

Relationships between Emotional Well-Being, Patient Activation and Social Support among Adults with Severe Obesity Who Have Undergone Gastric Bypass Surgery

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Abstract

Objective: To examine the relationship between emotional well-being, patient activation and social support in a cohort of adults with severe obesity who underwent gastric bypass surgery from January to December 2012. **Design:** Cross-sectional survey. **Subjects:** Of a total population of 129 people, aged 18 - 68 years, at a local hospital in central Norway, 64 (50%) responding to the questionnaire, 52 (81%) being women. **Main Outcome Measures:** The World Health Organization—Five Well-Being Index (WHO-5), the 13-item Patient Activation Measure (PAM-13), a 16-item instrument on the frequency and content of social support, and demographic and clinical data. **Results:** A significant positive association was found between higher level of patient activation and better emotional well-being ($P = 0.02$) in linear regression analysis. A higher level of family support was significantly associated with better emotional well-being (practical social support from the family ($P = 0.04$), emotional social support from family ($P = 0.01$) and from friends ($P = 0.005$)). **Conclusion:** Screening tools for emotional well-being should be used systematically in postoperative consultations to recognize those who need a more individually tailored post-surgery follow-up care after gastric bypass surgery. In addition, health care providers in both specialist and primary health care settings should consider assessing the level of social support as part of regular follow-up routines.

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Keywords

Emotional Well-Being, Social Support, Obesity, Diabetes, Bariatric Surgery

1. Introduction

Worldwide, severe obesity is one of the most challenging diseases in the 21st century, already responsible for 10% - 13% of all deaths in some parts in Europe [1]. Obesity is defined as “abnormal or excessive fat accumulation that presents a risk to health” and is often classified as a body mass index (BMI) ≥ 30 kg/m². People with BMI ≥ 35 kg/m², with comorbidity or ≥ 40 kg/m² with reduced health-related quality of life are usually considered for surgery [2] [3]. Trends in overweight and obesity over 22 years in the county-wide Nord-Trøndelag Health Survey indicate that severe obesity is increasing among both men and women in Norway [4]. Severe obesity is associated with serious health complaints such as cardiovascular disease, type 2 diabetes, both complex conditions that affect physical, social and emotional health, as well as the perception of quality of life [1] [2].

Several studies have examined the health status and health-related quality of life, before and after bariatric surgery, and found that they improve [3] [5]-[7]. However, emotional well-being, anxiety, depression and adverse events are not sufficiently documented during follow-up, since long-term data are incomplete and many questions are still unanswered [3] [7]. Nevertheless, good self-management skills are essential to cope with the condition after bariatric surgery. Some interventions have been evaluated using the Patient Activation Measure (PAM), which assesses people’s knowledge, skill and confidence in self-managing their health or chronic conditions [8]. Patient activation reflecting, people’s engagement in health behavior is strongly related to a broad range of health-related outcomes, and improved activation has great potential [8].

Social support is considered to influence people to believe that they are cared for, loved, and highly esteemed and members of a network of mutual obligations [9]. Both practical and emotional social supports are important for an individual in coping with the changes in health or chronic diseases [2] [9].

Taking part in social support groups has been shown to be related to greater weight loss [10]. However, how emotional social support from family and friends affects health and well-being after gastric bypass surgery is not well documented. Thus, this study examined the relationships between emotional well-being, patient activation and social support in a population of severely obese people who underwent gastric bypass surgery at a local hospital in central Norway from January to December 2012.

2. Material and Methods

The study had a cross-sectional design.

2.1. Participants and Recruitment Strategy

A total of 129 people with obesity who underwent gastric bypass surgery from January to December 2012 at a local hospital in central Norway were eligible to participate. We included both men and women aged 18 - 68 years, of any ethnicity. We sent an invitation to all participants by mail, with information about the study along with a self-reported questionnaire and a preaddressed stamped envelope.

2.2. Data Collection

Demographic information (age, sex, height, weight (before and after bariatric surgery), educational level, working status and cohabitation) was collected. The participants also provided the following clinical information: diabetes diagnosis or not before surgery, HbA_{1c} levels before and after, smoking status, long-term diabetes complications (eye, kidney, heart, brain and foot diseases), mental disorders and musculoskeletal disorders.

2.3. Measurements

We used the World Health Organization Five Well-Being Index (WHO-5) (time frame: the previous 2 weeks) to collect data about emotional well-being [11]-[15]. It has five items rated on a six-point Likert scale, ranging

from 0 to 5: “at no time” (0), “some of the time” (1), “less than half of the time” (2), “more than half of the time” (3), “most of the time” (4) and “all of the time” (5). A total score of 0 to 100 (highest) was computed (the raw score is multiplied by 4). A cut off point of 28 or below is indicative of depression and warrants further assessment, whereas scores between 28 and 50 suggest low mood but not necessarily depression [16].

Further, we included two core questions from the WHO Quality of Life-BREF (WHOQOL-BREF) questionnaire. The first question asks about an individual’s overall perception of quality of life: “How would you rate your quality of life?” Alternative answers were given: “very poor” (1), “poor” (2), “neither poor nor good” (3), “good” (4) and “very good” (5). The second question asks about an individual’s overall perception of his or her health: “How satisfied are you with your health?” The response options were: “very dissatisfied” (1), “dissatisfied” (2), “neither satisfied nor dissatisfied” (3), “satisfied” (4) and “very satisfied” (5) [17].

Patient Activation Measurement (PAM) is an internationally well-known, unidimensional 13-item questionnaire designed to capture patients’ knowledge, skills and confidence for self-management while living with chronic conditions [18]. It is widely used [19]–[21] and has been translated and validated for use in Norway [18]. Each item has four response categories with scores from 1 to 4: “strongly disagree” (1), “disagree” (2), “agree” (3) and “agree strongly” (4). Participants who answered at least 10 items were included in the analysis. The scale scores are transformed to a scale of 0 to 100 (0 = lowest activation level, 100 = highest activation level). The manual suggests cut-off points to categorize patients into four levels of activation reflecting their engagement in health behavior. Level 1 (0 - 47) indicates that the individual may not believe the patient role is important, level 2 (47.1 - 55.1) indicates that a patient lacks confidence and knowledge to take action, level 3 (55.2 - 67.0) indicates that a patient has begun to engage in the recommended health behavior, and level 4 (67.1 - 100) indicates that a patient is proactive concerning health and engages in many types of recommended health behavior [20].

We constructed a 16-item questionnaire for this study to determine the frequency of self-management support and social support, consultations or group meetings (after surgery and a one-year follow-up period). Examples of questions were: “How often did you meet your physician?”, “How many times have you met socially or had telephone communication with other people who have had bariatric surgery?” and “Did you have emotional and practical help and support to follow the recommended lifestyle (food habits, physical activity and general lifestyle) during the past 12 months?”.

2.4. Data Analysis

We analyzed the data using SPSS Statistics version 21 software (SPSS, University of Bradford, UK). We report descriptive statistics as count, proportions, means and standard deviations (SD). Wilcoxon signed rank test was used to compare difference in BMI before and after gastric bypass surgery. We used unadjusted and adjusted linear regression to compare the association and covariance between independent variables (WHO-5) and dependent variables (demographic and clinical data, social support and PAM). To assess the association between WHO-5 and other variables, we fitted block wise linear regression models in which blocks of variables were entered according to our hypothesis; age, sex and cohabitation status, weight loss and patient’s knowledge, skills and confidence for self-management in living with chronic conditions (PAM) and items to capture the frequency and content of social support, respectively. *R*-squared explain the contribution of each block to the explained variance. The significance level was set at 0.05.

3. Results

Of the 129 participants invited to participate in this study, 64 (50%) returned the questionnaire by mail. The mean age of the participants was 43.4 years (range: 21 - 68), and 52 (81%) of the participants were women. The dropout analysis showed 18 (28%) men and 47 (72%) women.

Table 1 shows the demographic details of the participants. The educational level was low; 3 (25%) men and 14 (27%) women had education from college. Regarding cohabitation, 83% of men and 89% of women were living with a partner or with children younger than 18 years. Before bariatric surgery, 58% of both men and women were employed or studying; the corresponding numbers after surgery were 75% of men and 69% of women respectively.

Table 2 reports the clinical data. The prevalence of comorbidity was low. Only 3 (27%) men and 8 (17%) women had problems with their feet, 4 (33%) men and 22 (43%) women had musculoskeletal disorders, 3 (27%)

Table 1. Demographic profile of the participants (*n* = 64).

Characteristics	Men (<i>n</i> = 12)	Women (<i>n</i> = 52)
Age, years, mean \pm SD	47.3 (13.6)	42.5 (10.5)
Cohabitation, <i>n</i> (%)		
Living alone	2 (17)	6 (12)
Living with child or spouse	10 (83)	46 (89)
Educational level, <i>n</i> (%)		
Until upper secondary	9 (75)	38 (73)
From college	3 (25)	14 (27)
Working part time or full time or studying, <i>n</i> (%)		
Before surgery	7 (58)	30 (58)
After surgery	9 (75)	36 (69)

Table 2. Clinical characteristics of the 64 people who underwent gastric bypass surgery.

	Men (<i>n</i> = 12)	Women (<i>n</i> = 52)
BMI, mean (SD)		
Before	45.2 (4.9)	44.7(6.5)
After	29.2 (5.0)	27.7 (4.1)
Weight loss, %, mean (SD)	35.4 (7.4)	37.7 (7.2)
Diseases and other factors, <i>n</i> (%)		
Type 2 diabetes	5 (42)	14 (29)
Stroke	1 (9)	0
Heart	1 (9)	0
Kidney	0	1 (2)
Eye	0	0
Indigestion problems	0	2 (4)
Problems with feet	3 (27)	8 (17)
Urinary ailment	0	2 (4)
Musculoskeletal disorder	4 (33)	22 (43)
Mental disorder	3 (27)	10 (21)
Smoking	1 (8)	16 (34)

men and 10 (21%) women reported having mental health problems, and 1 (8%) man and 16 (34%) women smoked.

Almost 30% (19 participants) of the 64 reported that they had diabetes; the duration range was 3 - 28 years. The mean diabetes duration was 7.5 years (SD 4.8) for men and 12.9 years (SD 8.2) for women. Among non-participants, 17 (26%) had diabetes.

The HbA_{1c} levels decreased substantially for all patients, from mean 8.2 (SD 1.6) before gastric bypass sur-

gery to 5.6 (SD 1.6) after for men, and from mean 9.4 (SD 1.0) before gastric bypass surgery to 6.1 (SD 1.1) after for women. Before surgery the mean BMI was 44.8 (SD 6.2) after surgery it decreased to 28.0 (SD 4.3) ($P = < 0.001$) by Wilcoxon signed rank test. The prevalence of diabetes complications was low: only one woman (2%) had kidney disease, one man had had stroke and heart disease (9%) and 2 women (4%) had indigestion problems. For WHO-5, 3% of the participants scored less than 28 (depression) and 14% less than 50 (low mood).

Table 3 reports the specific scores of the three questionnaires. The participants had a mean emotional well-being score of 69.1 (SD 18.9), it was 66.0 for men (SD 15.2) and 69.8 for women (SD 19.7). The mean score was 70.0 (SD 17.6) for those with diabetes and 67.5 (SD 19.5) for those without. More than 80% reported that their overall perception of their quality of life was good or very good (WHOQOL-BREF). Patients reported a relatively high score on patient's knowledge, skills and confidence for self-management (PAM scale scores): 70.9 (SD 18.0). Only 8% of the responders had PAM scores at the lowest level (≤ 47).

Group-based follow-up after gastric bypass surgery was reported by 35 participants (55%), with a mean weight-loss from 24% to 50%. Forty participants (62%) had consulted other health care professionals (mainly a dietitian), whereas 19 participants (30%) had consulted their general practitioner one or two times in the past year. Ten participants (16%) reported that they had taken part in lay-led group meetings.

Table 4 shows the association between the variables. In univariate analysis, age and emotional well-being were significantly positively associated ($B = 0.43$, $P = 0.04$) as were patient activation and emotional well-being ($B = 0.48$, $P = 0.001$). Further, emotional well-being was correlated with practical support from family ($B = 9.70$, $P = 0.04$), emotional social support from family ($B = 12.22$, $P = 0.01$) and from friends ($B = 13.38$, $P = 0.005$). In linear regression analysis we identified significant relationships between higher degrees of emotional well-being and social support from family ($B = 9.75$, $P = 0.03$), patient activation ($B = 0.32$, $P = 0.01$) and age ($B = 0.55$, $P = 0.02$) (Model 1). Practical social support from family was not correlated ($P = 0.08$) with emotional well-being when adjusting for control variables (Model 2). A higher degree of emotional well-being was significantly associated with higher patient activation ($B = 0.30$, $P = 0.02$) and age ($B = 0.61$, $P = 0.007$).

4. Discussion

4.1. Main Findings

This study examined the relationship between emotional well-being, patient activation and social support. The rates of emotional well-being, patient activation, and emotional social support from family and friends were significantly associated in this cross-sectional study. Both practical and emotional social support from family and emotional social support from friends contributed significantly to higher emotional well-being. The proportions reporting a high degree of support from health care professionals (dietitians and physicians) and participation in group meetings (lay-led and nurse-led) were lower than expected. The majority reported high levels of emotional well-being and an overall good perception of quality of life (>80%). Few participants had diabetes complications or depression symptoms. Both HbA_{1c} and BMI decrease done year after bariatric surgery. The participants also had a relatively high percentage weight loss. Moreover, the proportion of participants taking an active role in society (more in jobs and school) increased.

Table 3. The scores of the WHO-5, PAM-13 and WHO-Bref ($N = 64$).

	Men ($n = 12$) mean (SD)	Women ($n = 52$) mean (SD)	All $N = 64$ mean (SD)
WHO-5	66.0 (15.2)	69.8 (19.7)	69.1 (18.9)
PAM-13	70.1 (14.1)	71.0 (18.9)	70.9 (18.0)
WHO-Bref			
Overall perception of quality of life ^a	3.92 (0.90)	4.20 (0.80)	4.14 (0.82)
Overall perception of health ^b	3.58 (0.90)	3.90 (1.16)	3.84 (1.12)

^a“very poor” (1), poor (2), “neither poor nor good” (3), “good” (4) and “very good” (5); ^b“very dissatisfied” (1), “dissatisfied” (2), “neither satisfied nor dissatisfied” (3), “satisfied” (4) and “very satisfied” (5).

Table 4. Linear regression analysis for PAM-13 score, emotional and practical support from the family associated with WHO-5 among 64 people with severe obesity who underwent gastric bypass surgery.

	Univariate			Model 1			Model 2		
	<i>B</i>	95% CI	<i>P</i>	<i>B</i>	95% CI	<i>P</i>	<i>B</i>	95% CI	<i>P</i>
Intercept (constant)				−22.63			−23.04		
Age	0.43	(0.011, 0.842)	0.04	0.55	(0.11, 0.98)	0.02	0.61	(0.17, 1.05)	0.007
Sex	3.77	(−8.4, 15.9)	0.54	6.06	(−4.46, 16.58)	0.25	7.46	(−3.65, 18.60)	0.16
Weight loss	0.18	(−0.47, 0.84)	0.58	0.29	(−0.33, 0.90)	0.35	0.18	(−0.46, 0.82)	0.57
Living alone	13.79	(−0.145, 27.7)	0.05	10.72	(−2.19, 23.64)	0.10	10.18	(−3.06, 23.42)	0.13
PAM-13	0.48	(0.24, 0.71)	<0.001	0.32	(0.07, 0.56)	0.01	0.30	(0.05, 0.56)	0.02
Emotional support									
From family	12.22	(2.96, 21.48)	0.01	9.75	(1.15, 18.3)	0.03			
From friends	13.38	(4.15, 22.61)	0.005						
From other patients	6.49	(−3.78, 16.73)	0.21						
From health professionals	−4.48	(−16.44, 7.47)	0.46						
Practical support									
From family	9.70	(0.28, 19.13)	0.04				8.59	(−1.08, 18.27)	0.08
From friends	6.52	(−2.86, 15.89)	0.17						
From other patients	6.11	(−3.62, 15.85)	0.21						
From health professionals	−2.58	(−13.30, 8.16)	0.63						
R²				0.36			0.34		

B: Unstandardized regression coefficient. Model 1: Adjusted for demographic data, PAM-score + emotional support from family. Model 2: Adjusted for demographic data, PAM score + practical support from family.

4.2. Strengths and Weaknesses

The strengths of this study were the use of standardized, validated instruments to measure emotional well-being and patient activation. Furthermore, a pilot study was conducted to examine the face validity of the social support questionnaire developed to fit the population invited to participate. Further, a dropout analysis was conducted among non-participants related to age, sex and diabetes diagnosis.

The main weakness of the study was the response rate (50%). In addition, more women (81%) than men participated. Nevertheless, more women than men undergo surgery. Further, a cross-sectional study design limits conclusions on causal relationships.

4.3. Comparison with Existing Literature

Bariatric surgery has been an effective treatment for obesity for decades, considering the weight-associated comorbidity, socioeconomic factors (health care costs and lost productivity) and quality of life [3] [7] [21]. This study found that the participants were more likely to study or work part time or full time after gastric bypass surgery and were thereby able to participate or play a more active role in society.

Most participants had remission of their type 2 diabetes, and diabetes complications were low in the study. Thus, further health promotion strategies are needed to provide necessary support and care for those with a previous diabetes diagnosis after bariatric surgery to prevent further development of the disease and avoid further complications [2]. Recommended screening programs are available and should therefore be followed by physicians, as suggested in the guidelines [2] [22]. According to the literature, the incidence of type 2 diabetes can be determined up to 10 years after bariatric surgery, and having hypertension before surgery is likely to decrease

the incidence [3] [7]. A group of people with type 2 diabetes got intensive lifestyle intervention and had lower cardiovascular risk factors among others [23]. Giving people individual treatment after surgery is therefore important.

The participants in the present study reported high emotional well-being scale scores, and few were depressed. The weight loss was also relatively high compared with previous studies. Weight loss of 15% - 25% has been described after bariatric surgery [3] [7]. We might speculate that the higher weight loss identified in this study (up to 50% one year after surgery) could be a possible explanation for the high emotional well-being scale scores in this study. Nevertheless, evidence is lacking on the long-term effects of surgery, since most trials only follow participants for a few years after surgery. Thus, the long-term effects on quality of life, emotional well-being and anxiety and depression remain unclear [3] [7].

In this study, the participants only consulted their general practitioner and health care providers in specialist health care a few times. This was surprising, since people after gastric bypass surgery need follow-up on medication: less hypertension and blood sugar medication and more vitamins [2] [24]. Nevertheless, most participants were satisfied, even with less support from health care professionals. A qualitative study with patients who had undergone bariatric surgery found that participation in an online forum showed “promising results”, especially for the patients who self-disclose themselves from traditional support programs [25]. A high-quality study 5 years after bariatric surgery highlights the need for individually tailored and long-term follow-up because weight regain was connected with emotional stress [26]. One might discuss the benefit of alternative follow-up programs, lay-led, or peer-led, in contributing to existing programs.

The present study reported relatively high scale scores on emotional social support from family and friends. Being aware of patients’ self-management skills and lack of social support from family and friends before bariatric surgery predicted interdisciplinary follow-up after surgery, especially on emotional well-being and depressive affect. According to Cobb [8], emotional and practical social support is important for physical and mental health in coping with changes in life. Moreover, emotional and practical social support from family and friends are essential [9].

Using the PAM instrument seems beneficial. Relationships with better emotional well-being (WHO-5) are promising in using this tool to examine the participants’ subjective well-being and resources to self-manage their condition. Patients’ knowledge, skills and confidence for self-management in living with chronic conditions can give health care providers useful information about their engagement and need for more complex post-surgery care. According to Magnezi *et al.* [27], assessing patient activation enables health care professionals to monitor levels of self-care and potential adherence to health care recommendations among patients in primary care.

Emotional social support was correlated with emotional well-being and patient activation. The participants with type 2 diabetes had even higher PAM scores than others. It may depend on being treated with insulin or not, or the total weight loss, which was high among those participating in group-based activity. The mean weight loss in this study was higher at 1 and 2 years of follow-up compared with available review articles but also compared with other studies in Norway [5] [6]. The mean BMI before surgery may be higher in southern and western Norway, or the weight loss may depend on the surgical procedure. Previous research indicates that subjective wellbeing and the quality of life are documented in different ways and are thereby not comparable [3] [7]. Participants with a high degree of social support seem to have high emotional well-being and are simultaneously more likely to know how to use the knowledge, skills and self-management to achieve an overall perception of high quality of life.

4.4. Conclusion and Implications for Clinicians and Policy-Makers

An important task for the teams caring for people who have had bariatric surgery is to be aware of those without social support from family and friends, and systematically ask about these matters. Furthermore, using screening tools for emotional well-being like WHO-5 could enhance the likelihood of recognizing needs individually tailored post-surgery follow-up care after gastric bypass surgery. People who had type 2 diabetes before surgery should be systematically screened in the future.

Ethical Considerations

We performed the study in accordance with the Declaration of Helsinki. The Central Norway Regional Committee for Medical and Health Research Ethics (Ref: 2013/1608) approved the study. Participants were informed

that participation was voluntary. Completed and returned self-report questionnaires were considered as consent for participation.

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Conflicts of Interests and Funding

The authors declare that there were no competing interests.

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References

- [1] World Health Organization (2014) Obesity. World Health Organization, Geneva.
<http://www.euro.who.int/en/health-topics/noncommunicable-diseases/obesity>
- [2] Neff, K.J. and le Roux, C.W. (2013) Bariatric Surgery: A Best Practice Article. *Journal of Clinical Pathology*, **66**, 90-98. <http://dx.doi.org/10.1136/jclinpath-2012-200798>
- [3] Colquitt, J.L., Pickett, K., Loveman, E. and Frampton, G.K. (2014) Surgery for Weight Loss in Adults. *The Cochrane Database of Systematic Review*, **8**, Article ID: CD003641. <http://dx.doi.org/10.1002/14651858.CD003641.pub4>
- [4] Midthjell, K., Lee, C.M.Y., Langhammer, A., Krokstad, S., Holmen, T.L., Hveem, K., Colagiuri, S. and Holmen, J. (2013) Trends in Overweight and Obesity over 22 Years in a Large Adult Population: The HUNT Study, Norway. *Clinical Obesity*, **3**, 12-20. <http://dx.doi.org/10.1111/cob.12009>
- [5] Aasprang, A., Andersen, J.R., Sletteskog, N., Vage, V., Bergsholm, P. and Natvig, G.K. (2008) Health-Related Quality of Life before and One Year after Operation for Morbid Obesity. *Tidsskrift Norske Laegeforening*, **128**, 559-562.
- [6] Aasprang, A., Andersen, J.R., Vage, V., Kolotkin, R.L. and Natvig, G.K. (2013) Five-Year Changes in Health-Related Quality of Life after Biliopancreatic Diversion with Duodenal Switch. *Obesity Surgery*, **23**, 1662-1668. <http://dx.doi.org/10.1007/s11695-013-0994-z>
- [7] Giske, L., Lauvrak, V., Elvsaa, I.K.Ø., Hofmann, B., Håvelsrud, K., Vang, V. and Fure, B. (2014) Langtidseffekter etter fedmekirurgi [Long-Term Effects after Bariatric Surgery]. Norwegian Knowledge Centre for the Health Services, Oslo.
- [8] Greene, J. and Hibbard, J.H. (2012) Why Does Patient Activation Matter? An Examination of the Relationships between Patient Activation and Health-Related Outcomes. *Journal of General Internal Medicine*, **27**, 520-526. <http://dx.doi.org/10.1007/s11606-011-1931-z>
- [9] Cobb S. (1976) Presidential Address—1976. Social Support as a Moderator of Life Stress. *Psychosomatic Medicine*, **38**, 300-314. <http://dx.doi.org/10.1097/00006842-197609000-00003>
- [10] Livhits, M., Mercado, C., Yermilov, I., Parikh, J.A., Dutson, E., Mehran, A., Ko, C.Y., Shekelle, P.G. and Gibbons, M.M. (2011) Is Social Support Associated with Greater Weight Loss after Bariatric Surgery? A Systematic Review. *Obesity Reviews*, **12**, 142-148. <http://dx.doi.org/10.1111/j.1467-789X.2010.00720.x>
- [11] Peyrot, M., Rubin, R.R., Lauritzen, T., Snoek, F.J., Matthews, D.R. and Skovlund, S.E. (2005) Psychosocial Problems and Barriers to Improved Diabetes Management: Results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabetic Medicine*, **22**, 1379-1385. <http://dx.doi.org/10.1111/j.1464-5491.2005.01644.x>
- [12] Rubin, R.R., Peyrot, M. and Siminerio, L.M. (2006) Health Care and Patient-Reported Outcomes: Results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabetes Care*, **29**, 1249-1255. <http://dx.doi.org/10.2337/dc05-2494>
- [13] Peyrot, M., Rubin, R.R. and Siminerio, L.M. (2006) Physician and Nurse Use of Psychosocial Strategies in Diabetes Care: Results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabetes Care*, **29**, 1256-1262. <http://dx.doi.org/10.2337/dc05-2444>
- [14] Bech, P., Gudex, C. and Johansen, K.S. (1996) The WHO (Ten) Well-Being Index: Validation in Diabetes. *Psychotherapy and Psychosomatics*, **65**, 183-190. <http://dx.doi.org/10.1159/000289073>
- [15] Hochberg, G., Pucheu, S., Kleinebreil, L., Halimi, S. and Fructuoso-Voisin, C. (2012) WHO-5, a Tool Focusing on Psychological Needs in Patients with Diabetes: The French Contribution to the DAWN Study. *Diabetes & Metabolism*,

- 38, 515-522. <http://dx.doi.org/10.1016/j.diabet.2012.06.002>
- [16] Swinnen, S.G.A., Snoek, F.J., Dain, M.P., DeVries, J.H., Hoekstra, J.B. and Holleman, F. (2009) Rationale, Design, and Baseline Data of the Insulin Glargine (Lantus) versus Insulin Detemir (Levemir) Treat-to-Target (L2T3) Study: A Multinational, Randomized Noninferiority Trial of Basal Insulin Initiation in Type 2 Diabetes. *Diabetes Technology & Therapeutics*, **11**, 739-743. <http://dx.doi.org/10.1089/dia.2009.0044>
- [17] Saxena, S., Carlson, D. and Billington, R. (2001) The WHO Quality of Life Assessment Instrument (WHOQOL-Bref): the Importance of Its Items for Cross-Cultural Research. *Quality of Life Research*, **10**, 711-721. <http://dx.doi.org/10.1023/A:1013867826835>
- [18] Steinsbekk, A. (2008) Patient Activation Measure. *Tidsskrift Norske Laegeforening*, **128**, 2316-2318.
- [19] Rygg, L.O., Rise, M.B., Grønning, K. and Steinsbekk, A. (2012) Efficacy of Ongoing Group Based Diabetes Self-Management Education for Patients with Type 2 Diabetes Mellitus. A Randomised Controlled Trial. *Patient Education and Counseling*, **86**, 98-105. <http://dx.doi.org/10.1016/j.pec.2011.04.008>
- [20] Hibbard, J.H., Mahoney, E.R., Stockard, J. and Tusler, M. (2005) Development and Testing of a Short Form of the Patient Activation Measure. *Health Services Research*, **40**, 1918-1930. <http://dx.doi.org/10.1111/j.1475-6773.2005.00438.x>
- [21] Specchia, M.L., Veneziano, M.A., Cadeddu, C., Ferriero, A.M., Mancuso, A., Ianuale, C., Parente, P., Capri, S. and Ricciardi, W. (2014) Economic Impact of Adult Obesity on Health Systems: A Systematic Review. *European Journal of Public Health*, **25**, 1-8. <http://dx.doi.org/10.1093/eurpub/cku170>
- [22] Claudi, T. (2009) Diabetes forebygging, diagnostikk og behandling (Preventing, Diagnosing and Treating Diabetes). Norwegian Directorate of Health, Oslo.
- [23] Look AHEAD Research Group, Wing, R.R. (2010) Long-Term Effects of a Lifestyle Intervention on Weight and Cardiovascular Risk Factors in Individuals with Type 2 Diabetes Mellitus—Four-Year Results of the Look AHEAD Trial. *JAMA Internal Medicine*, **170**, 1566-1575.
- [24] Hofsvø, D., Aasheim, E.T., Søvik, T.T., Jakobsen, G.S., Johnson, L.K., Sandbu, R., Aas, A.T., Kristinsson, J. and Hjeltnes, J. (2011) Follow-Up after Bariatric Surgery. *Tidsskrift Norske Laegeforening*, **131**, 1887-1892. <http://dx.doi.org/10.4045/tidsskr.10.1463>
- [25] Das, A. and Faxvaag, A. (2014) What Influences Patient Participation in an Online Forum for Weight Loss Surgery? A Qualitative Case Study. *Interactive Journal of Medical Research*, **3**, e4. <http://dx.doi.org/10.2196/ijmr.2847>
- [26] Natvig, E., Gjengedal, E. and Råheim, M. (2013) Totally Changed, Yet Still the Same: Patients' Lived Experiences 5 Years Beyond Bariatric Surgery. *Qualitative Health Research*, **23**, 1202-1214. <http://dx.doi.org/10.1177/1049732313501888>
- [27] Magnezi, R., Glasser, S., Shalev, H., Sheiber, A. and Reuveni, H. (2014) Patient Activation, Depression and Quality of Life. *Patient Education and Counseling*, **94**, 432-437. <http://dx.doi.org/10.1016/j.pec.2013.10.015>