

1     **Attendance and weight and waist circumference outcomes of patients with**  
2     **type 2 diabetes receiving dietetic care through the Medicare Benefits Schedule**  
3             **Primary Care Items for Allied Health Services Program**

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47 Marie-Claire O'Shea contributed to the study design, and data collection and manuscript  
48 editing. Lauren Ball contributed to the study design and manuscript preparation. Ben  
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55

56

57 **Abstract**

58 The aim of this study was to investigate the participation and weight and waist  
59 circumference outcomes of patients with type 2 diabetes receiving dietetic care  
60 through the Medicare Benefits Schedule Primary Care Items for Allied Health  
61 Services program. A prospective observational study was conducted between  
62 January and September 2011, utilising three private practice dietitians who provided  
63 services at eleven medical centres in South East Queensland. All patients with type  
64 2 diabetes who were referred to one of the dietitians through the Medicare Benefits  
65 Schedule Primary Care Items for Allied Health Services program were asked to  
66 participate in the study. Participants' attendance at consultations was recorded for  
67 the study duration. The dietitian collected weight and waist circumference measures  
68 at each consultation. One hundred and twenty-nine participants ( $58.9 \pm 15.7$  years,  
69  $32.2 \pm 5.6$  kg/m<sup>2</sup>) were included in the study. The most frequent number of  
70 consultations allocated to a dietitian was two. Small, but statistically significant  
71 reductions in body weight ( $1.9 \pm 2.9$  kg,  $p < 0.05$ ) and waist circumference ( $2.0 \pm 4.8$  cm,  
72  $p < 0.05$ ) were observed from the initial to the final consultation. Participants who  
73 attended more than two consultations lost significantly more weight than those who  
74 only attended two consultations ( $3.7 \pm 4.15$  kg vs  $1.1 \pm 1.6$  kg,  $p < 0.05$ ). Almost one  
75 third of participants ( $n=38$ , 30%) did not complete the allocated number of  
76 consultations available through their referral. Modest weight and waist circumference  
77 reductions are achievable for patients with type 2 diabetes receiving dietetic care  
78 through the Medicare Benefits Schedule Primary Care Items for Allied Health  
79 Services program. However, the clinical significance of these reductions requires  
80 further investigation. Patients who attend more consultations with a dietitian may

81 experience further improvements in weight and waist circumference outcomes.  
82 However, many patients do not complete the number of allocated consultations.  
83 Further research is required to explore the determinants of attendance at  
84 consultations in order to maximise the potential improvements in health outcomes for  
85 patients receiving dietetic care through the Medicare Benefits Schedule Primary  
86 Care Items for Allied Health Services program.

87

**88 Introduction**

89 Type 2 diabetes is a lifestyle-related chronic disease, with risk factors including  
90 overweight and obesity, poor nutrition behaviour and low physical activity (Dietitians  
91 Association of Australia (DAA), 2011). The prevalence of type 2 diabetes in Australia  
92 is approximately 4% of the population (Australian Bureau of Statistics (ABS), 2012).

93 The cost associated with the treatment of type 2 diabetes is currently estimated to be  
94 in excess of \$10.3 billion annually (Diabetes Australia, 2012). The presence of micro-  
95 and macro-vascular complications significantly increases the burden of disease of  
96 type 2 diabetes, and more than doubles the annual health cost per person (Colagiuri  
97 et al., 2003).

98 Controlling the modifiable risk factors of type 2 diabetes including hyperglycaemia,  
99 hypertension, dyslipidaemia and overweight and obesity can reduce the incidence of  
100 micro- and macro-vascular complications (Shamoon et al., 1993). Lifestyle  
101 intervention studies have demonstrated that intensive nutrition and physical activity  
102 advice improves many modifiable risk factors for type 2 diabetes complications  
103 (Dengel et al., 2006; Pi-Sunyer et al., 2007; Wing, 2010). Specifically, nutrition  
104 advice provided by dietitians has been shown to result in improved weight and  
105 glycaemic control in individuals with type 2 diabetes (Ash et al., 2003; Franz et al.,  
106 1995; UKPDS, 1990). Furthermore, weight loss of 5-10% of initial body weight has  
107 been associated with improvements in fasting plasma glucose, glycated  
108 haemoglobin (HbA1c), and blood pressure (Manning et al., 1998; Wing, 2010).

109 Considering that 80-90% of individuals with type 2 diabetes are overweight or obese  
110 (Ross et al., 2011), weight management is an essential component of the  
111 management of type 2 diabetes.

112 In 2004 the Australian government introduced the Medicare Benefits Schedule  
113 (MBS) Primary Care Items for Allied Health Services program (previously referred to  
114 as the Enhanced Primary Care program) to promote the coordination of healthcare  
115 for individuals with chronic conditions, including type 2 diabetes (Australian  
116 Government Department of Health and Ageing, 2012). Under this program, eligible  
117 patients can access up to five subsidised consultations per calendar year from any of  
118 the 14 registered allied health professions. The fee for each consultation is set by  
119 individual providers, and is either bulk billed (no out-of-pocket cost to the patient), or  
120 charged at a higher rate than the rebate provided by Medicare. General Practitioners  
121 (GPs) develop and manage each referral, and receive upfront financial remuneration  
122 for this work. The remuneration for allied health professionals is provided after of  
123 each consultation through Medicare Benefits Schedule Primary Care item numbers.

124 The MBS Primary Care Items for Allied Health Services program has been the  
125 subject of recent debate (Cant, 2010; Foster et al., 2009; Foster et al., 2008). The  
126 number of subsidised consultations available to patients, and the remuneration for  
127 allied health professionals has been criticised. In addition, allied health professionals  
128 have reported making compromises to best practice to accommodate the funding  
129 model (Foster, et al., 2009). Although recent studies have described the utilisation of  
130 services and the practices of health professionals under the program, patients'  
131 health outcomes have not been evaluated.

132 Dietitians are the third most utilised allied health profession within the MBS Primary  
133 Care Items for Allied Health Services program, conducting 251 781 services in the  
134 2011-2012 financial year (Australian Government Department of Health and Ageing  
135 and Medicare Australia, 2012). However, Medicare collects data on the use of the  
136 program by recording completed, billed consultations. As a result, this data does not

137 identify the attendance rates of patients at allocated consultations, so does not  
138 completely describe the participation of patients within the program. As the value of  
139 the MBS Primary Care Items for Allied Health Services program to the Australian  
140 public has been recently questioned (Webber, 2012), it is important to understand  
141 the rate of participation by patients in the program.

142 The aim of this study was to investigate the attendance and weight and waist  
143 circumference outcomes of patients with type 2 diabetes receiving dietetic care  
144 through the MBS Primary Care Items for Allied Health Services program. This  
145 investigation will assist in evaluating the effectiveness of Australian government  
146 funding provided for dietetic services to confront this national health priority area.

147

148 **Methods**149 *Study Design*

150 This study utilised a prospective observational approach to document the weight and  
151 waist circumference outcomes of patients with type 2 diabetes receiving dietetic care  
152 through the MBS Primary Care Items for Allied Health Services program. Three  
153 private practice dietitians consulting at eleven medical centres in south-east  
154 Queensland were involved in the study. The dietitians were Accredited Practising  
155 Dietitians (APDs) registered with the Dietitians Association Australia (DAA) and  
156 eligible to provide services through the MBS Primary Care Items for Allied Health  
157 Services program. Each dietitian was aware of the study being undertaken. The  
158 dietitians provided services under one business enterprise, and consultation fees  
159 were equal to the Medicare rebate available to patients (bulk-billed). Ethics approval  
160 was obtained from the Griffith University Human Research Ethics Committee  
161 (Reference PBH/37/10/HREC).

162 *Participants*

163 Between January and September 2011, all patients with type 2 diabetes who  
164 attended at least one consultation with a dietitian through the MBS Primary Care  
165 Items for Allied Health Services program were asked to participate in the study. To  
166 ensure usual practice was followed, the referring GPs were not specifically informed  
167 of the study while data was being collected. At the initial consultation, all eligible  
168 patients were asked to participate in the study regardless of current medications or  
169 other treatment plans.

170



171

172 *Data Collection*

173 Data were recorded by the three dietitians involved in the study during participating  
174 patients' consultations. Data were recorded in each patient's paper-based medical  
175 file. Dependent measures of weight and waist circumference were collected at each  
176 consultation. Independent variables including gender and time since diagnosis of  
177 type 2 diabetes were recorded. At the conclusion of the data collection period, data  
178 from the patient's file were collected and analysed. Each participant's progress  
179 through the program was recorded according to the following criteria.

- 180 1. Completed: the patient had attended all consultations allocated within the  
181 referral.
- 182 2. Ongoing: the patient had not attended all consultations allocated within the  
183 referral, however the next consultation was scheduled.
- 184 3. Not completed: the patient had not completed all consultations within the referral,  
185 and no future appointment was scheduled.

186 *Outcome measures*

187 Weight was measured using digital scales and waist circumference was measured  
188 using a metallic tape measure. Specific training in anthropometric measurement was  
189 not provided because all data was collected by Accredited Practising Dietitians who  
190 had significant previous experience in conducting these measurements. Where a  
191 clinic provided a stadiometer, height was measured and recorded. Alternatively,  
192 height was taken from the patients' medical file. Body mass index (BMI) was  
193 calculated from collected weight and height.

194

195

196 *Data Analysis*

197 Statistical analyses were performed using SPSS version 21.0 (IBM Corporation,  
198 2012). Analysis of the change in weight and waist circumference measures was only  
199 conducted for patients who attended two or more consultations. Given the high  
200 number of participants not attending allocated consultations, an intention to treat  
201 model was not used, and the actual change in outcomes were described. A paired t-  
202 test was used to compare initial and final body weight and waist circumference of  
203 participants. Independent t-tests were used to determine the effect of the number of  
204 consultations attended (two versus more than two) on weight and waist  
205 circumference changes. Statistical significance was accepted at the  $p < 0.05$  level.  
206 The World Health Organisation cut-off points for BMI and waist circumference were  
207 used to assess risk of metabolic complications (World Health Organisation, 2008,  
208 2011). Clinical significance for weight lost was set at 5% of initial weight in  
209 accordance with the NHMRC recommendations (National Health And Medical  
210 Research Council, 2003)

211

212 **Results**

213 Between January and September 2011, 173 individuals with type 2 diabetes  
214 presented with a referral through the MBS Primary Care Items for Allied Health  
215 Services program to the one of the dietitians involved in the study. Of these potential  
216 participants, 129 individuals (80 male, 49 female; mean age  $59.8 \pm 15.9$  years)  
217 consented to participate in the study and completed their first consultation. The  
218 number of dietitian consultations attended by each patient varied as a result of  
219 differences in the number of consultations allocated in the referral, and the number  
220 of allocated consultations actually attended by the patient. Figure 1 outlines the  
221 overall participation of patients throughout the study. A limited rate of participation  
222 was observed with only 60 of the 129 consenting participants attending two or more  
223 dietitian consultations.

224 INSERT FIGURE ONE ABOUT HERE

225 The number of consultations allocated to a dietitian through the referral, and rates of  
226 completion, are shown in Table 1. The most frequent number consultations allocated  
227 to a dietitian was two ( $n=67$ , 52%). Nearly half of the participants ( $n=60$ , 47%)  
228 completed the number of allocated consultations within their referral during the data  
229 collection period. A quarter of participants ( $n=36$ , 24%) had not completed the  
230 number of allocated consultations but had scheduled the next consultation, and the  
231 remainder ( $n=39$ , 30%) had not completed the number of allocated consultations and  
232 did not have any future consultation scheduled.

233 INSERT TABLE ONE ABOUT HERE

234 At baseline, the mean weight, BMI and waist circumference of the 129 consenting  
235 participants was  $94.1 \pm 20.4$ kg,  $32.2 \pm 5.6$ kg/m<sup>2</sup> and  $111.8 \pm 12.9$ cm respectively. The  
236 proportion of participants with an increased risk of metabolic complications was 91%  
237 based on BMI measures, and 97% based on waist circumference measures.

238 Table 2 shows participants' changes in body weight, BMI and waist circumference  
239 between baseline measurements and the final consultation for participants who  
240 attended two or more consultations (n=60) and had weight (n=51), height (n=45) and  
241 waist circumference (n=45) recorded on each occasion. Weight and waist  
242 circumference measures were both significantly lower at the final consultation  
243 compared to the initial consultation. The overall percentage of body weight lost was  
244  $1.8 \pm 2.7\%$ , and five participants lost more than 5% body weight.

245 INSERT TABLE TWO ABOUT HERE

246 Table 2 also shows participants' change in BMI and waist circumference categories  
247 after their final consultation with a dietitian. No participants experienced an  
248 improvement in their BMI category, however a small number of participants (n=2,  
249 4%) experienced an improvement in their waist circumference category.

250 Participants who attended more than two consultations lost significantly more weight  
251 than those who only attended two consultations ( $-3.7 \pm 4.2$ kg vs  $-1.1 \pm 1.6$ kg;  $p=0.002$ ).  
252 However, participants who attended more than two consultations lost significantly  
253 more weight from consultation one to two, compared with those who only attended  
254 two consultations ( $-2.3 \pm 2.4$ kg vs.  $-1.1 \pm 1.6$ kg;  $p=0.038$ ). No associations were found  
255 between the number of consultations attended and changes in waist circumference.

256

257 **Discussion**

258 The aim of this study was to investigate the attendance and weight and waist  
259 circumference outcomes of patients with type 2 diabetes receiving dietetic care  
260 through the MBS Primary Care Items for Allied Health Services program. This study  
261 is important because there is limited understanding of the outcomes of individuals  
262 with type 2 diabetes receiving dietetic care through this program. In the present  
263 study, modest reductions in weight and waist circumference were observed, with  
264 greater reductions in weight achieved by participants who attended more than two  
265 consultations with a dietitian. Overall participation of patients in the program was  
266 limited with less than half of the participants attending two or more consultations with  
267 a dietitian within the study period.

268 Allied health professionals report that that the number of consultations currently  
269 included in the MBS Primary Care Items for Allied Health Services program is  
270 inadequate and is not conducive to providing the optimal service to patients with  
271 complex care needs (Foster, et al., 2009). However, approximately one third of  
272 patients in the present study did not complete all consultations that were allocated to  
273 them within the study period. Notably, data was unable to be captured on the  
274 number of patients who were provided with a referral from their GP for a dietitian, but  
275 did not attend their initial consultation. Therefore, the current data is prone to  
276 underestimate actual attendance in the program. Regardless of the precise  
277 attendance figure, it is reasonable to conclude that participation in the program is  
278 limited.

279 The limited participation in the program by patients suggests that many patients feel  
280 that the allocation of dietetic consultations is actually more than adequate for the

281 management of their condition. Interestingly, Grimmer-Somers et al. (2010) report  
282 high levels of satisfaction from patients with type 2 diabetes receiving integrated  
283 GP/allied health care despite only receiving an average of 2.3 visits to allied health  
284 professionals over an eight-month period. Patients in the Grimmer-Somers et al.  
285 (2010) study felt that the integrated care improved knowledge and awareness of their  
286 condition and encouraged them to self-manage. The limited participation by patients  
287 found in the present study may not necessarily be due to any dissatisfaction with the  
288 service provided by the dietitians. Conversely, it could be speculated that the service  
289 provided was actually perceived to be very good and that patients did not feel they  
290 needed to attend all allocated consultations because they had already developed  
291 sufficient knowledge and understanding of dietary management for their condition.  
292 Clearly further research is required to understand the reasons for the limited  
293 participation by patients in the MBS Primary Care Items for Allied Health Services  
294 program.

295 Patients attending two or more consultations with the dietitian in the present study  
296 lost an average of 1.9kg (or 1.8% of initial body weight), which is a similar amount as  
297 found in other studies using a similar number of dietitian consultations (Franz, et al.,  
298 1995; Manning, et al., 1998). The National Health and Medical Research Council  
299 (NHMRC) recommends a target weight loss of 5-10% of initial body weight in  
300 overweight or obese individuals in order to support long-term metabolic  
301 improvements including reduction in blood pressure, blood lipids, fasting plasma  
302 glucose and HbA1c (Australian Government Department of Health and Ageing,  
303 2003). Therefore the average weight loss observed in the present study may not be  
304 associated with improvements in other markers of metabolic control. In addition,  
305 there was very little change in the number of patients at increased risk of metabolic

306 complications as assessed by World Health Organisation cut-off points for BMI or  
307 waist circumference. Conversely, Andrews et al (2011) have recently shown that a  
308 12-month dietary counselling intervention can reduce HbA1c and insulin resistance  
309 in type 2 diabetes patients despite a weight loss of only 1.7% of initial body weight.  
310 Other studies which have reported small changes in the body weight of type 2  
311 diabetes patients have also demonstrated significant reductions in HbA1c (Coppell et  
312 al., 2010; Miller et al., 2012) Further research is warranted to determine if the  
313 modest, but statistically significant, weight loss observed in this study could be  
314 associated with changes in metabolic control and risk of diabetes related  
315 complications.

316 The weight loss observed in the present study is somewhat less than observed in  
317 other dietary intervention studies in patients with type 2 diabetes. Following 12  
318 weeks of intensive dietetic counselling Ash and colleagues (2003) observed an  
319 average participant weight loss of 6.5% (Ash, et al., 2003). Interestingly, this study  
320 involved three groups receiving different dietary prescriptions all designed to elicit an  
321 energy deficit. As there was no difference in weight loss between groups, the authors  
322 concluded that it was the intensive weekly contact with the dietitian that facilitated  
323 the successful weight loss. The lack of a clinically significant weight loss in the  
324 present study may be due to the low frequency of consultations with a dietitian. If this  
325 is the case, the limited participation in the program by patients is somewhat  
326 perplexing. Many patients did not to attend the full allocation of consultations with a  
327 dietitian. However, it may be necessary to attend many more consultations than  
328 allocated to actually achieve clinically meaningful changes in weight, waist  
329 circumference and possibly other health outcomes.

330 Intensive dietary interventions led by dietitians have been shown to produce positive  
331 changes in measures of glycaemic control in patients with type 2 diabetes after 12  
332 months (Andrews, et al., 2011; Coppell, et al., 2010; Pi-Sunyer, et al., 2007). Each of  
333 these trials included interventions involving many more dietary counselling sessions  
334 (range from eight to 40) than the maximum of five that is subsidised under the MBS  
335 Primary Care Items for Allied Health Services program. Interestingly, most patients in  
336 the present study were only allocated two consultations with a dietitian. The reason  
337 for such a low allocation of dietitian sessions is not clear. A referral can include any  
338 number of allied health sessions, however, only five of these are subsidised by  
339 Medicare. Therefore the GPs developing management plans for the patients in the  
340 current study may be aware of the likely attendance of patients to allied health  
341 appointments and this may have been a key consideration when developing  
342 management plans for these patients. Nevertheless, there appears to be a clear  
343 discrepancy between the evidence for the required number of dietitian consultations  
344 for optimal management of type 2 diabetes and the actions by both GPs and patients  
345 regarding referral and attendance at these consultations.

346 The present study demonstrated that patients who attend more than two  
347 consultations with a dietitian lose significantly more weight than patients who attend  
348 only two consultations. It is likely that the frequency of sessions with a dietitian is an  
349 important component to successful weight loss (Ash et al., 2003). Therefore greater  
350 weight loss in patients with a higher number of consultations with the dietitian was  
351 expected. However, the patients in the present study who attended more than two  
352 consultations also experienced greater weight loss between their first and second  
353 consultation compared to patients who only attended two consultations. Patients  
354 experiencing a greater magnitude of weight loss after their first consultation may



355 have a greater commitment to dietary modification which is reflected by a willingness  
356 to return for additional consultations. Patients who experience poor results may not  
357 feel as motivated to return to the dietitian. Therefore, the association between a  
358 greater number of visits to the dietitian and a greater weight loss may not necessarily  
359 be causal in one direction.

360 The present study had two noteworthy limitations. Firstly, data was collected by  
361 dietitians during consultations. As a result of time constraints and patient refusal,  
362 some weight and waist circumference data were unable to be collected.

363 Furthermore, the time between consultations was not uniform for all patients, so the  
364 outcomes were measured at variable time points. Although this limits comparability  
365 to more structured intervention trials, the aim of this study was to describe the  
366 changes experienced by patients actually participating in the MBS Primary Care  
367 Items for Allied Health Services program.

368 Overall, this study has demonstrated that patients with type 2 diabetes receiving  
369 dietetic care through the MBS Primary Care Items for Allied Health Services program  
370 experience modest reductions in weight and waist circumference. However, the  
371 clinical significance of these reductions requires further investigation. Patients who  
372 attend more consultations with a dietitian may experience further improvements in  
373 weight and waist circumference outcomes. However, participation in the program is  
374 limited with many patients not completing the number of consultations allocated  
375 through the MBS Primary Care Items for Allied Health Services program. Further  
376 research is required to explore the determinants of attendance at consultations in  
377 order to maximise the potential health outcomes for patients receiving dietetic care  
378 through this program.

379

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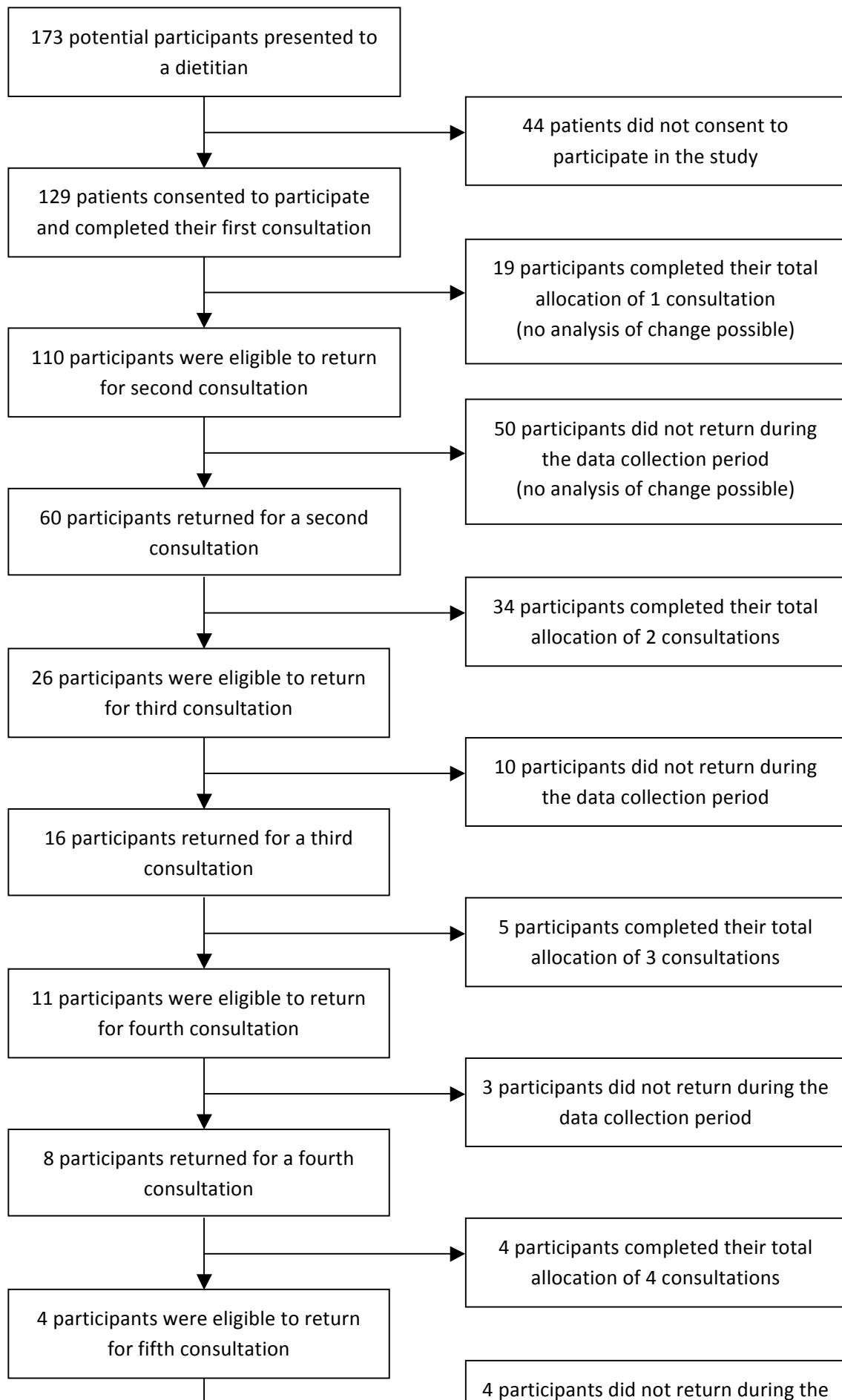
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460 Table 1: Number of consultations allocated to a dietitian through an EPC referral,  
 461 and rates of completion.

<b>Number of allocated consultations</b>	<b>Number of participants</b>	<b>Completed<sup>a</sup></b>	<b>Ongoing<sup>b</sup></b>	<b>Not completed<sup>c</sup></b>
1	19	19 (100%) <sup>d</sup>	-	-
2	67	33 (49%)	9 (13%)	25 (37%)
3	26	4 (15%)	15 (58%)	7 (27%)
4	8	4 (50%)	1 (12%)	3 (38%)
5	9	0 (0%)	6 (67%)	3 (33%)
<b>Total</b>	129	60 (46%)	31 (24%)	38 (30%)

462 <sup>a</sup>*Completed* was defined as a participant that had attended all consultations  
 463 allocated within the EPC referral.

464 <sup>b</sup>*Ongoing* was defined as a participant that had not attended all the consultations  
 465 allocated within the EPC referral, but had scheduled the next consultation.

466 <sup>c</sup>*Not Completed* was defined as a participant that had not completed all consultations  
 467 allocated within the EPC referral and did not have a future appointment scheduled.

468 <sup>d</sup>Data was not collected on the number of patients referred to a dietitian who did not  
 469 attend the first consultation.