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**Citation:** Wong, S., Van Middendorp, J., Belci, M., Van Nes, I., Roels, E., Smith, É., Hirani, S. P. & Forbes, A. (2015). Knowledge, attitudes and practices of medical staff towards obesity management in patients with spinal cord injuries: An international survey of four western European countries. *Spinal Cord*, 53(1), pp. 24-31. doi: 10.1038/sc.2014.168

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**Link to published version:** <https://doi.org/10.1038/sc.2014.168>

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1 **Title:**

2 Knowledge, attitudes and practices of medical staff towards obesity management in  
3 patients with spinal cord injuries: an International Survey of four Western European  
4 countries

6  
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44 Abstract

45 Objective: To 1) examine the opinions of medical staff working in spinal cord injury  
46 (SCI) centres (SCICs); 2) evaluate their knowledge, attitudes and practices towards  
47 obesity prevention and management; 3) report the number of beds and dietitians  
48 available at each SCIC.

49 Methods: A 37-item questionnaire was sent to 23 SCICs in the UK, the Netherlands,  
50 Belgium and the Republic of Ireland between September 2012 and January 2013.

51 Results: Eighteen SCICs returned the questionnaires for analysis. All respondents  
52 stated that they had an interest in obesity treatment but only 2.3% of the respondents  
53 received training in obesity management. Sixty-one percent of staff did not consider  
54 body mass index (BMI) to be appropriate for use in SCI patients and subsequently  
55 less than half of the respondents use BMI routinely. The majority of respondents  
56 reported that they are confident in dealing with overweight (74.5%) and obese (66.1%)  
57 SCI adults, less than half (44.1%) are confident in treating overweight and obese SCI  
58 children. Respondents also indicated the need for nationally adopted guidelines and a  
59 lack of physical-activity provision. There were 17.5 whole-time equivalent (WTE)  
60 dietitians recorded in 22 SCICs, equivalent to 47.8 beds per WTE dietitians (range  
61 10 – 420). Non-UK SCIC dietitians are significantly better resourced than in UK  
62 SCICs (beds per WTE dietitian: 36 vs 124,  $p=0.035$ ).

63 Conclusion: Medical staff expressed the need to participate in obesity prevention and  
64 management. Appropriate training should be considered for all medical staff and the  
65 development of specific weight management guidelines and dietetic provision should  
66 be considered.

67

68 Keywords: Obesity management; Spinal Cord Injuries; Staff survey; Weight

69 management

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85 Introduction

86 Obesity is common after spinal cord injury (SCI). It has become a major clinical and  
87 public health problem which requires several medical interventions, modifications of  
88 individual behaviour and environmental changes.<sup>1</sup> Recent literature reported that up to  
89 45% of SCI patients were overweight and 29% were obese<sup>2,3</sup>. Obesity is recognised as  
90 both a cause and consequence of disease and it has been shown to be associated with  
91 poor clinical outcomes and increased healthcare costs<sup>2</sup>. There are many health risks  
92 and co-morbidities including hypertension, diabetes, ischaemic heart disease,  
93 gallstones, osteoarthritis and some malignancies associated with obesity.<sup>1</sup>

94 Yet in clinical practice, many patients, allied health professionals and hospital  
95 managers do not realise how common obesity is in hospitalised patients<sup>4,5</sup>. If ignored,  
96 this will cause a greater problem with the development of chronic nutrition-related  
97 complications<sup>1</sup>.

98 Among medical staff, knowledge of, attitudes towards and practices in the  
99 management of obesity have been studied in various English-speaking countries,  
100 especially amongst General Practitioners (GPs)<sup>6-9</sup>. However, despite high awareness  
101 of obesity as a medically significant issue<sup>10</sup>, the magnitude of the obesity epidemic  
102 remains high and is worsening, particularly in patients with neurological disabilities  
103 such as spinal cord injuries<sup>2</sup>. Weight management is not commonly offered to SCI  
104 patients, at least not in the UK<sup>11,12</sup>.

105 SCI specialists have been identified as important potential contributors to the  
106 prevention and treatment of overweight and obesity, in part, because of continued  
107 involvement during rehabilitation. SCI medical staff are therefore in a unique position  
108 to provide guidance to patients. In some countries, SCI consultants will continue to  
109 see their patients as part of life-long follow up. They are a frequently used source for  
110 information about weight control and are perceived to be a reliable formal source of  
111 information. However to our knowledge, no studies reporting the views of SCI  
112 specialists have been published.

113 A more detailed understanding of knowledge, attitudes and practice is  
114 necessary to determine the best way to facilitate the contribution of SCI medical staff  
115 to management of obesity after SCI. Although there are standard published  
116 recommendations for SCI management and optimal staffing levels<sup>13,14</sup>, these  
117 documents do not make specific recommendations regarding obesity management.

118

119 Whilst dietitians are considered essential members of the multidisciplinary  
120 team (MDT) caring for patients with obesity management,<sup>1,15</sup> the availability of  
121 dietitians in British and European SCICs remains variable.<sup>4</sup>

122 We therefore conducted this international survey in order to include all the  
123 SCICs in four western European Countries including Belgium, the Republic of  
124 Ireland, the Netherlands, and the United Kingdom as we assume we share similar  
125 management approaches for SCI care. The aims of the study were: (i) to examine the  
126 opinions on weight management among medical staff working in SCICs; (ii) to  
127 evaluate their knowledge, attitudes and practices towards obesity prevention and  
128 management; (iii) to report the number of dietitians per bed available at each SCIC.

129

### 130 Methods

131 A 37 item cross-sectional survey was developed based on reviewed literature<sup>8</sup> and  
132 was modified further by a team of multi-disciplinary professionals working in SCICs.

133 Three, 3, 4 and 5-point scales were used, in which the participants had to  
134 indicate their level of agreement with each statement by selecting one from ‘strongly  
135 agree’, ‘agree’, ‘neutral’, ‘disagree’ or ‘strongly disagree’; or in practice statements,  
136 from ‘very confident’, ‘fairly confident’ or ‘not confident’ and in service statements,  
137 from ‘all of the time’, ‘most of the time’, ‘occasionally’ or ‘not at all’.

138 The questionnaire consisted of five sections; 5 questions on demographic data  
139 and staff awareness; 10 statements on exploring attitudes; 3 statements on self  
140 efficacy; 11 statements on major limitations and; 8 statements on service  
141 improvements.

142 In addition to gathering baseline demographic data and professional  
143 characteristics, a spokesman for each SCIC was asked to provide the number of  
144 available SCI beds and the number of whole time equivalent (WTE) dietetic staff.

145 Because of the small sample size and for ease of presenting the data, most of  
146 the responses were grouped together, such that ‘agreed’ encompassed both ‘strongly  
147 agreed’ and ‘agreed’, ‘disagreed’ both ‘strongly disagreed’ and ‘disagreed’, and ‘most  
148 of the time’ referring to ‘all’ and ‘most of the time’.

149

### 150 Ethics

151 Formal ethical permission to conduct the study was not required by the Stoke  
152 Mandeville hospital review board as this was considered to be a clinical audit not

153 involving active patient participation (NRES).<sup>16</sup> This was accepted by the other  
154 centres. The questionnaires were approved by the local clinical audit departments for  
155 phrasing and grammar of the questions. In addition, a pilot questionnaire was sent to  
156 three medical staff to assess the content and the time required to complete the  
157 questionnaire; feedback from this guided the drafting of the final version of the  
158 questionnaire (Appendix 1). For Dutch and Belgian participants, the English survey  
159 was translated into native language by the study co-author (JvM) and validated by co-  
160 authors (ER) all of whom are competent in both languages (Appendix 2).

161

#### 162 Survey administration

163 The survey was administered to all medical staff working in the SCICs over four  
164 European countries (Belgium: n=3, the Republic of Ireland: n=1; the Netherlands:  
165 n=8, and the United Kingdom: n=11) between October 2012 and May 2013, with a  
166 covering letter addressed to the local medical lead explaining that findings would be  
167 used to identify current knowledge, attitude and practices of medical staff and to  
168 identify areas for improvement. Participants were reassured that all findings would be  
169 treated anonymously and in confidence to encourage respondents to answer honestly.  
170 Completed questionnaires were anonymised prior to analysis. Two reminders were  
171 sent (one at 8 weeks and one 12 weeks after the initial survey distribution).

172

#### 173 Statistical analysis

174 Descriptive statistics were used to calculate the response frequency. Data are reported  
175 as medians (ranges).

176 Further statistical analysis was conducted to compare the existence of  
177 associations between respondents' demographic and professional characteristics and  
178 their survey responses. In addition, the dietetics workforce was compared between  
179 UK and non-UK SCICs. For numeric data on an ordinal level, the Mann-Whitney test  
180 was used, and for cross-tabulation on a nominal level, the Chi-squared test was  
181 performed. The data were analysed using Minitab version 15 (Minitab Ltd, Coventry,  
182 UK) and significance was accepted if  $p < 0.05$ .

183

#### 184 Results

185 Medical staff from 23 SCICs were approached. The centres contained a total of 823  
186 SCI beds (48 in Belgium, 36 in the Republic of Ireland, 258 in the Netherlands, and  
187 481 in the United Kingdom). (Table 1 and Table 2)

188 The overall SCIC response rate was 78.4% (18/23 SCICs; 59 individual  
189 responses, 2-12 responses per SCIC, 63.6% in the United Kingdom (n=7), 66.7% in  
190 Belgium (n=2), 62.5% in the Netherlands (n=5) and 100% in the Republic of Ireland  
191 (n=1)).

192

### 193 Demographics and professional characteristics

194 Nearly half of the respondents were male (n=26). The median duration of practice in  
195 SCICs was 2.5 years. Fifty-four percent (n=32) of respondents were senior  
196 doctors/consultants (had completed training) and 67.8% (n=40) were from the UK  
197 SCICs. (Table 1)

198 No junior/trainee doctors reported that they had received formal training in  
199 obesity management of SCI patients and only 2 (6.3%) senior doctors reported that  
200 they had formal training in this area.

201

### 202 Medical staff attitudes and knowledge towards obesity management

203 Forty-seven (76%) respondents agreed with the statement, “Obesity is a major health  
204 problem amongst patients with SCI and requires urgent action”. Non-UK respondents  
205 (100% v 70%, p=0.037) and non-UK consultants (100% v 71.4%, p=0.028) were  
206 more likely to agree with the statement than UK respondents. (Table 3)

207 Most respondents believed that they have a role in obesity prevention (64.5%)  
208 and offer advice to their patients (77.9%). Most (86.5%) believed that advice on  
209 weight maintenance should be given to all patients with SCI in order to prevent  
210 obesity. Most respondents (86.4%) believed that weight management should be  
211 offered at an early stage rather than waiting until the patients are obese (18.6%).

212 Although all surveyed SCICs have dietitian support (Table 3), not all  
213 respondents reported that their centre has a dietitian that deals with weight  
214 management for SCI patients.

215

### 216 Obesity recognition

217 Most of the respondents (61%) reported that they do not believe that BMI is an  
218 appropriate measure to guide weight management in SCI patients. A minority (35.6%)



219 of the respondents reported they monitor in-patients' BMI. In the out-patient setting  
220 this is even less common (23.7%). Non-UK respondents were less likely to use BMI  
221 measurements (26.3% v 35.6% in in-patients; 0% v 35% in out-patients) than UK  
222 respondents.

223

#### 224 Self-reported proficiency / ability

225 Most respondents felt more confident in treating overweight than obese SCI adults  
226 (Table 4). Three out of 4 respondents (74.6%) felt adequately trained to treat patients  
227 who are overweight, but only 2/3 (66.1%) of respondents rated themselves competent  
228 in managing obesity; fewer than half (44.1%) were confident in treating paediatric  
229 obesity, even though most centres were also responsible for the care of children with  
230 SCI. (Table 4)

231       Significantly fewer UK respondents reported being confident in treating obese  
232 paediatric patients with SCI than non-UK correspondents (35% v 63.2%,  $p=0.042$ ,  $\chi^2$ :  
233 4.144).

234

#### 235 Barriers to weight management

236 The leading five obstacles, identified as limitations in delivering optimal care to obese  
237 patients, in descending order, were lack of nationally adopted guidelines (64.4%),  
238 lack of patient motivation and non-compliance (61%), lack of provision of a suitable  
239 physical activity programme (61%), short consultation time for medical staff (55.9%)  
240 and lack of specialist weight management clinics to which to refer patients (52.5%).  
241 (Table 5)

242       Significantly more UK respondents reported short consultation times to be a  
243 limiting factor (70% v 26.3%,  $p=0.015$ ). Similarly, significantly more UK  
244 respondents felt they had inadequate training in providing lifestyle and behavioural  
245 counselling for their patients when compared to non-UK respondents (65% v 21.1%,  
246  $p=0.030$ ).

247

#### 248 Weight management strategies

249 All respondents felt an ideal weight management programme should include dietary  
250 advice (100%) and physical activity advice (100%). Leaflets and education material  
251 were rated as highly important as preventive measures and in general support. (Table  
252 6)

253 A large majority of respondents stated that family support (93.2%) and  
254 behavioural counselling (88.1%) were important. Most respondents would consider  
255 referrals of their patients to a dietitian (84.7%) as a first treatment step.  
256 Pharmacotherapy and bariatric surgery were the least used strategies, only 6.8% of  
257 respondents considered anti-obesity medications, and only 3.4% considered bariatric  
258 surgery as an option for weight management.

259

#### 260 Dietetic provision in SCICs

261 The 22 responding centres house a total of 837 SCI beds. There were 17.45 whole-  
262 time equivalent (WTE) dietitians recorded; the median of 47.9 beds per WTE dietitian  
263 conceals a huge range (from 10 – 420). The workforce allocation is summarised in  
264 Table 2. Non-UK SCICs were significantly better resourced than UK SCICs (beds  
265 per WTE dietitian: 36 vs 124,  $p=0.035$ ).

266

#### 267 Suggestions

268 Ten out of fifty-nine respondents (16.9%) provided additional feedback. All responses  
269 were positive; common suggestions were the need for specific guidelines for weight  
270 management and opportunities to attend training.

271

#### 272 Discussion

273 To the best of our knowledge, this is the first international multicentre survey  
274 to report on knowledge, attitudes and practices of SCIC medical staff in weight  
275 management and on the provisions of dietitians in SCICs. Previous surveys have  
276 primarily focused on obesity management among general practitioners and found that  
277 practices regarding obesity management vary widely.<sup>7-9</sup>

278 Weight gain after SCI is common. This is most likely due to reduced  
279 nutritional requirements secondary to enforced inactivity and immobilisation as a  
280 result of paralysis and changes in body composition<sup>17</sup>, most marked in tetraplegia.<sup>18</sup> In  
281 the long term, there seems to be a tendency for people with SCI to gain weight.  
282 Energy needs tend to decrease as a function of time post-injury related to loss of  
283 muscle mass. Desirable body weight / BMI for people with SCI may be lower than for  
284 the general population.<sup>19-20</sup> After SCI, the percentage of body fat increases and muscle  
285 decreases. The body composition represented by a conventional BMI (overweight:  
286  $>25 \text{ kg/m}^2$ ; obese:  $>30 \text{ kg/m}^2$ ) will be inappropriate after SCI. Buchholz's<sup>19</sup> and

287 Laughton's group<sup>20</sup> highlights that BMI values of over 22 kg/m<sup>2</sup> are associated with  
288 high fat mass in SCI individuals. The present study found that 61% of respondents  
289 considered BMI is to be an inappropriate measure to manage weight in SCI  
290 suggesting further research to define a disease specific BMI or alternative measure is  
291 needed.

292 All respondents agree that successful weight management should start with  
293 prevention. Currently, there are no SCI specific guidelines for prevention and  
294 management of overweight and obesity. Generic guidelines published by the UK  
295 National Institute for Health and Clinical Excellence (NICE) suggest that dietary and  
296 lifestyle changes (a reduction in energy intake, following the eat-well plate set by the  
297 government)<sup>1</sup> and increased physical activity in conjunction with behaviour  
298 modification support should be considered before any anti-obesity medications or  
299 bariatric surgery<sup>20,21</sup>.

300 Although weight loss has been advocated as a primary treatment strategy for  
301 obesity, to date, little high quality evidence exists to support this concept in patients  
302 with SCI. To our best knowledge, only limited trials have reported the effect of  
303 dietary interventions in obese SCI individuals. Studies demonstrate that a carefully  
304 planned program with restricted dietary intake and lifestyle modification could be an  
305 effective way to reduce the body weight of obese patients with SCI without  
306 compromising total lean body mass and overall health.<sup>11,12</sup>

307 It is acknowledged that all patients with SCI should receive dietary advice in  
308 order to prevent obesity and its complications. In clinical practice, for all patients to  
309 be seen individually by a dietitian would lead to an unmanageable caseload. To offer  
310 educational material and input in patient education sessions may be an alternative,  
311 more effective and achievable approach. One UK SCIC offers dietetic input for  
312 patients with a BMI of 28 kg/m<sup>2</sup> or above and the preliminary data has suggested that  
313 this approach has helped overweight individuals with SCI to reduce weight without  
314 compromising lean body mass.<sup>12</sup>

315 Dietitians see as their remit the management of factors related to obesity  
316 surrounding the physiological, psycho-social and ethnic needs of the patient.  
317 Professional guidelines and recommendations offer assistance on how dietitians might  
318 improve the quality of care and outcomes.<sup>22</sup> To tackle malnutrition and nutrition-  
319 related complications, the dietetic practice manual published by the British Dietetics  
320 Association has recommended that each SCIC should have access to a specialist

321 dietitian in order to assess patients' nutritional status and to provide further nutritional  
322 advice.<sup>22</sup> More recently, the American Dietetic Association has also published  
323 guidelines for managing patients with SCI.<sup>24</sup> It has emphasised the importance of a  
324 specialist dietitian in managing patients in acute, rehabilitation and community  
325 settings. The present study found considerable variation in dietetic provision among  
326 SCICs varied between centres and British centres have significantly lower dietetic  
327 provision when compared to some non-UK centres.

328

### 329 Strengths and limitations

330 The main strength of this study is that it is the first official international survey  
331 conducted in a multicentre European setting which obtained an overall 78.4%  
332 response rate from across 4 European countries.

333 Although the respondent sample size (n=59) was small, we feel that this still  
334 reflects the views of SCI doctors working in SCICs. To our knowledge, this  
335 represents at least 46.8% of all senior medical staff in the UK and Ireland SCICs (15  
336 out of a total 32) which is comparable to the literature (53% response rate).<sup>25</sup>

337 Because the centre response rate varied from 2-12 responses per SCIC, some  
338 larger centres may be over-represented in the results. In addition, our technique of  
339 secondary invitation of respondents by selected lead individuals within a SCIC could  
340 introduce selection bias and we acknowledge this; however, guidance was provided to  
341 them to circulate the questionnaire to all medical staff, with varying degrees of  
342 experience and special interest, working in the SCIC.

343 There was a predominance of respondents from the UK (n=40)  
344 compared to non-UK respondents (n=19). Although this arguably over-represents one  
345 country's perspective, it does not reflect the reality of staff mix in the SCI centres.  
346 The numbers of senior medical staff surveyed was comparable in the UK and non-UK  
347 centres (14 vs 19).

348

### 349 Conclusion

350 The present study found little variation in the knowledge, attitude and practices  
351 towards obesity prevention and management of medical staff working in the European  
352 SCICs. Limited knowledge among medical staff and variation in dietetic provision in  
353 SCIC are probably barriers to effective weight management.<sup>4</sup> Without proper  
354 guidelines and training, it is unlikely that healthcare staff will have sufficient

355 knowledge to identify at-risk patients or to offer appropriate treatment. This study  
356 reinforces the need to consider collaborating with national professional bodies to  
357 develop SCI-specific weight management guidelines which include clear guidance on  
358 optimal dietetic service provision within the SCICs.

359

360 Contributions

361 SW- Protocol development, Questionnaire development, data analysis, manuscript  
362 preparation

363 JvM – Questionnaire translation, manuscript revision

364 MB- Clinical supervision, manuscript revision

365 IvN, Local SCIC coordinator, manuscript revision

366 ER – Local SCIC coordinator, manuscript revision

367 ES- Local SCIC coordinator, manuscript revision

368 SH – Statistical supervision, manuscript revision

369 AF – Academic supervision, manuscript revision and guarantor

370

371 Acknowledgements:

372 All authors contributed to the report. The authors are grateful to all medical-staff  
373 facilitating the dissemination of study questionnaires from the UK, the Netherlands,  
374 Belgium and the Republic of Ireland.

375 We also thank the following persons who provided information for this study:

376 Anthony Twist, Sian Gruffudd, Carolyn Taylor, Kim Paterson, Philippa Bearne,  
377 Heather Nunn, Rees Colling, Nusrat Kauser, Tebbe Sluis, Christof Smit, Janneke  
378 Stolwijk, Dirk van Kuppevelt, Govert Snoek, Helma Bongers, Marga Tepper,  
379 Willemijn Faber, Hans Sloodman, David Gobets, Catja Dijkstra, Casper van  
380 Koppenhagen and Annick Viaene.

381

382 Conflict of interest: Parts of the study data were presented at the International Spinal  
383 Cord Society annual conference in October 2013, in Istanbul, Turkey and the British  
384 Association of Parenteral and Enteral Nutrition annual meeting in November 2013, in  
385 Harrogate, UK. University College London (UCL) Staff receive support from the  
386 Biomedical Research Centre funding awarded to UCL and its partner Trust by the  
387 National Institute for Health Research.

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Table 1 Breakdown of respondents (n =59)

Number of respondents and percentage

Grade / Seniority	number of Survey returned	%	Male		Female	
			n,	%	n,	%
Doctors after training	32	54.2	18	(56.3%)	14	(43.7%)
Consultants						
Physician	26	44.1	12	(46.2%)	14	(53.8%)
Surgeon	3	5.1	3	(100%)		
Associate specialist	3	5.1	3	(100%)		
Doctors in training	27	45.7				
Specialist Registrar	9	15.3	5	(55.6%)	4	(44.4%)
Senior House officer	18	30.4	3	(16.7%)	15	(83.3%)
UK medical staff	40	67.8	18	(45%)	22	(55%)
Non-UK European medical staff	19	32.2	8	(42.1%)	11	(57.9%)

Table 2 Centre characteristics and dietetic provision

Centres	no. of SCI beds	total WTE dietitian	no. of beds per WTE dietitian
UK centres	n= 495	n= 5.3	93.4
1	115	1.73	66.4
2	15	0.4	37.5
3	15	0.4	50
4	46	0.4	115
5	48	0.3	153
6	32	0.3	160
7	42	0.27	156
8	62	0.5	124
9	42	0.1	420
10	34	0.6	56.7
11	44	0.3	146.7
Other European centres	n= 342	n=12.15	28.1
1	27	0.7	38.5
2	40	0.3	133
3	30	3	10
4	28	1.2	23.3
5	45	2	22.5
6	22	2	11
7	20	0.05	400
8	38	0.8	47.5
9	28	0.1	280
10	28	1	28
11	36	1	36

WTE: whole time equivalent; UK centres: (England: n=8; Wales: n=1; Scotland: n=1; Northern Ireland: n=1); Other European centres (the Netherlands; Belgium and Republic of Ireland) Median no. of patient per WTE dietitian (UK: 124 v non-Uk european: 36, p=0.0356)

Tabel 3 Medical staff's attitude and knowledge towards obesity management \* P<0.05; † p<0.01

Statement regarding medical staff's attitude and knowledge (no. of responses)			Agree (n, %)	Disagree (n, %)	Neutral (n, %)
<b>Q1. Obesity is a major health problem amongst SCI patients and requires urgent action</b>					
All	(n=59)		47, 76.6%	7, 11.8%	5, 8.5%
UK consultants	(n=14)	p=0.726 (vs UK trainee)	10, 71.4%	3, 21.4%	1, 7.2%
UK trainees	(n=26)		18, 69.2%	4, 15.4%	4, 15.4%
European consultants	(n=19)*	p=0.028 (vs UK Consultant)	19, 100%	0, 0%	0, 0%
<b>Q2. SCI doctors have a limited role in obesity prevention and management</b>					
All	(n=59)		4, 6.8%	41, 64.5%	14, 23.7%
UK consultants	(n=14)	p=0.296 (vs UK trainee)	2, 14.3%	10, 71.4%	2, 14.3%
UK trainees	(n=26)		1, 3.8%	18, 69.2%	7, 26.9%
European consultants	(n=19)	p=0.449 (vs UK Consultant)	1, 5.3%	13, 68.4%	5, 26.3%
<b>Q3. I will only offer advise about weight management if the patients ask for it</b>					
All	(n=59)		8, 13.6%	46, 77.9%	5, 8.5%
UK consultants	(n=14)	p=0.498 (vs UK trainee)	2, 14.3%	11, 78.6%	1, 7.1%
UK trainees	(n=26)		6, 23.1%	18, 69.2%	2, 7.7%
European consultants	(n=19)	p=0.179 (vs UK consultant)	0, 0%	17, 84.2%	2, 10.5%
<b>Q4. Our SCIC has a dietitian that deals with weight management</b>					
All	(n=59)		44, 74.6%	6, 10.2%	9, 15.3%
UK consultants	(n=14)	p=0.575 (vs UK trainee)	13, 92.9%	1, 7.1%	0, 0%
UK trainees	(n=26)		20, 76.9%	3, 11.5%	3, 11.5%
European consultants	(n=19)	p=0.496 (vs UK consultant)	11, 57.9%	2, 10.5%	6, 31.6%

Statement regarding medical staff's attitude and knowledge (no. of responses)			Agree (n, %)	Disagree (n, %)	Neutral (n, %)
<b>Q5. I always monitor the BMI of patients I see as inpatients</b>					
All	(n=59)		21, 35.6%	27, 45.7%	11, 18.6%
UK consultants	(n=14)	p=0.809 (vs UK trainee)	6, 42.9%	5, 35.7%	3, 21.4%
UK trainees	(n=26)		10, 38.5%	10, 38.5%	6, 23.0%
European consultants	(n=19)	p=0.184 (vs UK consultant)	5, 26.3%	12, 63.1%	2, 10.5%
<b>Q6. I always monitor the BMI of patients I see as outpatients</b>					
All	(n=59)		14, 23.7%	29, 49.2%	16, 27.1%
UK consultants	(n=14)	p=0.445 (vs UK trainee)	5, 35.7%	7, 50%	2, 14.3%
UK trainees	(n=26)		9, 34.6%	7, 26.9%	10, 38.5%
European consultants	(n=19) †	p=0.009 (vs UK consultant)	-	15, 78.9%	4, 21.1%
<b>Q7. I do not believe that BMI is appropriate to use for SCI weight management</b>					
All	(n=59)		36, 61.0%	12, 20.3%	11, 18.6%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	9, 64.3%	3, 21.4%	2, 14.3%
UK trainees	(n=26)		15, 57.7%	7, 26.9%	4, 15.4%
European consultants	(n=19)	p=0.635 (vs UK consultant)	12, 63.2%	2, 10.5%	5, 26.3%
<b>Q8. Weight management should be discussed with SCI patients of a healthy weight (BMI: 18.5 to 25) in order to maintain their weight</b>					
All	(n=59)		51, 86.5%	1, 1.7%	7, 11.9%
UK consultants	(n=14)	n/a (vs UK trainee)	13, 92.9%	-	1, 7.1%
UK trainees	(n=26)		22, 84.6%	-	4, 15.4%
European consultants	(n=19)	p=1.0 (vs UK consultant)	16, 84.2%	1, 5.3%	2, 10.5%

Statement regarding medical staff's attitude and knowledge (no. of responses)			Agree (n, %)	Disagree (n, %)	Neutral (n, %)
<b>Q9. Overweight SCI patients (BMI: 25-28) with other co-morbidities should be offered</b>					
Weight loss treatment					
All	(n=59)		51, 86.4%	2, 3.4%	6, 10.2%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	13, 92.9%	-	1, 7.1%
UK trainees	(n=26)		24, 92.4%	1, 3.8%	1, 3.8%
European consultants	(n=19)	p=1.0 (vs UK consultant)	14, 73.7%	1, 5.3%	4, 21.2%
<b>Q10. Treatment for weight loss should be offered only to SCI adults who are obese (BMI&gt;28 kg/m<sup>2</sup>)</b>					
All	(n=59)		11, 18.6%	39, 66.1%	9, 15.3%
UK consultants	(n=14)	p=1.00 (vs UK trainee)	3, 21.4%	8, 57.1%	3, 21.4%
UK trainees	(n=26)		6, 23.1%	16, 61.5%	4, 15.4%
European consultants	(n=19)	p=0.351 (vs UK consultant)	2, 10.5%	15, 79.0%	2, 10.5%

BMI: body mass index

Table 4 Medical staff reported self efficacy

How confident and professionally prepared do you feel to advise / treat			Confident (%)	Not confident (%)	Don't know (%)
<b>Overweight SCI patients</b>					
All	(n=59)		44, 74.6%	15, 25.4%	-
UK consultants	(n=14)	p=0.750 (vs UK trainee)	9, 64.3%	5, 35.7%	-
UK trainees	(n=26)		18, 69.2%	8, 30.8%	-
European consultants	(n=19)	p=0.080 (vs UK consultant)	17, 89.5%	2, 10.5%	-
<b>Obest SCI patients</b>					
All	(n=59)		39, 66.1%	20, 33.9%	-
UK consultants	(n=14)	p=0.787 (vs UK trainee)	8, 57.1%	6, 42.9%	-
UK trainees	(n=26)		16, 61.5%	10, 38.5%	-
European consultants	(n=19)	p=0.257 (vs UK consultant)	15, 78.9%	4, 21.1%	-
<b>Overweight and obese children with SCI</b>					
All	(n=59)		26, 44.1%	33, 55.9%	-
UK consultants	(n=14)	p=0.445 (vs UK trainee)	6, 42.9%	8, 57.1%	-
UK trainees	(n=26)		8, 30.8%	18, 69.2%	-
European consultants	(n=19)	p=0.247 (vs UK consultant)	12, 63.2%	7, 36.8%	-

Table 5 Medical staff reported major limitations in weight management of SCI patients

Potential limiting factors (no. of responses)			Agree (%)	Disagree (%)	Neutral (%)
<b>Short consultation time / work overload</b>					
All	(n=59)		33, 55.9%	17, 28.8%	9, 15.3%
UK consultants	(n=14)	p=0.434 (vs UK trainee)	12, 85.7%	2, 14.3%	-
UK trainees	(n=26)		16, 61.5%	7, 26.9%	3, 11.5%
European consultants	(n=19)*	p=0.018 (vs UK consultant)	5, 26.3%	8, 42.1%	6, 31.6%
<b>Lack of specialist obesity clinic to refer patient to</b>					
All	(n=59)		31, 52.5%	12, 20.3%	16, 27.1%
UK consultants	(n=14)	p=0.189 (vs UK trainee)	8, 57.1%	5, 35.7%	1, 7.1%
UK trainees	(n=26)		15, 57.7%	2, 7.7%	9, 34.6%
European consultants	(n=19)	p=1.00 (vs UK consultant)	8, 42.1%	5, 26.3%	6, 31.6%
<b>Lack of nationally adopted guidelines</b>					
All	(n=59)		38, 64.4%	4, 6.8%	17, 28.8%
UK consultants	(n=14) *	p=0.046 (vs UK trainee)	7, 50%	3, 21.4%	4, 28.6%
UK trainees	(n=26)		16, 61.5%	-	10, 38.5%
European consultants	(n=19)	p=0.264 (vs UK consultant)	15, 78.9%	1, 5.3%	3, 15.8%
<b>Inadequate number of dietitians to refer patients to</b>					
All	(n=59)		22, 37.3%	20, 33.9%	17, 28.8%
UK consultants	(n=14)	p=0.581 (vs UK trainee)	6, 42.8%	5, 35.7%	3, 21.4%
UK trainees	(n=26)		7, 26.9%	9, 34.6%	10, 38.5%
European consultants	(n=19)	p=0.781 (vs UK consultant)	9, 47.4%	6, 31.6%	4, 21.1%

Potential limiting factors (no. of responses)			Agree (%)	Disagree (%)	Neutral (%)
<b>Lack of patient motivation and non-compliance</b>					
All	(n=59)		36, 61.0%	5, 8.5%	18, 30.5%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	10, 71.4%	2, 14.3%	2, 14.3%
UK trainees	(n=26)		16, 61.5%	2, 7.7%	8, 30.8
European consultants	(n=19)	p=1.0 (vs UK consultant)	10, 52.6%	1, 5.3%	8, 42.1%
<b>Lack of provision of a physical activity programme suitable for SCI patients in the community</b>					
All	(n=59)		36, 61.0%	11, 18.6%	12, 20.3%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	12, 85.7%	2, 14.3%	-
UK trainees	(n=26)		13, 50.0%	3, 11.5%	10, 38.5%
European consultants	(n=19)	p=0.239 (vs UK consultant)	11, 57.9%	6, 31.6%	2, 10.5%
<b>Bariatric surgery is not available in my SCI centre</b>					
All	(n=59)		26, 44.1%	11, 18.6%	22, 37.3%
UK consultants	(n=14)	p=0.386 (vs UK trainee)	4, 28.6%	4, 28.6%	6, 42.85
UK trainees	(n=26)		10, 38.5%	4, 15.4%	12, 46.2%
European consultants	(n=19)	p=0.182 (vs UK consultant)	12, 63.2%	3, 15.8%	4, 21.0%
<b>I have had inadequate training in providing lifestyle and behavioural counselling for obese SCI patients</b>					
All	(n=59)		30, 50.8%	14, 23.7%	15, 25.4%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	9, 64.3%	3, 21.4%	2, 14.3%
UK trainees	(n=26)		17, 65.4%	5, 19.2%	4, 15.4%
European consultants	(n=19)	p=0.192 (vs UK consultant)	4, 21.1%	6, 31.5%	9, 47.4%



Potential limiting factors (no. of responses)			Agree (%)	Disagree (%)	Neutral (%)
<b>Lack of adequate knowledge of obesity management after SCI</b>					
All	(n=59)		22, 37.3%	19, 32.2%	18, 30.5%
UK consultants	(n=14)	p=0.141 (vs UK trainee)	5, 35.7%	7, 50.0%	2, 14.3%
UK trainees	(n=26)		13, 50.0%	6, 23.1%	7, 26.9%
European consultants	(n=19)	p=1.0 (vs UK consultant)	4, 21.1%	6, 31.6%	9, 47.3%
<b>Don't believe obesity management is successful</b>					
All	(n=59)		4, 6.8%	46, 78.0%	9, 15.2%
UK consultants	(n=14)	p=0.09 (vs UK trainee)	3, 21.4%	9, 64.3%	2, 14.3%
UK trainees	(n=26)		1, 3.8%	24, 92.4%	1, 3.8%
European consultants	(n=19)	p=0.095 (vs UK consultant)	-	13, 68.4%	6, 31.6%
<b>Lack of interest in obesity treatment</b>					
All	(n=59)		2, 3.4%	53, 89.8%	4, 6.8%
UK consultants	(n=14)	p=1.0 (vs UK trainee)	1, 7.1%	13, 92.9%	-
UK trainees	(n=26)		1, 3.8%	24, 92.4%	1, 3.8%
European consultants	(n=19)	p=0.467 (vs UK consultant)	-	16, 84.2%	3, 15.8%

Table 6 Weight management strategies reported by medical staff

Components to include in weight management programme for SCI patients		Most of the time (%)	Occasionally (%)	Not at all (%)	Don't know
<b>Dietary advice</b>					
All	(n=59)	59, 100%	-	-	-
UK consultants	(n=14)	14, 100%	-	-	-
UK trainees	(n=26)	26, 100%	-	-	-
European consultants	(n=19)	19, 100%	-	-	-
<b>Physical activity advice</b>					
All	(n=59)	59, 100%	-	-	-
UK consultants	(n=14)	14, 100%	-	-	-
UK trainees	(n=26)	26, 100%	-	-	-
European consultants	(n=19)	19, 100%	-	-	-
<b>Behavioural counselling</b>					
All	(n=59)	52, 88.1%	7, 11.9%	-	-
UK consultants	(n=14)	13, 92.8%	1, 7.2%	-	-
UK trainees	(n=26)	21, 80.8%	4, 15.4%	-	-
European consultants	(n=19)	17, 89.5%	2, 10.5%	-	-
<b>Referring to dietitian</b>					
All	(n=59)	50, 84.7%	8, 13.6%	-	1, 1.7%
UK consultants	(n=14)	11, 78.6%	3, 21.4%	-	-
UK trainees	(n=26)	23, 88.5%	3, 11.5%	-	-
European consultants	(n=19)	16, 84.2%	2, 10.5%	-	1, 5.3%

Components to include in weight management programme for SCI

Most of the time (%) Occasionally (%) Not at all (%) Don't know

Provision of anti-obesity medication

All	(n=59)	4, 6.8%	40, 67.8%	11, 18.6%	4, 6.8%
UK consultants	(n=14)	1, 7.1%	10, 71.4%	1, 7.15	2, 14.3%
UK trainees	(n=26)	3, 11.5%	21, 80.8%	1, 3.8%	1, 3.8%
European consultants	(n=19)	-	31, 77.5%	2, 5.0%	3, 7.5%

Referring to weight loss (bariatric) surgery

All	(n=59)	2, 3.4%	41, 69.5%	12, 20.3%	4, 6.8%
UK consultants	(n=14)	-	12, 85.7%	-	2, 14.3%
UK trainees	(n=26)	2, 7.7%	22, 84.7%	1, 3.8%	1, 3.8%
European consultants	(n=19)	-	7, 36.8%	11, 57.9%	1, 5.3%

Leaflets and education material

All	(n=59)	59, 100%	-	-	-
UK consultants	(n=14)	14, 100%	-	-	-
UK trainees	(n=26)	26, 100%	-	-	-
European consultants	(n=19)	19, 100%	-	-	-

Family involvement

All	(n=59)	55, 93.2%	3, 5.1%	-	1, 1.7%
UK consultants	(n=14)	13, 92.9%	1, 7.1%	-	-
UK trainees	(n=26)	25, 96.2%	1, 3.8%	-	-
European consultants	(n=19)	17, 89.4%	1, 5.3%	-	1, 5.3%