

RESEARCH ARTICLE

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Low carbohydrate diet and obesity treatment in primary health care: dietary advice after the new Swedish report

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Abstract

Background: In 2013, the Swedish Council on Health Technology Assessment (SBU) published a report “Dietary treatment of obesity” where low carbohydrate diet (LCD) was established as one of the evidence based diet options in obesity treatment, even without diabetes. No data exists on how much the health care professionals (HCP) in primary care actually are informed of or to which extent they use the knowledge in the new report. We aimed to investigate the HCPs’ current knowledge, attitudes and application of LCD in obesity treatment in primary care.

Methods: All primary health care centres (PHCC) in Jönköping County Council (JCC) were invited to participate in this cross sectional descriptive study. HCPs who were working with obese patients were sent an online survey by email from January to March 2014. Data was collected about self-estimated knowledge, clinical practice of dietary advice and attitudes on LCD as well as demographic data and work related information. Chi2 and logistic regression were used to analyse associations between the independent and the outcome variables.

Results: Two hundred and seventy-one HCPs completed the survey (70.7 %); 95 % gave dietary advice. Those who gave dietary advice, 49 % were uncertain about evidence based dietary advice; 28 % received education on dietary advice last year; 60 % reported patient requests for LCD; 80 % felt hesitant about LCD; 54 % stated that they have good knowledge about LCD and 47 % recommended LCD. Factors that influenced the advisement on LCD were profession (physician and diabetes nurse), patient requests for LCD (OR 0.46, 95 % CI 0.27-0.77, $p = 0.003$) and good knowledge (self-estimated) about LCD (OR 0.43, 95 % CI 0.26-0.71, $p = 0.001$). Recent education on dietary advice affected in a positive way the uncertainty about evidence based dietary advice (OR 0.19, 95 % CI 0.10-0.37, $p = 0.0001$), the hesitancy about LCD (OR 0.37, 95 % CI 0.20-0.71, $p = 0.002$) and self- estimated knowledge about LCD (OR 2.67, 95 % CI 1.49-4.80, $p = 0.001$).

Conclusions: HCPs were positive to dietary advisement but had an ambivalent attitude toward LCD as yet another dietary option. This area may be improved with continuous educational training, supposing that this is prioritized. Thus, it is reasonable to believe that LCD will gradually be more common as a tool to deal with obesity in primary care in the future.

Keywords: Overweight, Obesity, Diabetes, Primary health care, Knowledge, Attitude, Low carbohydrate diet, Dietary treatment, Dietary advice

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Background

Treatment of overweight and obesity is a frequently discussed topic in the scientific community as well as in the public debate world-wide [1–3]. From the numerous trials published in the past years, comparing diets with various macronutrient composition, it can be concluded that interest in the dietary treatment field has increased profoundly. The low carbohydrate diet (LCD) has gained much attention the past two decades, particularly in diabetes care. However, there's no consensus on the definition of LCD and in scientific context the calories of carbohydrates can vary anywhere between 45 % to less than 5 % depending on which diet is studied; low carbohydrate ketogenic diet (<10 E%), LCD (10–26 E%) or moderate carbohydrate diet (26–40 E%) [4]. In 2008 the American Diabetes Association [5] and in 2011 Diabetes UK [6], concluded that evidence exist suggesting a positive effect of this diet on weight loss and improvement of glycaemic control. Moderate LCD is also recommended in Sweden by the National Board of Health and Welfare (NBHW) as one of four dietary options for diabetes management since 2011 [7].

Furthermore, the Swedish Council on Health Technology Assessment (SBU) -report "Dietary treatment of obesity" from 2013 [8] states that LCD is evidence based in obesity treatment, even without diabetes. The report concluded that in the short-term (up to six months) LCD alternatives (strict ≤ 20 E% or moderate ≤ 40 E%) resulted in more weight loss than low fat dietary advice and in the long-term, several dietary alternatives (LCD, low fat, high protein, low GI, Mediterranean diets) lead to weight loss and tended to be fairly equivalent [8]. Johnston et al. found similar results and conclusions in their meta-analysis; supporting the practice of recommending any diet that a patient will adhere to in order to lose weight [9]. Thus, patients with obesity can now receive better, more customized but still evidence based dietary advice.

However, national [10] and international [11–14] studies have identified obstacles to the implementation of obesity treatment in daily clinical work within primary care. Some of the more common factors described are lack of knowledge [10, 13], lack of positive attitude [11–13] among the staff working with obese patients, vague guidelines [10, 12] and lack of practical descriptions on how to implement the guidelines [12–14]. The choice of treatments offered to patients often depends on local conditions or traditions [13].

In the Jönköping County Council (JCC), Sweden, a well-established health promoting and disease preventing program is conducted at every primary health care centre (PHCC) [15]. In addition to the physicians and diabetes nurses, specially trained staff (lifestyle counsellors) also give health counselling including dietary advice.

Yet little is known about the health care professionals' (HCP) self-perceived knowledge, attitude and practices related to dietary advisement, particularly advice on LCD as an option in obesity treatment. The purpose of this study was to investigate this in the JCC primary care.

Methods

Study sample

The target population of this cross-sectional descriptive study were all currently employed physicians (general practitioners and general practitioner trainees), diabetes nurses i.e. nurse practitioners who are integrated into primary care diabetes teams and lifestyle counsellors at public (31 units) and at private (21 units) PHCC in JCC. These HCPs were expected to give dietary advice to overweight and obese patients in their clinical practice. Each unit had 2–10 physicians, 1–2 diabetes nurses and 2–4 lifestyle counsellors depending on the unit's size. Accordingly, physicians were the largest group followed by lifestyle counsellors at units that provide dietary advice. HCPs were excluded if they were not providing dietary advice in their clinical practice.

Approval for contact and an up-to-date list of these HCPs was obtained from the County administrative director at the public PHCC or the operational managers at the private PHCC. All of the 31 public and 10 of the private centres chose to participate in the study.

Ethic

This study did not require ethical approval, according to the Swedish Central Ethical Board, the Ethical Review of Research Involving Humans, Act 2007/08:44. The participation was voluntary, sensitive personal data was not involved, the respondents was anonymous for the study conductor by esMaker survey tool and any risk of harming subjects physically or psychologically not clearly involved.

Data collection

The HCPs were contacted after approval with an informative email about the survey a week before onset. During January- March 2014, a cover letter and a link to an online, self-administrated survey was sent by email. The cover letter contained a presentation of the authors, the purpose of the study, its method and a clear statement that participation in the study was entirely voluntary, and that the results would be analysed and used anonymously. The survey took less than 10 min to complete. Four reminders were sent with a one-week gap to maximize the number of participants. esMaker (Entergate AB software development, USA) [16] was used as the survey tool, which guaranteed both the anonymity and the confidentiality of the respondents.

The questions in the survey were obtained from a previously published study [8] and were further developed to suit the purpose of our study. The 20 questions in the survey were mainly one- or multiple- choice alternatives (Additional file 1). The first part contained neutral questions such as demographic data and work related information (gender, age, profession, years in profession, and type of employment). The second part investigated the last educational training on obesity treatment, self-estimated knowledge, clinical practice of dietary advice and attitudes on LCD. Two open-ended questions were included to collect data about experience related to LCD advisement.

Data analysis

The responses from esMaker were transferred to a database where the results were compiled and analysed using Statistica 12 (StatSoft Inc, Dell Software, Tulsa, USA) [17], statistical software. Analyses began with simple frequency counts for categorical variables (gender, age group, profession, etc.). Most of the variables were characterised dichotomously or converted into dichotomous values in order to enable relevant statistical analysis. The Chi square test was used to explore the association between each of the categorical questionnaire items and the key variables of interest. Logistic regression was used to study the factors associated with recommendation of LCD and with the knowledge on evidence-based dietary advice. P values < 0.05 were regarded as significant. The open-ended questions were analysed using content analysis. This involved categorising specific responses with similar meanings into broader themes.

Results

In total, 383 online surveys were distributed and 271 were answered completely. Of these, 14 respondents were excluded since they did not give dietary advice. The included respondents were predominantly female (71 %), ≤ 50 years old (60 %) and employees of public medical health centres (80 %). Most of them (72 %) had received their most recent education on dietary advice more than one year ago. The distribution of gender, profession and type of employment of the included respondents was similar to the target population (Table 1).

Practice of LCD advice

Overall, 47 % of the participants recommended LCD to obese patients. Only 32 % of the lifestyle counsellors recommended LCD which was significantly less than physicians (50 %) and diabetes nurses (61 %). Other factors associated with recommendation of this diet option were patient request for LCD, good knowledge (self-estimated) and no hesitancy towards LCD (Table 2).

Table 1 Characteristics of the included respondents and target population

Variable	Included respondents N = 257	Target population N = 383	p-value
Gender			0.30
Female	183 (71 %)	258 (67 %)	
Age			
≤50 years	153 (60 %)		
Profession			0.52
Physician	150 (58 %)	237 (62 %)	
Lifestyle counsellor	71 (28 %)	103 (27 %)	
Diabetes nurses	36 (14 %)	43 (11 %)	
Years in profession			
≤10 years	124 (48 %)		
>10 years	133 (52 %)		
Type of employment (public/private)			0.27
Public medical health centers	206 (80 %)	320 (84 %)	
Continuing education on obesity treatment			
Never or more than a year ago	185 (72 %)		

Included respondents = respondents who give dietary advice
Target population = all HCPs at PHCC in JCC expected to provide dietary advice
Chi-square test was used for two-tailed p-value

Analyses of the comments from the two open-ended questions revealed that the most frequently mentioned benefit was health improvements and the most common disadvantage was that the long-term effect are unknown (Table 3). Ninety-one percent of the LCD advisers stated benefits and 57 % stated disadvantages.

Knowledge (self-estimated) on LCD and on evidence based dietary advice

Fifty-four percent of the participants stated a good knowledge (self-estimated) about LCD, with a significant gender difference within profession physicians. Male physicians more often reported good knowledge about LCD than female physicians ($p = 0.02$).

Half of the participants (49 %) felt uncertain about evidence based dietary advice. Logistic regression showed less uncertainty among lifestyle counsellors vs physicians (OR 0.49, 95 % CI 0.27-0.88, $p = 0.01$) and a higher uncertainty among physicians with fewer years in the profession (<10 years) vs veteran physicians (OR 2.78, 95 % CI 1.43-5.41, $p = 0.002$).

Continuing education in dietary counselling during the last year was associated with less uncertainty about evidence based dietary advice (OR 0.19, 95 % CI 0.10-0.37,

Table 2 Factors associated with recommendation of LCD

Variable	Odds ratio	95 % CI	p-value
Profession			
Physician	2.08	1.15-3.76	0.01
Lifestyle counsellor	1 (Ref)		
Diabetes nurse	3.27	1.42-7.55	0.005
Knowledge (self-estimated) on LCD			
Yes	1 (Ref)		
No	0.43	0.26-0.71	0.001
Patients requests for LCD			
Yes	1 (Ref)		
No	0.46	0.27-0.77	0.003
Hesitancy towards LCD			
Yes	0.13	0.06-0.28	0.000
No	1 (Ref)		

CI confidence interval

$p = 0.0001$) and higher knowledge on LCD (OR 2.67, 95 % CI 1.49-4.80, $p = 0.001$).

Attitude on dietary advice and on LCD

HCP's attitude

Nearly all participants (91 %) agreed that the employer should promote even more nutritional counselling. Overall, 65 % of the participants asked for more educational training and 26 % regarded the dietician as the

Table 3 The LCD advisers comments from open-ended questions about benefits and disadvantages of LCD

Theme from questions benefits/disadvantages	Frequency of mention N (%)	Comments
Benefits		
Health improvements	44 (40 %)	Improved blood glucose, improved blood pressure, better health
Weight loss	32 (29 %)	
Easy diet	26 (24 %)	Easy to follow, do not have to count calories, better saturation, less hunger, easy to explain
Disadvantages		
Long-term effect unknown	40 (58 %)	High fat intake, deficiency of vitamins and fibre
Difficult to follow and gives side effects	19 (28 %)	Difficult to vary/monotonous diet, do not fit the everyday life
Does not fit everyone	16 (23 %)	With physical training must have carbs, must have bread and potato for good life quality, those who have insulin regime, do not tolerate fat

The comments are ranked by frequency of mention for benefits and for disadvantages
Total possible N (number of included respondents who give LCD advice) is 120

most suitable health care provider for the dietary treatment of patients with obesity. Further analyses showed that physicians referred the nutritional counselling to dieticians more than lifestyle counsellors ($p = 0.01$) and diabetes nurses ($p = 0.01$) did.

Hesitancy towards LCD was high (80 %) among the participants, highest (93 %) among those who did not recommend this diet option. The most frequently reported reasons for this hesitancy were perceived knowledge gaps (34 %), lack of clear recommendations from the NBHW (25 %), and concerns about side effects (16 %). A few (5 %) comments were about bad experiences with LCD, stating that better alternatives to weight loss were available.

Those who reported uncertainty regarding evidence based dietary advice also reported hesitancy towards LCD ($p = 0.001$). Continuing education in dietary counselling during the last year was associated with less hesitancy towards LCD ($p = 0.002$).

Patient's attitude experienced/perceived of HCP

Thirty percent of the participants stated that their dietary advice was questioned. Figure 1 shows the percentage distribution of the participants answers regarding questioned advice. Most questioned was the proportion of fats in the diet, especially the saturated fats but also polyunsaturated fats. Carbohydrates like potatoes, bread, pasta and rice, were also highly questioned. The least questioned macronutrients were the meats and fish. There were certain differences in the reported macronutrients which were questioned. LCD advisers more often reported that polyunsaturated fats and potatoes, bread, pasta, rice were questioned, HCPs who did not give LCD advice more often reported that saturated fats were questioned. Of the participants, 60 % reported that patients had asked for LCD as a treatment option for obesity.

Discussion

The results of our study provide the first data on the current status of LCD practice in obesity treatment in Swedish primary care. As far as we know the study is also the first with focus on all the HCPs working with overweight or obese patients. Most of the previous studies that investigated knowledge, attitude and practice of dietary advisement usually did so in one profession, mostly physicians, and on obesity treatment in general instead of on a specific dietary option.

Nearly half of the participants recommended LCD for weight loss; a somewhat surprisingly low number considering the increasing evidence both in diabetes and obesity treatment the last few years [6–8]. Physicians and diabetes nurses recommend it to a significantly higher degree, which may indicate that the LCD concept

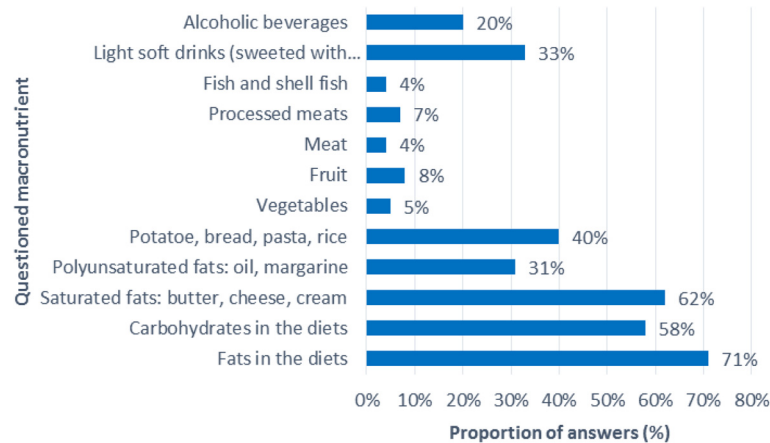


Fig. 1 Distribution of HCPs responses regarding mainly questioned diet advice by patients

is under wider acceptance in the diabetes context. The reported benefits were consistent with previously described benefits in studies [18–20] and guidelines [7, 8]. The main disadvantage reported was concerns about long-term effects.

Despite the fact that twice as many male physicians than female physicians stated that they had received recent educational training on LCD, and that male physicians reported significantly more often a good knowledge (self-estimated) about LCD than female physicians, we did not find gender differences in the recommendation of LCD. This suggests that other factors than knowledge and education affect what advice the HCPs provided.

Previous studies on attitude showed that attitude had greater impact on clinical practice than education [21–24]. In our study, many (80 %) HCPs felt hesitant towards LCD and this hesitancy was associated with perceived knowledge gaps. However, the findings in our study did not show which of these factors has the most impact on clinical practice of LCD advice. No comparative studies were available except one previous study from the USA describing that Atkins (a variant of LCD) was the least recommended approach for weight loss, despite the diet's superior weight loss results and more favourable metabolic effects than low fat diets [11].

Our findings also suggested that HCPs perceived a shortage of clear recommendations from the policy makers (NBHW), as is so often pointed out in other obesity management studies [10, 12, 13]. The SBU-report is an evidence based document and an important source of information for decision-making authorities such as the NBHW as well as for those who work practically in health care [25]. No new national guidelines from NBHW have yet been published after the SBU-report and the HCPs pursue a wait-and-see policy until the guidelines come.

Other interesting findings were that the media debate on LCD as dietary advice was reflected in the answers to the questions relating to patient attitudes perceived by the HCPs (diet composition) as well as to the HCP's attitude (diet composition and long-term effect). Similar results were found in the praxis survey conducted for the SBU-report that the proportion of the fats, especially the saturated fats, and the proportion of the carbohydrates in the diet, were the most contested issues [8].

Similar to others, we found that most of the HCPs considered dietary advisement important in obesity management [10, 26] and that more educational training was desirable [11, 27]. Moreover, the few (28 %) participants who received their education in dietary counselling less than one year ago felt more confident about evidence based dietary advice and were to a higher degree positive to LCD advisement, indicating that education and training influences the level of self-estimated knowledge and the attitude toward newer treatment options. This finding is consistent with other studies [23, 28].

Limitations

A potential limitation of the study is that it was conducted in only one county and that only 10 of the 21 private centres chose to participate in the study. JCC has one of the largest population in Sweden and has a well-developed primary health care. The majority of the HCPs are employed at public centres. Those private centres which chose to not participate were small centres with few employees. Thus the composition of the participants could be considered as representative for the Swedish primary care, which increases the reliability of our findings on a national scale.

Another limitation is that there is always a risk that those who are interested in diet issues will answer a survey on this topic more frequently, or that the self-reported answers create a false image of the respondent's

knowledge, attitude, etc. The high response frequency in our study, and the fact that all HCPs in PHCC in JCC working with dietary advice at the time of the study were invited, probably lessens the selection bias.

Conclusions

Overall, our study showed that HCPs were positive to dietary advisement but had an ambivalent attitude toward LCD as yet another dietary option in obesity management. They felt uncertain about the side effects and about the long-term effects, especially related to a higher intake of saturated fat. Our study also suggests that this area may be improved with continuous educational training supposing that this is prioritized. Thus, it is reasonable to believe that new guidelines will follow the SBU-report similar to the guidelines for diabetes treatment and that LCD will gradually be more common as a tool to deal with obesity in primary care in the future.

Additional file

Additional file 1: Welcome to the 20 questions about dietary advice. (DOCX 14 kb)

Abbreviations

LCD: Low carbohydrate diet; SBU: Swedish Council on Health Technology Assessment; JCC: Jönköping County Council; PHCC: Primary health care centres; HCP: Health care professional; NBHW: National Board of Health and Welfare.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

GB participated in the design of study, distributed the survey, performed the statistical analysis and helped to draft the manuscripts. AT participated in the design of study, contributed to the interpretation of data and helped to draft the manuscript. CJO contributed to the interpretation of data and helped to draft the manuscript, including final editing. All authors read and approved the final manuscript.

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