HCPs to delineate tailored health goals</li> <li>3. HCPs must be trained in nutrition and diet as preventive, treatment and complementary strategies</li> <li>4. All HCPs should be patient advocates and recognise a more holistic approach, including nutrition as foundation</li> </ol>
What are the gaps where nutrition is relevant and how to address it?	<ol style="list-style-type: none"> <li>1. A 'pick and mix' of practical advice for patients, carers, health and support staff, e.g., support toolbox based on symptoms, situation, barriers</li> <li>2. Joint problem-solving multi-professional discussions to direct decisions about nutritional requirements and include cultural and religious preferences</li> <li>3. HCPs and others (Age UK, social prescribers, etc.) to know</li> </ol>	Please prioritise and rank the following items regarding issues to address for the resource to support nutritional care for COVID-19 recovery	<ol style="list-style-type: none"> <li>1. To receive a more consistent health service for long COVID and nutrition than that currently offered</li> <li>2. Explain the importance and frequency to assess vitamin levels and more support in monitoring this</li> <li>3. Joint healthcare and make sure everything is registered in medical records</li> <li>4. Follow myalgic encephalomyelitis guidelines and expertise,</li> </ol>

TABLE 3 (Continued)

Professional panel		Patient panel	
Question	Top-ranked responses	Question	Top-ranked responses
	<p>what access they, patients and carers, have to signpost rather than relying on general practitioners</p> <p>4. Create a symptom-based, patient-led assessment, for HCPs and non-HCPs, and resources to overcome nutritional issues and most individual bothersome symptoms</p>		<p>particularly for exercise and nutrition</p>
Essential questions from first HCP contact	<ol style="list-style-type: none"> <li>1. Assess current food intake and ability to manage diet: <ul style="list-style-type: none"> <li>• Appetite and interest in eating</li> <li>• Actual food consumption</li> <li>• Taste changes and distortion</li> <li>• Use of nutritional supplements</li> <li>• Recipes for all kinds of situations (cannot cook, will not cook, etc.)</li> <li>• Food accessibility</li> <li>• General challenges for eating and drinking</li> <li>• Previous underlying conditions affecting COVID-19 recovery</li> <li>• Current dietary and nutrition knowledge and preferences</li> <li>• Identifying poor nutrition and offer to add nutritional value to their current diets</li> </ul> </li> <li>2. Assessment of living situation. Do they have appropriate support for their nutritional care?</li> </ol>	Rank these ideas based on what you think is the most important to offer consistent dietary advice	<ol style="list-style-type: none"> <li>1. Consistent advice based on symptoms and diagnoses; empowering patients to know how to adjust diet in response to symptoms so patients can respond consistently</li> <li>2. Holistic patient-centred approach, with a multidisciplinary professional input</li> <li>3. Consistency in messaging from HCP and operating in a consistent way (blood tests, frequency of monitoring, etc.)</li> </ol>
How to ensure follow-up with patients	<ol style="list-style-type: none"> <li>1. Assess patients' abilities as well as expectations from health services</li> <li>2. By empowering and/or delegating social prescribers, dietetics assistants, healthcare workers, volunteers with knowledge that can work for patients' benefit</li> <li>3. Transferring some responsibility to pharmacy</li> <li>4. Signpost to support groups in the community or community organisations</li> <li>5. Telehealth for some; phone and video calls short but frequent to see how they get on</li> <li>6. To explicitly say what services can support them</li> <li>7. Patients to be able to re-refer themselves into a service</li> <li>8. Consider the key role of family in help keeping a symptom calendar or diary</li> </ol>	Select two topics that you think are most important to cover in a potential question and answer session to dispel myths about nutrition and diet related to COVID-19	<ol style="list-style-type: none"> <li>1. How can I decrease inflammatory reactions in my body through diet? Is it even possible?</li> <li>2. How can I link my diet with my symptoms and body reactions? (tracking without obsessing)</li> <li>3. Key vitamins and how we can increase our levels</li> </ol>

(Continues)



TABLE 3 (Continued)

Professional panel		Patient panel	
Question	Top-ranked responses	Question	Top-ranked responses
	<ol style="list-style-type: none"> <li>Use social media channels and apps (to provide prompts and friendly triggers across their recovery journey)</li> </ol>		
Operational needs and care provision improved	<ol style="list-style-type: none"> <li>Tiered approach based on risk assessment or screening?</li> <li>Review cycle</li> <li>Adapting resources for people with learning disabilities</li> <li>Listening to patient desires and concerns; do not neglect due to age</li> <li>Making time and show interest</li> <li>Be mindful of cultural aspects of language and English diets</li> <li>Assign clear responsibility for follow-up</li> <li>Avoid medical jargon</li> <li>Everything in partnership with patients</li> </ol>	What would you have liked to be asked (by healthcare staff) regarding nutrition and diet for your COVID-19 recovery?	<ol style="list-style-type: none"> <li>Healthcare practitioners to consider diet as an influencing factor for COVID-19 recovery regardless of specialty</li> <li>To ask about nutrition-related symptoms (e.g., digestive symptoms) regardless of whether this is shown in tests</li> <li>Conversations about what steps to take given symptoms and about nutritional care</li> </ol>

Abbreviation: HCP, healthcare professionals.

directly, managing a service, researcher or involved in professional body response to the pandemic.

Panel meetings were held online between December 2020 and March 2021. Two professional panels were held first, then two patient panels, followed by a final professional and a final patient panel. Our strategy to enable 'silent generation' by sending information before the meeting proved beneficial, with various participants supporting this approach. Participants were given the chance to ask questions briefly at the start of each meeting to clarify any of the content before 'silent generation' commenced.

### Selection of final consensus statements

We held three virtual meetings per expert group using the same methodology. These lasted between 90 and 150 min, enabling between one and three NGT cycles to be completed in each meeting. Each meeting was facilitated by one author, with two or more others observing and taking notes. The details of the questions discussed at each meeting and the ideas produced are presented in Supporting Information, Table A. Table 3 presents the final top-ranked ideas from the final ranking exercise in each meeting.

The aim of the consensus process was to explore what resource could support the nutritional care of individuals with COVID-19 infection. These results shaped the creation and development of the nutrition and COVID-19 recovery knowledge hub.

## DISCUSSION

At the start of the COVID-19 pandemic in the summer of 2020, little was known about the nutritional consequences of COVID-19. Nevertheless, many expert groups issued guidance, and it was widely accepted that the risk of malnutrition was increased in many groups. This project attempts to draw together the evidence and advice available regarding COVID-19 and nutrition by focusing on what was important to patients and professionals. As the project progressed, post-COVID syndrome or long COVID emerged, and with the passage of time, the scale and severity of this after-effect has become apparent. The emergence of long-COVID influenced the development of this project and the types of the information people wanted.

NGT has been followed under 'normal' circumstances by researchers trying to identify priorities to manage certain population groups,<sup>17</sup> develop evidence-based guidelines for disease treatment,<sup>5</sup> select key attributes for a drug therapy,<sup>8</sup> to name a few examples. These studies have highlighted some limitations, such as obtaining a large number of ideas, agreeing on controversial topics<sup>17</sup> and ranked priorities becoming obsolete.<sup>5</sup> Despite these limitations and as noted also by these authors, NGT was selected for the present study as a feasible, transparent, systematic, egalitarian and rapid method to obtain and rank ideas and opinions from a range of people about a number of issues which need a tailored approach and democratic decisions.

The adapted consensus process described here enabled professionals and patients to convene safely online and for the development of consensus statements to guide the development of a nutrition and COVID-19 recovery knowledge hub. The first stage of the NGT is to bring together the relevant information. In this situation there was little information available due to the novel nature of the virus. We therefore also explored relevant information from other infectious diseases (e.g., pneumonia). The rapid review<sup>11</sup> found a proliferation of guidelines for acute care but relatively limited information for community care. We also surveyed<sup>12</sup> the dietetic profession to understand what actions were being taken to support nutrition and what the requirements were in practice. This focused our recruitment strategy on community and primary care healthcare professionals who were dealing with cases who remained at home or had continued symptoms after overcoming the acute phase. We also realised that many support groups were established for patients and those who responded were those suffering from long COVID.

The adapted process for NGT had the potential to enable a wide range of professionals and patients to join the research process. This will prove a major advantage in the future to bring much more disparate groups together, including those whose symptoms, geographic location, work pressures or economic situation would otherwise prevent or dissuade them from joining such a consensus process. This advantage is limited to those with the knowledge and confidence to use the available technology for this purpose. The pandemic has vastly increased the global population's awareness and abilities in this respect. Those without access to the available technology would continue to be excluded from online processes described here.

Data analysis is an iterative process, and we observed how our original ideas evolved when presented to the two panels. The key finding from professional experts was that they agreed with the idea of developing a resource that benefits and supports them in advising and or signposting patients to nutrition and dietary resources. They also agreed that it needed to be highly accessible, flexible, adaptable and based on the latest research and policy. Realistically this nutrition advice and information would be applied by non-nutrition expert health and social care workers in primary care, charities and care homes, including registered staff and support workers. Therefore, the consensus was that a toolbox with different approaches based on the patient was going to be the most effective resource to map out nutritional support.

A key finding from the patient panel was that a large volume of misleading information on nutrition and diet was available, and help was needed to find reliable trustworthy information. This further supported the idea of a flexible and adaptable repository of quality information which could be accessed freely.

Patients also agreed that accessing care for post-COVID syndrome was challenging and the nutritional expertise of the healthcare professionals was frequently limited. Thus, the two panels achieved consensus on the type of resource required, a flexible offering which could support the needs of patients with widely differing symptoms and disease patterns, which was reliable and contained the best-available evidence and which supports healthcare professionals to provide the right support.

We demonstrated the feasibility of using an adapted version of NGT to reach consensus rapidly, as well as to map out what information would be valuable for targeted audiences in the context of lockdowns. Our main research output (known as nutrition and COVID-19 recovery knowledge hub) intends to be a source of evidence-based information for professionals working in the community or out-patients as well as patients. It is designed around the consensus statements derived from the panel discussions. This is a web-based resource freely available to meet the need for information.

The hub has been peer reviewed by both professionals and patients to enhance its acceptability and content. Patients and professionals completed a systematic review of the hub content and structure using a questionnaire designed for the purpose. We targeted professionals who were unable to attend the panel meetings, including general practitioners and physiotherapists. The research team also had critical discussions to amend sections before launching this hub and continues to implement a peer review process for new information. Six organisations endorsed the hub, demonstrating our processes met recognised standards.

## Limitations

Our time and financial resources were constrained to the available funding and therefore limited; thus, coding and analysing was conducted by one researcher only. Patient recruitment was conducted mostly through electronic resources (email and social media); therefore, we cannot say we included a representative sample of patients recovering from COVID-19. There were clear selection biases towards female gender, those suffering long COVID, and those with high educational attainment and professional roles.

## Strengths

This project was a rapid response to an essential requirement during an unprecedented pandemic. We recruited a variety of health and care professionals with different roles and range of experiences to develop consensus statements and to review our final resource.

We used a systematic approach to review the evidence base included in the background information both to our panels and our public knowledge hub.

NGT was selected given its flexibility to embrace a relatively new topic (drawing different ideas from different perspectives), combine steps, group ideas and vary the number of participants, and it was the most time-effective method to obtain rapid results. Other advantages are that group divergences or similarities can be compared; individual contributions are valued more than other methods<sup>9</sup>; and it could be adapted to the pandemic context, where meetings were recommended to be held virtually. The NGT is an optimal method when there is a lack of a theoretical body of knowledge on a topic,<sup>7</sup> which is the case for the COVID-19 infection. Finally, we conducted an adapted version of the technique rigorously and transparently.

## CONCLUSION

Following a robust methodology and systematic approach, we successfully applied NGT to obtain consensus statements to guide optimal nutritional support for both healthcare professionals who care for COVID-19 sufferers in the recovery stage and COVID-19 patients themselves.

## AUTHOR CONTRIBUTIONS

Anna Julian, W. C. Elizabeth, Gary Frost, Jane Murphy and Mary Hickson conceived the research idea and methods. Anna Julian, W. C. Elizabeth, Jane Murphy, Mary Hickson and Yessica A. Tronco Hernandez participated at various moments and in different roles during the data collection process. Yessica A. Tronco Hernandez and Mary Hickson followed all the data analysis process. Yessica A. Tronco Hernandez wrote the first draft, and all authors provided comments. All authors reviewed and agreed to the final manuscript.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.


## DATA AVAILABILITY STATEMENT

Research data are not shared.

## ETHICS STATEMENT

Ethical approval was granted by the University of Plymouth, Faculty of Health Research Ethics and Integrity Committee (REF: 20/2466).

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## PEER REVIEW

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jhn.13163>.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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