doi: 10.1111/cob.12158

Early dumping syndrome is not a complication but a desirable feature of Roux-en-Y gastric bypass surgery

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What is already known about this subject?

- Dumping syndrome (DS) after Roux-en-Y gastric bypass (RYGB) surgery is a well-known phenomenon.
- Healthcare professionals have divided opinions about how to classify DS: the majority sees it as a *complication*, a few consider it a *side effect* or a *consequence* and exceptionally it is interpreted as a *desirable feature* of RYGB surgery.

What does this study add?

- Although the symptoms are unpleasant, patients after RYGB surgery consider DS to be positive, because they perceive that the symptoms help them maintain control over their food intake.
- Healthcare professionals should come to a common interpretation of DS and embrace the patient's view of the symptoms as a desirable feature for controlling eating behaviour and food intake.

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Received 24 May 2016; revised 27 June 2016; accepted 3 July 2016

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Summary

Early dumping syndrome after gastric bypass surgery due to rapid delivery of hyperosmolar nutrients into the bowel causing intense symptoms is often described as a complication. Twelve patients, mean age 47 years, were interviewed approximately 9 years post-operation. The interviews were audiotaped and transcribed verbatim, followed by an inductive content analysis to reveal patients' experience of the dumping syndrome. The core category 'Dumping syndrome is a positive consequence of Roux-en-Y gastric bypass surgery and a tool to control food intake' was identified based on the following four sub-categories: (i) 'The multidimensional emergence and effects of dumping syndrome', (ii) 'Dumping syndrome as something positive although unpleasant', (iii) 'Developing coping mechanisms and ingenious strategies' and (iv) 'My own fault if I expose myself to dumping syndrome'. From the patients' perspective, dumping syndrome gives control over food intake; although the symptoms were unpleasant, patients considered dumping syndrome as a positive protection against over-consumption. Hence, healthcare professionals should not present dumping syndrome as a complication but rather as an aid to control eating behaviour and excessive food intake.

Keywords: Dumping syndrome, psychological adaptation/coping skills, qualitative research.

Introduction

Dumping syndrome (DS) after upper gastrointestinal surgery is a common phenomenon, and bariatric surgery is currently the most common cause of post-operative DS. Symptoms of DS can be classified as early or late, depending on how soon they occur after ingestion. Early DS occurs as a result of rapid delivery of nutrients into the small intestine, and the release of vasoactive substances, incretins and hormones, causing numerous symptoms 10–30 min after food intake (1,2). Early DS comprises both gastrointestinal symptoms (such as abdominal pain, diarrhoea, borborygmi [rumbling sound due to the fluid flow], nausea and bloating) and vasomotor symptoms (such as tiredness, a need to lie down after meals, palpitations, perspiration, tachycardia and hypotension) (2,3). Late DS, which we prefer to label reactive hypoglycemia (RH), occurs 1–3 h after ingestion of a meal and includes symptoms such as perspiration, palpitations, hunger, fatigue,

confusion, aggression, tremor and syncope (2,4). The underlying mechanisms for DS are not completely understood, although symptoms of DS and RH are considered to have a distinct underlying pathophysiology (2,5,6). Early DS is not considered harmful, while RH can have serious consequences. In summary, the differences between DS and RH are the timing and symptoms, where the DS provides gastrointestinal and vasomotor symptoms as stated above, while RH causes symptoms that are related to hypoglycemia such as tremor, weakness, hunger and, in severe cases, neuroglycopenic symptoms such as confusion, visual disturbances, difficulties to concentrate, slurred speech, cramp and syncope. However, both DS and RH cause palpitations and perspirations.

Most studies on early DS after RYGB surgery use quantitative methods, and very few use a qualitative approach (7–10). A Norwegian study with a phenomenological approach concluded that after RYGB surgery, women experienced dumping as unpredictable and complex, and that DS had a profound impact on their process of adjustment (7). In another Norwegian study, patients reported that the whole day revolved around planning and consuming meals, including regulating and prioritizing the proper amount of food, because they had to eat frequent small meals (9), but patients also reported that the first year required trial and error. There are major differences in the reporting of DS prevalence, from 10% of patients after gastric surgery (11) to 75% after RYGB surgery (12), depending on the reporting method used.

Traditionally, DS has often been regarded as a complication because it was first described in other populations undergoing surgeries for a completely different purpose than to improve or cure obesity, e.g., total gastrectomy due to cancer or Billroth II surgery due to a stomach ulcer. In the case of RYGB surgery, healthcare professionals have different interpretations of DS; the majority considers DS to be a *complication* of RYGB surgery (2,5,10,13–18), one defines DS as a *consequence* of the surgery (8) and occasionally it is seen as a *desirable feature* (12,19–21). If healthcare professionals do not take a common view of DS, it may be difficult for patients to relate to and cope with the syndrome and its consequences.

Hence, the aim of this study was to investigate DS from the patient's perspective using a qualitative method, and thereby to increase understanding about how healthcare professionals should relate to the phenomenon and present it to their patients.

Materials and methods

Design and participants

A qualitative, semi-structured interview study was performed, using an inductive content analysis method. Patient selection employed a purposive sampling strategy, such that patients who still experienced DS approximately 9 years after RYGB surgery – and thereby best could address the research questions – were invited to participate in the study. Sixteen patients were identified from earlier research records and were contacted by mail with information about the study; this was followed by telephone contact, when they were given further details about the study and an opportunity to ask questions. Four patients declined to participate, of which two did not experience DS and two due to lack of time. The remaining 12 patients agreed to participate and decided where they wanted the interviews to be carried out: five preferred the hospital, four chose to be interviewed at home and the remaining three preferred their workplace. Before starting the interviews, patients were again informed that participation was voluntary; they were asked whether they had any questions and thereafter signed a written informed consent. All interviews were audiotaped and transcribed verbatim, with a patient code to ensure confidentiality. All 12 patients were operated on with RYGB technique, as described in detail elsewhere (22).

An interview guide with open-ended questions, such as *What did you know about dumping before surgery?*, *Can you describe what dumping is to you?*, *Is dumping positive or negative?*, and was used together with follow-up questions when needed, such as, *Interesting, can you describe it further?* Before ending the interview, a short summary was made by the interviewer (AL) to ensure that the patients' narratives had been understood satisfactorily, which also gave the patients an opportunity to add further comments about DS that had not been covered by the interview schedule. The transcripts were produced by a medical secretary and checked for consistency by the researcher who conducted all the interviews. Mean interview time was 40 min, with a range of 20–70 min.

Patients also filled in the Dumping Syndrome Rating Scale (DSRS), which is a self-assessed questionnaire containing 10 items associated with DS and measuring DS severity and frequency. DSRS has been validated on over 100 RYGB patients, through cognitive interviews, test–retest reliability, internal consistency reliability, construct validity and known-groups validity and is considered as a reliable clinical screening instrument that can be used to identify patients with severe DS; however, there are no cut-off values for the DSRS (3).

Ethical considerations

The regional ethical board of the University of Gothenburg approved the study (D-no: 588–14), and the study was performed in accordance with the Declaration of Helsinki. Before being included in the study, patients received verbal and written information and filled out a written informed

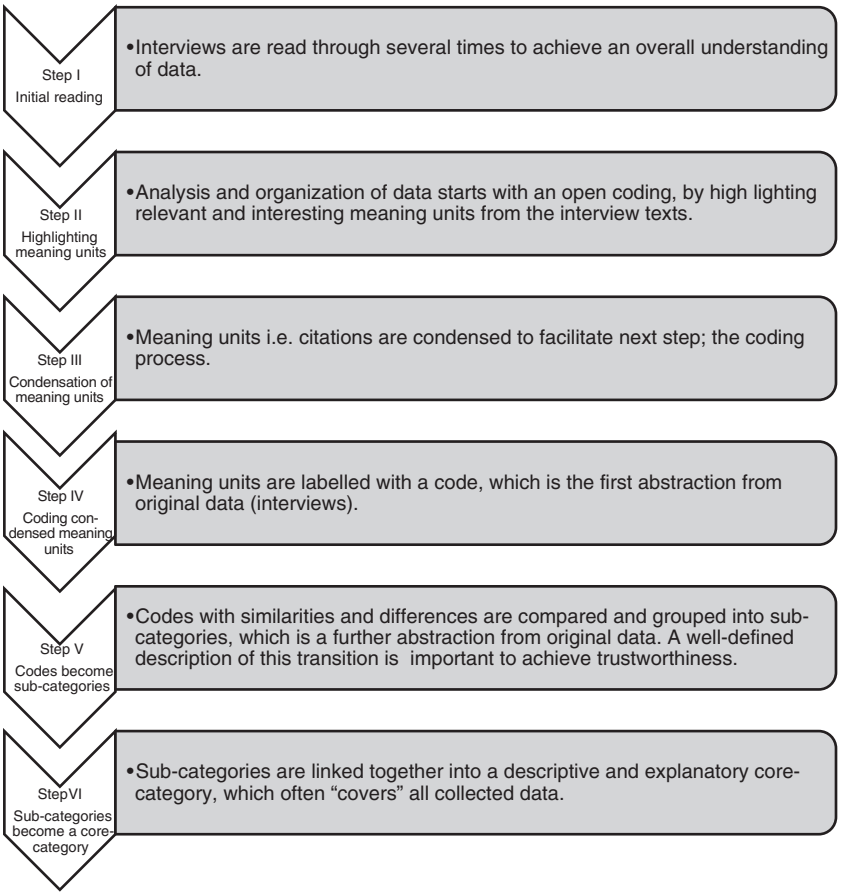

Figure 1 Model for inductive content analysis.

consent. During the study, patients were informed that participation was voluntary and that they could cancel their participation at any time during the study.

Data analysis

When studying a sparsely investigated topic, such as the patient's perspective on DS, an inductive content analysis is an appropriate method, partially because of its sensitivity to the studied content, namely, the interviews. It provides a systematic analysis (23), examining the text from the specific to the general, so that individual examples are highlighted and thereafter combined into general conclusions that can lead to new insights within unexplored research fields (23) (Fig. 1).

When all interviews had been transcribed, the overall content analysis proceeded as follows: Initial readings of the transcribed interviews were carried out, giving a general impression of the content of the patients' narratives. Thereafter, relevant meaning units were highlighted and condensed, and these condensed meaning units were then labelled with a code. Finally, codes were abstracted and grouped together by similarities and differences into four sub-categories and one core category.

To achieve trustworthiness in the analysis process, the recommendations of Elo *et al*. (23,24) were followed; thus, one of the researchers was responsible for the analysis and the other researcher followed the process closely. Multiple discussions were held concerning the codes, abstraction process and categories (8). Both researchers read all the interviews. The authors are experienced within the clinical and research field of bariatric surgery, and they were therefore able to continuously reflect on their preconceptions during the data collection and analysis (4,25–28).

Results

Patients

Eight women and four men, mean age 47 years (range 32–58 years), participated in the study and the interviews took place an average of 9 years (range 7–10 years) after RYGB surgery. The mean preoperative body mass index (BMI) was 46.1 (range 37.3–57.1) kg m^{-2} and the self-reported BMI at the interview was 32.5 (range 23.5–41.5)

Table 1 Background characteristics of the interviewees

Patient	Sex (F/M)	Age (years)	Time since surgery (years)	BMI at surgery (kg m^{-2})	Current BMI (kg m^{-2})
1	F	32	8	47.9	32.4
2	F	51	9	37.3	26.8
3	M	46	9	40.2	31.7
4	F	48	9	57.1	41.5
5	F	44	8	47.0	40.9
6	F	43	9	46.2	35.1
7	M	43	8	48.9	32.2
8	F	49	10	47.2	23.5
9	M	58	8	44.6	31.4
10	F	50	8	46.4	30.4
11	F	53	8	48.7	31.4
12	M	44	7	41.1	32.9

kg m^{-2} (29,30). Background characteristics of the interviewees are presented in Table 1.

The results of the content analysis are reported in the following four sub-categories (i1) 'the multidimensional emergence and effects of dumping syndrome', (ii) 'dumping syndrome as something positive although unpleasant', (iii) 'developing coping mechanisms and ingenious strategies' to master symptoms and, finally, (iv) 'my own fault if I expose myself to dumping syndrome', all resulting in the core category 'Dumping syndrome is a desirable feature of Roux-en-Y gastric bypass surgery and a tool for controlling eating behaviour and food intake' (see Table 2).

Dumping syndrome emergence and effects

The emergence and effects of DS were seen to be multidimensional. Besides food choices, eating behaviour played an important role in the occurrence of DS. Several informants explained that having regular meals was important, because they were more likely to get symptoms if they had not eaten for several hours.

> 'If it's a stressful day, e.g., you're more likely to skip lunch and then you have much more to eat for dinner at home instead and so that's … when you get the dumping.'

Furthermore, eating more slowly was important, and even if many informants were aware of this, eating slowly was sometimes difficult. A restaurant menu was also described as troublesome, and if they were served a smorgasbord, which is common in major holidays, these patients had to be extra careful because buffets and smorgasbords traditionally include fatty foods with only a few vegetables; in other words, foods that easily provoke DS.

> 'Especially when there's a buffet or Christmas dinner and suchlike, well – I take a plate and then put on it exactly what I intend to eat, and then I won't take any more.'

> 'So there's never really any point for me to even, you know, consider a restaurant menu.'

The choice of food plays a major role and many stated that not only high-carbohydrate foods trigger DS, but also fatty foods.

> 'Well, I stay away from fatty foods and sugar and suchlike.'

> 'If I eat food that's too greasy, then it makes me dump. So do some illogical dishes that I don't understand why they make me dump.'

Regularity, pace of eating, portion size and food choices were described by most of the informants as important factors associated with DS. Furthermore, some informants explained that drinking with the meal could lead to DS and that the risk was highest with the first meal of the day. DS was reported to result in a broad range of symptoms: fatigue and nausea were the most common, but also feeling warm and sweating. The severity varied: some reported that they became very sick, whereas others claimed that they could accept a dumping episode as it allowed them to eat what they wanted.

> 'I can eat, I've bought ice cream – full-cream ice, in fact – so I can take it, and then I know that I, that's when I get dumping. And then I lie down on the sofa and it goes away after half an hour.'

Unpleasant symptoms with positive effects

None of the informants described DS as a complication, and despite the fact that the symptoms are unpleasant, the participants did not want to be without the restraining factor that they considered DS constituted.

> 'Yes, that it's so to say nothing to be afraid of, it goes away, after all. It is very unpleasant but it will go away. So I think that you should… Yes, it is positive and so

Table 2 The core category based on four sub-categories and example of citations from the interviews, analysed according to an inductive content analysis method

Core category	Dumping syndrome is a desirable feature of Roux-en-Y gastric bypass surgery and a tool for controlling eating behaviour and food intake			
Sub-category	1. Dumping syndrome emergence and effects	2. Dumping syndrome as something positive although unpleasant	3. Developing coping mechanisms and ingenious strategies	4. My own fault if I expose myself to dumping syndrome
Example citations	'I sometimes catch myself eating too fast. And then I don't feel full, and then I can't stop in time and the dumping is inevitable.' 'I get very hot and sweaty, and you can't sit, stand, or breathe, and you can't really do anything. You become very sick.'	'I can't say that it is a positive experience … but it is not something negative. It's more that I … maybe something that I should watch out for.' 'Yes, if I hadn't gotten this dumping then I would certainly have carried on shovelling unhealthy food into my mouth.'	'I know what to do, so if I'm in an inconvenient situation, I am probably not so stupid as to eat so badly.' 'Yes, they ply you with food – the fact is that when people offer you food, they want you to eat! Taking another helping is basically out of the question! It has to be a tiny amount and preferably a little more salad, so it looks a lot on your plate.'	'Because as long as I get dumping, it must mean that the basic problem is not solved, that I am not eating properly of my own accord.' 'Because obviously dumping is, after all, a signal that I am doing something wrong.'

you … that it becomes a frame of reference. A good frame of reference.'
'I do *not* want to get rid of it because it's a reminder to me that – yes … it, it's like a bad, bad friend.'

'I think it's positive, I usually call it Antabuse for fatties!'

The majority of the informants were convinced that DS had a restraining effect regarding energy intake and was a security against regaining weight.

'Otherwise I would certainly have gone up in weight again.'

'Yes, I want it to be limited…'

Patients developed coping mechanisms and ingenious strategies

All patients developed coping mechanisms and ingenious strategies to master DS, and patients dwelled particularly on how they adapted after surgery in order to avoid DS. They used their experience of DS to develop strategies in response to the negative feedback mechanism that DS provided.

'Then I feel better if I eat regularly.'

Most stated that they could control their DS and that they chose their opportunities to expose themselves to symptoms. Another thing that patients proclaimed was that they learned how to deal with the DS by time so that they learn what and how much they can eat, which was considered both positive and negative.

'So I think at least the first few years you are very, very careful not to eat foods you think will give you dumping symptoms. Now I have learned how to eat the food and how much I can eat, which is, I suppose, both an advantage and a disadvantage (laughs).'

Coping mechanisms reflected the stigma that patients felt before surgery, which they used to their advantage in their attitude towards DS.

'I know what I've been through and I don't want to go through that again. I would rather have some dumping occasionally than end up in the same situation again.'

One woman who said that the DS was a result of her own stupidity also felt that it was best not to attach too much importance to it. This suggests that the patients might place an emphasis on DS as a part of their conceptualization of RYGB surgery. Another informant stated that DS should not be a reason to be reluctant to have the surgery.

Strategies to prevent DS were many and ingenious: one was to choose the right occasion to take the risk; another was to eat with caution. There were also substantially stronger strategies, such as imagining that you have a wound in your stomach.

'So then, when I know I'm going to do something special – then I absolutely mustn't get the dumping!'

'So keeping regular habits can be one thing, a strategy to try to eat regularly and making a few choices, not taking so much of the things that you know cause dumping.'

'That's what I say to people I meet who've had surgery. I say, "Eat as if you have an open wound in your stomach".'

Other strategies were to make plans in advance, e.g., by contacting a conference administrator and explaining what you cannot eat, by permitting yourself to leave food on your plate (even though others may comment on it) and by taking salad and distributing it on the plate, so that it looks more than it is, if forced to take extra helpings.

'Often when I travel on business or eat out, I have it under control; there are often several options. When I go on courses and conferences, I usually let them know in advance about dishes that I can't eat.'

'You're allowed to leave food. I actually found it very hard in the beginning when we were eating out: if the food was delicious and I didn't finish it, then the chef or whoever said, "So, wasn't the food good, then?" "Oh no, it was delicious".'

My own fault if I expose myself to dumping syndrome

Patients reported a large degree of self-blame, claiming that it was their own fault if they exposed themselves to DS and its consequences.

'Because you feel so literally washed out that you become fed up with yourself.'

'But it was more that I was stupid for not thinking before I ate, as it didn't really occur to me then … to stop myself.'

In addition to self-blame, some of the informants also gave accounts of other people they knew (relatives, friends and colleagues) who, by eating badly, often expose themselves to DS. One of the informants stated that her friend used DS as an excuse when she had eaten food she should not eat.

Dumping Symptom Rating Scale

Regarding the DSRS, 7-point severity scale, the majority of participants gave mainly the responses *no trouble at all, minor inconvenience* or *mild trouble*, all in the lower part of the severity scale; thus, substantial floor effects were noted for most symptoms (Table 3a). None of the participants responded *severe problems* or *very severe problems* (in the upper part of the severity scale) for any of the 10 symptoms. On the 6-point frequency scale, the results again showed a substantial floor effect (Table 3b). The participants stated *no trouble at all* or *less than once a week* for feeling nausea or urge to vomit, stomach cramp and feeling faint or shaky.

Discussion

Method discussion

No scientist is a completely blank slate and there is no 'uncontaminated' place to start a research project (31). The researcher as an instrument needs to sensitize and explain all preconceptions; otherwise there is a high risk of bias (24). Our preconceptions are based on a long experience with patients undergoing RYGB surgery, both clinically and by quantitative (3,26,32–37) and qualitative (27,28,38) research into the normal course of the surgery and into patients with complications (4,39–42). In this study, we combine qualitative with quantitative methods, and both point in the same direction: the floor effects observed in the DSRS results enhance the opinions expressed by the patients in the interviews. The study leads to a more detailed and in-depth knowledge that can provide a greater understanding of the phenomenon than a study with a purely quantitative approach can offer.

This study shows that none of the 12 patients considered DS as a complication; rather, they saw it as a security against over-consumption of high-calorie foods, large portions and weight regain.

DS has been suggested as a possible cause of weight loss after RYGB surgery because of the negative feedback mechanism when consuming high-calorie foods, similar to the negative feedback responses to particular tastes and smells (taste aversion) which is associated with nausea and vomiting. Despite this, numerous studies (3,12,21,43) have failed to show an association between DS and weight loss. Such a relationship is, however, difficult to demonstrate, as some people, through favourable food choice and eating behaviour after RYGB surgery, reduce their exposure to DS and increase their prospect of a good weight loss outcome. Our patients had a mean weight loss of 30.1% (range 13.0–50.3%), which mirrors the weight loss seen 10 years post-operatively in other studies (44).

Studies have shown that even patients undergoing sleeve gastrectomy can experience DS post-operatively, although the number of patients who experience DS was lower in sleeve gastrectomy compared with RYGB surgery (45). This is interesting because the number of sleeve gastrectomies is increasing worldwide and it could be particularly relevant if we are to regard DS as the positive phenomenon that the patients considered DS to be. If DS contributes to prevention of over-consumption and weight-regain, one would expect sleeve gastrectomy to be inferior to bypass in the long term, something that we do not know yet.

The severity of DS must be assessed based on the aetiology; e.g., cancer surgery has different perspectives and objectives than bariatric surgery, depending on the patient's initial weight, nutritional status and the intent of surgery. After bariatric surgery, the majority of patients

Table 3 Dumping Symptom Rating Scale: item frequency distribution for (a) the severity scale and (b) the frequency scale (rate of recurrence)

Item frequency distribution, number of patients in each category (total n = 12)							
(a)							
Severity scale	No trouble at all	Minor inconvenience	Mild trouble	Moderate trouble	Quite severe problems	Severe problems	Very severe problems
Tiredness	2	2	2	4	1	1	
Palpitations	7	2	2	1			
Sweating, flushing	6	2	4				
Cold sweats, paleness	6	3	3				
Need to lie down	5	2	3	1	1		
Diarrhoea	5	1	3		3		
Feeling nausea or urge to vomit	8	3	1				
Stomach cramp	11			1			
Feeling faint or shaky	10	1		1			
Pain, vomiting, stop	4	6	2				
(b)							
Frequency scale	No trouble at all	Less than once a week	Once a week	A few times per week	Once per day	Several times a day	
Tiredness	1	5	2	4			
Palpitations	8	3	1				
Sweating, flushing	7	3	1	1			
Cold sweats, paleness	8	2	1	1			
Need to lie down	5	4	1	1	1		
Diarrhoea	4	3	1	1		3	
Feeling nausea or urge to vomit	9	2		1			
Stomach cramp	11	1					
Feeling faint or shaky	10	2					

remain overweight or even obese, and many are still struggling to limit their energy intake in the long term (33,46). Moreover, previous studies have demonstrated that patients consider it important to achieve control over food intake and that loss of control entails a worse health-related quality of life (27,28). This relationship must be considered in order to see the DS from the obesity surgery patient's point of view and not based on researches on other patient populations. Consequently, a paradigm shift might be needed, not least in order to help patients cope with RYGB surgery. In the future, healthcare professionals should re-evaluate their opinion of DS as a complication, and instead adopt the patient's view of DS as a facilitator that might contribute in the control of eating behaviour and excessive food intake.

In a study by Groven *et al.* (7), patients pointed out that DS is unpredictable and complex and that it had a profound impact on their process of adjustment, but it also emerged that, over time, some of their respondents could learn by experience what food they could tolerate and not tolerate. Furthermore, Groven *et al.* described how the women in their study recriminated themselves for the consequences of getting DS and also expressed contempt for themselves at not being able to control their intake; this is in line with our results about self-blame. What distinguishes these two studies most is that Groven *et al.*'s informants believed that DS is unpredictable, whereas ours believed that DS can be controlled, and they considered DS to be a positive security against over-consumption. This difference could be the result of the researchers' preconceptions, which may be different in different disciplines. Furthermore, the time perspective might be different in our studies: Groven *et al.* did not describe how long post-operatively their interviews were conducted, but in our case it was a long time (9 years) after surgery. Our patients may have had a longer period of trial and error and thereby learned which foods and eating behaviours provoke the DS.

Strengths and limitations

The transferability of our findings is hampered by the fact that the previous empirical approach conceived of DS as a

complication; on the other hand, there are very few studies that have used a qualitative approach. The depth of understanding may thus be more limited using quantitative methods. Furthermore, the validity of the quantitative studies on DS has been questioned (47). Additionally, a limitation of the quantitative method used (DSRS) is that it only capture the severity and frequency of symptoms, but it cannot identify the patient's own experience of the phenomenon. In this study, there was no conflict between the severity of the DS and the positive effects that patients thought DS gave; thus, we may have found an important knowledge gap in the area between quantitative and qualitative studies. All 12 patients considered DS to be unpleasant, but despite this, all 12 described it as something positive in the interviews, which put a new perspective on the quantitative results. The number of patients was only 12, but the results of the interviews showed saturation, such that no new findings emerged during the last four interviews.

Our previous studies of DSRS demonstrated a clear floor effect, in which most of the symptoms were evaluated as insignificant regarding their severity and frequency, which is well in line with the results of the qualitative part of this study (3).

Conclusion

Based on the patients' perspective, DS is perceived as allowing control of food intake after RYGB surgery, and although the symptoms were obvious and very unpleasant, patients considered DS as a positive security against overconsumption. Hence, healthcare professionals should not present DS as a complication but as a facilitator that might contribute in the control of eating behaviour and excessive food intake.

Conflicts of Interest Statement

No conflict of interest was declared.

Acknowledgements

AL conducted a literature search, conceived the study design and collected data. AL and ME conceived the data analysis and data interpretation. Both authors were involved in writing the paper and had final approval of the submitted and published versions.

Medical secretary Ulrika Holst transcribed the interviews verbatim, and Catriona Chaplin, CMC Scientific English, reviewed the English language with focus on translation of the patient statements.

The study was funded by Region Västra Götaland, Sweden, VGFOUGSB-59891.

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