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1   **Abstract**

2   *Background:* Evidence-based guidance on choosing Food-Based (FB) strategies, Oral Nutritional  
3   Supplements (ONS) or Combined Interventions (COMB) in the management of adult malnutrition  
4   is lacking and systematic reviews of their relative efficacy have been discordant. This study aimed  
5   to assess comparative use of each approach in the oral nutritional support practice of UK dietitians,  
6   and to assess the factors which influence these clinical decisions, as previously unknown.

7   *Methods:* A cross-sectional, anonymous, national survey of UK dietitians.

8   *Results:* The number of completed responses received was 207 (3% response rate). More dietitians  
9   reported using COMB (n=129, 62%) over FB (n=70, 34%) or ONS alone (n=8, 4%) (n=207,  
10   p<0.001). Intervention choice was associated with clinical setting (n=207, p<0.001) where  
11   dietitians working in the community reported more frequent use of FB or ONS alone (n=48, 59%  
12   FB or ONS alone vs. n=34, 41% COMB) compared with acute dietitians (n=83, 78% COMB vs.  
13   n=24, 22% FB or ONS alone). Intervention choice was also associated with clinical speciality  
14   (n=207, p=0.017), such that specialist nutrition support dietitians reported more frequent use of FB  
15   or ONS alone (n=22, 54% FB or ONS alone vs. n=19, 46% COMB) compared with non-specialist  
16   (n=17, 45% FB or ONS alone vs. n=21, 55% COMB) and other specialist dietitians (n=39, 30% FB  
17   or ONS alone vs. n=89, 70% COMB). In general, the factors reported as having the greatest  
18   influence on intervention use were ease of implementation (n=192, 93%), departmental protocols  
19   (n=184, 89%), professional management pathways (n=179, 87%) and published research (n=165,  
20   80%). Patient circumstances (n=117, 57% and n=99, 48%) and ease of implementation (n=35, 17%  
21   and n=48, 24%) were reported as most influential in the first and second case scenarios  
22   respectively.

23   *Conclusions:* There are inconsistencies in oral nutrition support practice amongst UK dietitians. A  
24   lack of clear, evidence-based guidelines for choosing oral nutrition support approaches is causing  
25   dietitians to rely solely on their clinical judgement. Overall, dietitians' opinions favoured FB  
26   strategies while their reported clinical practice suggested COMB approaches were used most often.  
27   Ideally evidence-based practice should augment clinical judgement, therefore, there remains a need  
28   for further research to support this and patient-centred approaches in the management of adult  
29   malnutrition.

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## 32    **Introduction**

33            Approximately three million people in the UK are either malnourished or at risk of  
34    malnutrition <sup>(1, 2)</sup>, with 93% of these living at home <sup>(2, 3)</sup>. Adult malnutrition is associated with  
35    poorer nutritional, clinical and patient-centred outcomes as well as increased strain on health and  
36    social care budgets, much of which results from longer hospital stays and an increased likelihood of  
37    readmission <sup>(4-7)</sup>.

38            National and international clinical guidelines recommend nutritional intervention in the  
39    management of adult malnutrition based on evidence of improved nutritional status, quality of life  
40    (QOL) and functional outcomes <sup>(8-19)</sup>. Dietitians are uniquely skilled in providing nutritional  
41    support to malnourished patients and employ mainly food-based, oral nutritional supplements, or  
42    combined (FB/ONS/COMB) approaches when oral intake is safe and possible. Although clinical  
43    guidelines specify when it is appropriate to use oral nutrition support interventions, there remains a  
44    lack of evidence-based guidance on which approach (FB/ONS/COMB) to use. Several systematic  
45    reviews have sought to determine the relative efficacy of oral nutritional support interventions but  
46    studies were heterogeneous and of variable quality with some findings being discordant <sup>(20-23)</sup>  
47    resulting in confusion amongst clinical decision-makers and presenting a challenge to the  
48    implementation of evidence-based dietetic practice <sup>(24)</sup>. In the absence of evidence, other factors,  
49    including organisational priorities may be guiding the choice of intervention rather than patient-  
50    related considerations.

51            A lack of evidence-based guidance potentiates inconsistent management of adult  
52    malnutrition in clinical settings and the impact on patient care remains unknown. There were  
53    previously no data indicating the frequency with which FB/ONS/COMB interventions are used or  
54    the factors which influence clinical judgement in choosing amongst them. Discordance in the  
55    published literature in this area leaves the relative efficacy of FB/ONS/COMB interventions  
56    uncertain. It is conceivable that in practice, clinical decisions around the choice of oral nutrition  
57    support intervention may be influenced by an array of factors combined with the individual clinical  
58    judgement of the dietitian. Clinical decisions based primarily on clinical judgement and individual  
59    professional opinion are potentially highly variable, making it difficult to quantify their clinical  
60    effectiveness. Given the high prevalence of malnutrition in adults, and the fact that oral nutritional  
61    support is the preferred first-line approach in its clinical management, understanding of current  
62    dietetic practice in the use of oral nutritional support interventions and characterisation of the  
63    factors which influence clinical judgement during their practical application, was merited. This  
64    would give some indication of what dietitians are doing in practice in order to inform future

65 research into the relative efficacy of FB/ONS/COMB interventions. Clear evidence-based guidance  
66 resulting from this could potentially be translated into improvements in patient care. Furthermore,  
67 clinical judgment and evidence-based practice could and should be employed in collaboration.  
68 Therefore, this study aimed to assess clinical practice when prescribing oral nutritional support  
69 amongst UK dietitians, and to examine the factors which influence clinical decisions.

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## 88    **Methods**

89            A cross-sectional, anonymous, online survey of UK dietitians was used. Ethical approval  
90    was obtained from the City, University of London's School of Health Sciences Research Ethics  
91    Committee.

### 92    *Survey development*

93            A questionnaire was developed specifically for this study. Face and content validity were  
94    established <sup>(25)</sup> by piloting the survey using both subject experts (n=4) and clinical dietitians (n=3)  
95    currently practising in this area of dietetics, nominated by the subject experts. Subject experts were  
96    asked to assess the content validity of the questionnaire using a separate content validity assessment  
97    form (Appendix S1) based on published recommendations, which required rating of each  
98    questionnaire item on 4 x 4-point scales according to its relevance, clarity, simplicity and ambiguity  
99    within the questionnaire<sup>(25)</sup>. Free text space was also provided after each section for qualitative  
100   feedback. For each assessment criterion, questionnaire items which scored 4 by a majority of  
101   subject experts remained unmodified; those which scored between 1 and 3 were revised as  
102   suggested in the free-text feedback and those which scored 1 for "relevance" by a majority of  
103   subject experts were removed from the questionnaire altogether. During the content validity  
104   assessment phase, the subject experts were asked to nominate one clinically practicing dietitian to  
105   be invited to participate in the next phase of the questionnaire, in order to maintain objectivity.  
106   Following content validity assessments, the questionnaire was then assessed for face validity and  
107   piloted by a small sample of dietitians (n=3) to ensure clarity, comprehension and ease of access  
108   prior to national distribution. As clinical dietitians regularly using nutrition support to manage  
109   disease-related malnutrition, they were asked to comment on the ease of access, readability, logical  
110   flow and time taken to complete the questionnaire. A pilot and face validity assessment form was  
111   used (Appendix S2). Any required changes to the survey highlighted during the piloting phase  
112   were made prior to national distribution.

113            The final questionnaire comprised forty-six questions including one consent question, six  
114   study eligibility questions and thirty-nine survey questions divided into seven main sections  
115   (Appendix S3). Section A comprised questions about professional/career history and current job  
116   role. Sections B-D asked about usual dietetic practice and the factors which influence clinical  
117   decisions when choosing oral nutrition support interventions in the management of adult patients  
118   who are malnourished or at risk of malnutrition. In sections E-F, participants were then asked to  
119   work through two short hypothetical scenarios designed to reflect common clinical cases

120 encountered in dietetic practice. The survey questions included a mixture of closed questions with  
121 categorical responses, statements with possible responses measured on a Likert-type scale, ranked  
122 order responses measured on a 6-point ordinal rating scale and open-ended questions.

123 The online survey-based software Smart Survey (Smartline International Ltd, Tewkesbury,  
124 Gloucestershire, U.K.) was used for distribution.

### 125 *Sampling and recruitment*

126 The study population was UK registered dietitians. A convenience sample of dietitians who  
127 were active members of the British Dietetic Association (BDA) formed the sampling frame, which  
128 covered a broad demographic range and professional practice area. Dietitians were approached via  
129 an email invitation distributed by the BDA and a survey link shared via the BDA's social media  
130 platforms. A reminder was sent one month later via the BDA's monthly members' E-zine, social  
131 media platforms and BDA Specialist groups.

132 Inclusion criteria comprised dietitians who were registered with the Health & Care  
133 Professions Council (HCPC), currently practicing within the UK, and regularly seeing adult patients  
134 who were malnourished or at risk of malnutrition requiring oral nutrition support. Exclusion criteria  
135 comprised non-practising dietitians, retired dietitians, paediatric dietitians, exclusively academic  
136 dietitians, student dietitians and dietitians practicing outside of the UK. All participants were asked  
137 to complete a short questionnaire to establish study eligibility as inclusion criteria were self-applied  
138 within the survey. Those who met the exclusion criteria were redirected to a 'Thank You' page,  
139 whilst those meeting the inclusion criteria were directed to the questionnaire. A Participant  
140 Information Sheet (PIS) at the start provided details of the study. The survey remained open for  
141 approximately two months from August 2014.

### 142 *Statistical analysis*

143 Prior to national distribution, possible responses to closed-ended questions were pre-coded  
144 for entry and analysis in IBM SPSS Statistics, Version 19 (SPSS, Chicago, Illinois, USA).  
145 Responses to open-ended questions were not pre-coded and are not presented in this report.  
146 Descriptive statistics were used to describe the overall data set and frequencies for the categorical  
147 data <sup>(26)</sup>. For continuous variables, tests of normality were conducted using the Shapiro-Wilk test.  
148 Medians and interquartile ranges were used to describe continuous, non-parametric data <sup>(26)</sup>. Data  
149 from partially completed questionnaires were discarded. For analyses relating to the two case  
150 scenarios, where dietitians were unable to make a decision on an oral nutrition support intervention

151 and stated they would require further information to do so, the data were excluded. For both case  
152 scenarios, the sample was too small to reliably investigate any association between country of  
153 training, geographical location and choice of oral nutrition support intervention. Data were  
154 summarised as counts and percentages and analysed using Chi-Square tests for categorical data, and  
155 the non-parametric Spearman Rank correlation, Mann Whitney U test and Kruskal Wallis test  
156 where appropriate, all with  $p < 0.05$  indicating statistical significance. Chi-square tests were  
157 considered valid and reported only if the proportion of cells with expected values of less than 5 was  
158 below 20%. A multiple regression approach to analysing contingency tables <sup>(27)</sup> was used to  
159 conduct post hoc analyses for the Chi-square tests.



## 160    **Results**

161    A total of 279 individuals completed or partially completed the survey. Data for 46 individuals who  
162    only partially completed the survey were discarded. Of the 233 remaining participants, 228  
163    consented to participate and were directed to complete the survey. Data on five individuals who did  
164    not consent and/or did not meet the eligibility criteria were excluded. A total of 207 dietitians  
165    successfully completed the survey.

166    BDA membership at the time of the survey was 7,551 members, including 6486 UK-based, fully  
167    practicing members. A total of 6176 emails were sent out, of which 6029 were delivered.  
168    Approximately 20% of recipients opened the email and 6% (n=379) clicked on the survey link. A  
169    broad estimate of the response rate on the basis of the number of email invitations delivered  
170    (n=6029) and number actually commencing the survey (n=279) is 5%. However, as only 207  
171    surveys were fully completed, a more appropriate estimate of the response rate is 3%.

172    The main characteristics of the survey respondents are summarised in Table 1. A supplementary  
173    extended version of this table is available in Appendix S4.

### 174    *Dietitians' opinions about oral nutrition support practice:*

175    Dietitians' opinions, represented by their level of agreement or disagreement with statements  
176    relating to the choice of an oral nutrition support intervention for adult patients who are  
177    malnourished or at risk of malnutrition, are summarised in Table 2. Eighty one percent (n = 188) of  
178    dietitians surveyed agreed (n=83, 40%) or strongly agreed (n=84, 41%) that a food first approach  
179    should be adopted in the management of nutritionally vulnerable patients. Most dietitians (87%, n  
180    = 179) mildly disagreed, disagreed or strongly disagreed that ONS should be used as a first-line  
181    strategy. There was no clear distinction between responses to the statement that suggested a  
182    combined approach should be used first, with 54% (n = 111) of dietitians expressing agreement  
183    (mildly agreed, agreed, and strongly agreed) and 46% (n = 96) expressing disagreement (mildly  
184    disagreed, disagreed, and strongly disagreed). Overall eighty three percent (n = 171) of dietitians  
185    agreed with the statement that current oral nutrition support practice is evidence-based and an  
186    overwhelming majority (98%, n= 203) also agreed with the statement that oral nutrition support is  
187    largely based on the clinical judgement of the dietitian. Most dietitians (89%, n = 185) disagreed  
188    with the statement that ONS are clinically superior to FB approaches whilst nearly all dietitians  
189    surveyed (98%, n = 203) agreed that FB strategies may improve outcomes. Furthermore, there was  
190    a negative correlation between dietitians' total number of post-qualification years practicing and the  
191    opinion that ONS should be used as a first-line strategy ( $\rho=-0.154$ ,  $n=207$ ,  $p=0.027$ ) and likewise

192 a negative correlation between dietitians' total number of post-qualification years practicing and the  
193 opinion that FB strategies improve outcomes. ( $\rho=-0.143$ ,  $n=207$ ,  $p=0.040$ ).

194 ***Modes of patient contact used by dietitians:***

195 Respondents were asked to indicate the healthcare setting in which patients requiring oral  
196 nutritional support were most usually seen. The results are summarised in Table 3. Most contact  
197 for both first appointment and review appointments took place in the hospital setting, with face-to-  
198 face ward visits (or equivalent) or the outpatient clinic setting being reported as the most frequently  
199 used mode of contact for both new (48%,  $n=99$  ward and 25%,  $n=51$  outpatient) and review (45%,  
200  $n=94$  ward and 23%,  $n=48$  outpatient) patients requiring oral nutrition support. Both domiciliary  
201 visits and telephone consultations were used less frequently for both new patients and those being  
202 reviewed (21%,  $n=43$  and 17%,  $n=34$  respectively for domiciliary visits, and 5%,  $n=10$  and 13%,  
203  $n=27$  respectively for telephone consultations).

204 ***Types of oral nutrition support interventions most often used:***

205 When asked which type of intervention was used most often in the management of a patient at  
206 nutritional risk, 129 (62%) dietitians reported that they use COMB interventions more often than  
207 FB alone ( $n=70$ , 34%) or ONS alone ( $n=8$ , 4%) interventions. Analysis of responses according to  
208 work setting showed that dietitians working solely in the primary care setting were more likely  
209 ( $p<0.001$ ) to use FB or ONS alone as individual interventions ( $n=48$ , 59%) over COMB  
210 interventions ( $n=34$ , 42%), whereas those based in the acute setting were more likely ( $p<0.001$ ) to  
211 use COMB interventions ( $n=83$ , 78%) rather than either FB or ONS interventions alone ( $n=24$ ,  
212 22%) as shown in Figure 1. In fact, of the 48 community dietitians who reported using FB or ONS  
213 alone, all reported using FB most often, and none selected ONS as their most frequently used  
214 intervention. There was no difference in the reported relative use of COMB interventions ( $n=19$ ,  
215 46%) versus individual FB or ONS interventions ( $n=22$ , 54%) amongst specialist nutrition support  
216 dietitians ( $p=0.062$ ), and non-specialist dietitians ( $p=0.611$ ). However, dietitians working in other  
217 specialities were more likely ( $p=0.024$ ) to use a COMB intervention ( $n=89$ , 70%) over a FB or ONS  
218 intervention alone ( $n=39$ , 31%). There were no associations between frequency of use of particular  
219 interventions (COMB or FB/ONS only) and Agenda for Change (AfC) banding, geographical  
220 location, country of training or membership of a BDA specialist group.

221 ***Factors influencing practice around oral nutritional support of dietitians:***

222 Dietitians rated the influence of 9 factors potentially related to oral nutritional support practice, as  
223 well as suggesting any additional factors. Ratings of the influence of each factor, ranging from no  
224 influence to strong influence, are summarised in Table 4. Ease of implementation, departmental  
225 protocols, professional management pathways and published research were rated as having the  
226 greatest influence (moderate or strong influence) on practice (93%, n=192; 89%, n=184; 87%,  
227 n=179 and 80%, n=165 respectively). Cost to the healthcare provider, cost to the patient and 'The  
228 Multidisciplinary Team (MDT)' had a "moderate influence" on practice (50%, n=103, 49%, n=101  
229 and 36%, n=75 respectively). Work colleagues mainly exerted a "minor influence" (48%, n=100)  
230 on the dietitians surveyed, while the influence of a professional mentor was split between "no  
231 influence" (24%, n=50), "minor influence" (34%, n=70) and "moderate influence" (36%, n=75).  
232 Many dietitians (73%, n=152) did not report an additional influential factor. Some (18%, n=37) did  
233 report additional influential factors, given as open-ended responses, which are not presented in this  
234 report. Furthermore, there was a positive correlation between the total number of post-qualification  
235 years practicing and the influence of published research ( $\rho=0.144$ ,  $n=207$ ,  $p=0.039$ ) and a  
236 negative correlation between the total number of post-qualification years practicing and the  
237 influence of a professional mentor ( $\rho=-0.186$ ,  $n=207$ ,  $p=0.007$ ). The number of post-qualification  
238 years of practice was also positively correlated with dietitians' confidence in oral nutrition support  
239 ( $\rho=0.248$ ,  $n=207$ ,  $p<0.001$ ).

#### 240 ***Choice of intervention and influences in theoretical case scenario 1 (community-based patient):***

241 The first case-based scenario (see Appendix S1) involved an older male patient with conservatively  
242 managed oesophageal and gastro-oesophageal junction adenocarcinoma living alone and referred  
243 for poor oral intake (currently only managing 625kcal, 22g protein per day) and clinically  
244 significant (9%) weight loss over the preceding 3-month period. Dietitians who responded to this  
245 question (196/207) were more likely to recommend a COMB approach (65%, n=128) over a FB  
246 (30%, n=58) or ONS (5%, n=10) intervention ( $p<0.001$ ). The choice of oral nutrition support  
247 intervention (COMB or FB/ONS only) was not associated with AfC banding ( $p=0.854$ ), clinical  
248 speciality ( $p=0.588$ ), work setting ( $p=0.133$ ), or membership of a BDA specialist group ( $p=0.874$ ).  
249 Of the 207 dietitians surveyed, nearly two-third (57%, n=117) indicated that the greatest influence  
250 on their decision was the patient's circumstances, with ease of implementation of the intervention  
251 being the second most influential factor (17%, n=35).

#### 252 ***Choice of intervention and influences in theoretical case scenario 2 (hospital-based patient):***

253 The second case-based scenario (see Appendix S1) involved a nutritionally vulnerable patient in  
254 hospital, who also lived alone at home. In hospital, she was referred for dietetic input due to a

255 Malnutrition Universal Screening Tool (MUST) score of 2. She had been losing weight gradually  
256 but the period over which she had experiencing weight loss was unquantifiable due to poor recall.  
257 She was only managing 41% of her estimated nutritional requirements on the ward with large  
258 deficits. The patient was discharged from hospital 6 days later and followed up at home. Dietitians  
259 who responded to this question (198/207) were more likely to recommend a COMB approach (70%,  
260 n=138) over a FB (19%, n=38) or ONS (11%, n=22) intervention ( $p < 0.001$ ). More dietitians  
261 selected FB and ONS-based approaches alone in the community patient (FB: 30%, n=58; ONS: 5%,  
262 n=10) compared to the hospital-based patient (FB: 19%, n = 38; ONS: 11%, n=22). For the  
263 hospital-based patient, dietitians still reported that they would recommend a COMB intervention  
264 over FB or ONS alone. There were no associations between choice of oral nutrition support  
265 intervention (COMB or FB/ONS only) and AfC banding ( $p=0.699$ ), clinical speciality ( $p=0.508$ ),  
266 work setting ( $p=0.699$ ), or membership of a BDA specialist group ( $p=0.152$ ). A greater proportion  
267 of dietitians indicated that they would change the intervention post-discharge, compared with those  
268 that would make no change (58%, n=121 and 42%, n=86 respectively,  $p=0.015$ ). Again, almost half  
269 of dietitians (48%, n=99) reported that the greatest influence on the nutritional support intervention  
270 chosen for the hospital-based patient was the patient's circumstances and the second most  
271 influential factor was also the ease of implementation of the intervention, with 24% of dietitians  
272 (n=48) reporting this.

273 **Discussion**

274           This is the first study to examine dietetic practice when prescribing oral nutritional support  
275 interventions amongst UK dietitians and the factors which influence decisions. Overall, dietitians’  
276 opinions about oral nutrition support practice favoured FB approaches over ONS, however,  
277 combined interventions (COMB = FB + ONS) were reported to be used most often in practice, and  
278 were also the most popular choice in each case study. Choice of oral nutrition support intervention  
279 was associated with work setting and clinical speciality. Dietitians working in community settings  
280 and specialist nutritional support dietitians reported more frequent use of FB or ONS interventions  
281 alone, compared with acute and non-specialist dietitians, who reported more frequent use of COMB  
282 interventions. The most common factors reported to influence choice of intervention in clinical  
283 practice were ease of implementation, departmental protocols, professional management pathways,  
284 and published research. In the case studies, the factors having most influence on choice of  
285 intervention was patient circumstances, followed by ease of implementation. Professional  
286 management pathways referred to any published expert consensus statements in relation to the  
287 management of malnutrition. Ease of implementation referred mainly to the convenience of a  
288 chosen intervention particularly for the dietitian. Patient circumstances referred to the patient’s  
289 physical, psychological, social, environmental, emotional state. A greater proportion of dietitians  
290 indicated that they would alter their choice of intervention for the hospital-based patient upon  
291 discharge back into to the community, compared to those who would not, suggesting an influence  
292 of setting on practice. Despite the rise in telemedicine in dietetic practice <sup>(28, 29)</sup>, the dietitians  
293 surveyed reported that they provided most oral nutrition support via face-to-face consultations. It is  
294 also evident that some aspects of oral nutrition support practice, dietitians’ opinions, clinical  
295 judgements and confidence in such clinical decisions may be influenced by the number of years of  
296 clinical experience.

297           Whilst the National Institute of Clinical Excellence (NICE) specify the indications for oral  
298 nutrition support in the management of adult malnutrition in the UK <sup>(9)</sup>, they do not stipulate the  
299 type of intervention to be used and under what circumstances. Professional consensus management  
300 pathways for adult malnutrition, encourage optimisation of dietary intake with a “food first”  
301 approach reserving ONS for situations where FB measures alone have proved to be inadequate in  
302 improving oral intake <sup>(30)</sup>, recommendations also echoed by many local departmental policies.  
303 However, clinicians are cautioned as FB interventions may not provide nutritionally complete  
304 supplementation <sup>(30, 31)</sup>. Hence there remains controversy about the optimal method of oral  
305 nutritional support in managing malnourished patients. There is an underlying assumption in many  
306 policies that FB and ONS are able to achieve the same outcomes. The evidence base for the use of

307 either option has inconsistencies but appears stronger for ONS. In reality, local policies do vary<sup>(32)</sup>  
308 but there is an overall focus on FB approaches, with ONS being seen as an escalation option. The  
309 impact of this approach on longer term outcomes such as hospital admissions, number of  
310 prescriptions, length of hospital stay has not been studied<sup>(33)</sup>. Despite this, the results of this study  
311 suggest that despite a professional push towards FB strategies, COMB approaches are still preferred  
312 amongst clinically practicing dietitians. In a recently published study, despite professional  
313 guidelines for energy and protein content of the food available on hospital menus and the  
314 appropriate role of ONS and FB interventions within that setting, a recent audit demonstrated that,  
315 in practice, these standards were not being met for the majority of patients<sup>(34)</sup>. The authors suggest  
316 that an exploration of the factors which contribute to this disparity could help close the gap in a  
317 tailored, patient-centred fashion in addition to a uniquely placed, dedicated food services dietitian  
318<sup>(34)</sup>.

319 In this study, the reasons why most dietitians in practice prefer a combined intervention  
320 approach rather than choosing either intervention alone are not known. Although dietitians cited  
321 published research as an important influence on choice of method, the literature in this area tends to  
322 focus on FB approaches and ONS as separate entities, whereas in practice dietitians are tending to  
323 adopt combined approaches. Although the evidence in this area is inconsistent and sometimes  
324 patchy<sup>(20–23, 35)</sup>, there is a significantly greater body of evidence for ONS and although dietitians  
325 may perceive that research evidence is important, their practice does not support the fact that it is a  
326 key factor. This has also been observed in other areas of dietetic practice. Even in the presence of  
327 clear, evidence-based clinical guidelines to support early post-operative oral feeding amongst adult  
328 patients in a non-critical state of illness, adherence to those guidelines was poor with frequent  
329 delays to post-operative feeding<sup>(36)</sup>. Although the authors speculated over the contribution of  
330 patient-related, clinician-driven, and organisational factors to this lack of adherence, it is clear that  
331 the existence of evidence-based guidance has had a minimal effect on habitual clinical practice<sup>(36)</sup>.  
332 Therefore, unsurprisingly, in the absence of clear, specific evidence-based guidance, dietetic  
333 practice in oral nutrition support relies predominantly on clinical judgement. Furthermore, the  
334 results of this study suggests that evidence-based practice is not a substitute for the clinical skill and  
335 judgement of the dietitian. It has been argued that in clinical encounters, the judgement of the  
336 clinician is irreplaceable by evidence-based practice, particularly in situations when the clinician  
337 must weigh up a complex range of factors in making a clinical decision for a particular patient<sup>(37)</sup>.  
338 Indeed, the two scenarios used in this study presented two patients both with complex  
339 circumstances and nutritional dilemmas with some ambiguity about management to assimilate a  
340 real-life clinical encounter where the dietitian has to make a clinical judgement. Whilst the  
341 evidence-base is important, the dietitian must consider the complex social, environmental, medical

and other influences to provide patients with a dietary recommendation which can be incorporated into their daily lives and routines. The impact of this strong social component and its effects on a patient's ability to comply with an intervention should not be underestimated. Evidence-based care helps to minimise huge variations in the practices of healthcare professionals and helps to ensure the best, most effective care is provided to patients, in an environment where financial resources are limited <sup>(38)</sup>, whilst clinical judgement reflects the demands of the real life environment. Ideally evidence-based practice and clinical judgment should be used in conjunction to provide the best nutritional care for patients. Whilst dietitians reported being influenced by a patient's individual circumstances in the case scenarios, the ease of implementation of the intervention was also an influential factor in the decisions about oral nutrition support. In hospitals, where the provision of FB interventions that are appealing to acutely unwell patients can be challenging, ONS may be considered an 'easier and often cheaper option'.

Departmental protocols, professional management pathways and published research were three of the four main factors influencing practice by the majority of dietitians surveyed. This is in agreement with other online survey studies in the literature. Judges et al <sup>(39)</sup>, found that 70% of 678 dietitians who took part in a UK-wide survey, indicated that there was a relevant departmental protocol in place and 45% of respondents were influenced 'a lot' by departmental protocols when commencing new enteral tube feeding regimens. Sixty six percent of respondents who reported mandatory application of NICE guidelines <sup>(9)</sup> within their dietetic departments indicated that the guidelines exerted 'a lot' of influence <sup>(39)</sup>. A survey of renal dietitians in Australia reported that practice in 62 out of 65 respondents was significantly influenced by evidence-based practice guidelines, but was unaffected by the age, gender, location, years of experience in renal practice or research experience of the dietitian <sup>(40)</sup>. However, the positive correlation between years of experience and confidence in oral nutrition support practice observed in this study was also observed in the study by Judges and colleagues <sup>(39)</sup> which found that dietitians with more years in practice were more influenced by clinical experience when devising a new feeding regimen. Inclusion of case scenarios within this survey which tested clinical application, suggested that opinion and attitude about influences on practice was contrary to actual practice, which might reflect the lack of specific guidance in this area or the overriding dependency on clinical judgement when faced with a real-life situation.

In clinical practice, the cost to the patient and healthcare provider may vary dramatically by clinical setting, although this does not necessarily represent cost effectiveness. While ONS in hospital may be conceivably cheaper for acute healthcare providers due to industry tendered contracts, they are potentially more costly for primary care providers when prescribed in the community, where FB interventions may be implemented at a greater cost to the patient. It is no

surprise that costs to the patient and healthcare provider almost equally divided the dietitians sampled. Dietitians in primary care reported using individual interventions, specifically FB interventions, more than any other group, despite a recent systematic review which highlighted that more favourable clinical and financial outcomes were associated with ONS use in community settings and therefore ONS were deemed more cost effective in that context<sup>(33)</sup>. However, given the aforementioned focus on reducing prescriptions for ONS in this area, the greater use of FB approaches highlights the strong influence of costs and local guidelines on practice.

Despite the interesting findings in this study, it has some limitations. Firstly, lack of a pre-existing questionnaire which has been rigorously tested for reliability and validity<sup>(26, 41, 42)</sup> led to a bespoke questionnaire being designed for the study, but because of limited time and resources, assessment of validity was minimal. Secondly, given the response rate achieved in this study (3%), it is questionable whether the dietetic profession was adequately represented by the study sample. The response rate achieved was considerably lower than the 60-75% response rate considered acceptable in survey research<sup>(41)</sup> and threatens the representativeness of and external validity of the study. Other similar studies have also had variable success in achieving a good response rates amongst dietitians using a variety of sampling approaches<sup>(39, 43-46)</sup>. Thirdly, this study captures reported practice rather than actual clinical practice, an inherent limitation of a self-completed questionnaire study design<sup>(42)</sup>. As this study was cross-sectional and descriptive, the results are limited in their ability to capture fully the influences on clinical decision making or to illuminate in-depth understandings of clinical reasoning where the patient perspective comes into play and likely requires a qualitative or mixed method approach. One element which is completely absent is the patient perspective and practice in the real-world context may be very different from that reported here. Finally, despite the clinical relevance of the results observed in this study, many of the statistical correlations reported carried small effect sizes according to Cohen guidelines<sup>(47)</sup>.

Given the plethora of research evidence and clinical guidelines to suggest that dietary intervention in disease-related malnutrition amongst adults offers a number of clinical benefits, there is no reason to suggest that patients should not continue to be referred to a dietitian for oral nutrition support. Clinical guidelines derived from high quality trials, rather than consensus expert opinion, that outline whether FB/ONS/COMB interventions are more appropriate under particular clinical circumstances would facilitate an evidence-based approach to the clinical decisions dietitians have to make in oral nutrition support practice. At present, these decisions are left to the clinical judgement of the dietitian and may be highly variable. The implications for patient outcomes remain unknown. To advance as a profession, dietitians must continue to demonstrate evidence-based practice, however, although many dietitians have indicated favourable views about evidence-based practice, few reported that they had the skills and knowledge to apply it to their



412 practice <sup>(44)</sup>. As clinical guidelines do not exist for every area of dietetic practice, dietitians must be  
413 capable of reviewing the evidence for a particular clinical question and applying skills of critical  
414 appraisal in making clinical decisions. Evidence-based care and skills of critical appraisal should  
415 also be actively encouraged in the training of student dietitians, extending beyond the academic  
416 setting so that evidence-based practice can also be observed and applied within the clinical setting.

417 Data on the use of FB/ONS/COMB strategies and the factors which influence their  
418 application in clinical settings within the UK were previously lacking. This study highlights  
419 inconsistencies in clinical management and reiterates the need for further research into the  
420 experiences and views of patients on the receiving end of these oral nutrition support interventions.  
421 Furthermore, dietitians' opinions in relation to oral nutrition support approaches appeared to  
422 conflict their reported clinical practice. Research endeavours continue to try to define similarities  
423 and differences between the FB and ONS interventions and should data provide clear support for  
424 specific strategies in defined patient groups, it will be important to understand current management  
425 practices when developing implementation strategies. This could potentially also inform targeted  
426 training when areas of practice are outside of recommendations. As observed in other areas of  
427 dietetics <sup>(34), (36)</sup>, there appear to be inherent differences between recommendations and clinical  
428 practice. It is difficult to say that this study is further evidence of this, as this was not an audit of  
429 practice against recommendations specifically, but the variation in practice found, suggests that  
430 there might be differences. Greater use of FB only in the community suggests that maybe local  
431 guidance is being followed in this area. Perhaps the employment of procurement dietetic posts has  
432 placed a greater focus on managing practice within the recommendations. This study offers some  
433 tentative explanations about why practice varies, although this would need to be followed up in a  
434 more focused study. Future research in this area should focus on studies with designs incorporating  
435 both observation and triangulation of approaches to allow greater understanding of the choices  
436 made by dietitians as well as capturing the patient perspective and impact on outcomes. This would  
437 more clearly illuminate what dietitians are doing in practice and inform the debate on efficacy of  
438 different approaches to oral nutrition support.

439 Overall, a need remains for evidence-based clinical guidance based upon robust studies  
440 comparing the long-term clinical effectiveness the various forms of oral nutritional support, in order  
441 to inform dietetic practice. This will facilitate more effective, consistent clinical management of  
442 malnourished patients through the use of FB/ONS/COMB interventions as appropriate for optimal  
443 patient benefit.

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447 **Transparency Declaration**

448 The lead author affirms that this manuscript is an honest, accurate, and transparent account of the  
449 study being reported. The reporting of this work is compliant with STROBE guidelines. The lead  
450 author affirms that no important aspects of the study have been omitted and that any discrepancies  
451 from the study as planned have been explained.

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