

Comparison of the Effects of Diabetes Education for Patients with MDI vs CSII Therapy



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ABSTRACT

Structured diabetes education for patients with type 1 diabetes is a cornerstone of the therapy. However, it is unclear whether patients with MDI and CSII equally benefit from diabetes education. In a prospective analysis, we investigated the differential effects of diabetes education on patients with MDI and CSII therapy. A total of 409 patients with type 1 diabetes that participated in a diabetes education course were analyzed. The education course consisted of 12 lessons and was conducted as a group program for 3-8 patients. 19% of the patients were treated with an insulin pump. Prior to the education course and six months after the end of the education course, HbA1c was measured and patients completed questionnaires assessing diabetes distress and hypoglycemia unawareness.

At baseline, patients with CSII therapy did not differ from MDI patients with regard to age $(43.8\pm14.0\,\text{vs.}\,44.1\pm13.6\,\text{years},\,\text{p=.86})$, gender $(47\%\,\text{vs.}\,42\%\,\text{female},\,\text{p=.42})$, glycemic control $(8.1\pm1.3\,\text{vs.}\,8.1\pm1.1\,\%,\,\text{p=.81})$, hypoglycemia unawareness $(1.6\pm1.5\,\text{vs.}\,1.7\pm1.8,\,\text{p=.93})$, and diabetes distress $(1.1\pm0.9\,\text{vs.}\,1.1\pm10.7,\,\text{p=.93})$. CSII patients had a significantly longer diabetes duration than MDI patients $(22.0\pm10.8\,\text{vs.}\,11.0\pm12.3\,\text{years},\,\text{p<.01})$. After 6 months, HbA1c reduction was significantly lower in CSII patients than in MDI patients $(-0.0\pm0.7\,\text{vs.}\,-0.4\pm1.1\%,\,\text{p=.01})$. Improvements in hypoglycemia unawareness $(0.5\pm11.4\,\text{vs.}\,0.4\pm1.4,\,\text{p=.32})$ and diabetes distress $(-0.3\pm0.6\,\text{vs.}-0.2\pm0.6,\,\text{p=.13})$ were comparable.

At baseline, glycemic control of CSII patients was not better than that of MDI patients despite the fact that CSII therapy is the best available therapy option for patients with type 1 diabetes. Furthermore, CSII patients did benefit less from diabetes education than MDI patients. Specific interventions are needed to address the special needs of patients performing a CSII therapy. In a group setting, it can be questioned whether CSII and MDI patients should be mixed.

INTRODUCTION

- Structured diabetes education for people with type 1 diabetes is a cornerstone of the therapy.
- However, it is unclear whether people with type 1 diabetes treated by multiple daily insulin injections (MDI) or continuous subcutaneous insulin infusion (CSII) will equally benefit from diabetes education.
- In a prospective analysis we investigated the differential effects of diabetes education on people with type 1 diabetes either on MDI or CSII therapy.

METHODS

A total of 409 patients with type 1 diabetes that participated in a diabetes education course were analyzed.

- The education course consisted of 12 lessons and was conducted as a group program for 3-8 patients.
- 19% of the patients were treated with an insulin pump. Prior to

the education course and six months after the end of the education course, HbA1c was measured and patients completed questionnaires assessing diabetes distress:

- o (Diabetes Distress Scale DDS)
- o Hypoglycemia unawareness (Hypoglycemia unawareness Questionnaire -HUQ)
- Depression (Center of Epidemiological Studies Depression Scale – CES-D)
- o Diabetes self-efficacy (Diabetes Self-Efficacy Scale)
- o Empowerment (Empowerment Scale)
- Cohen's d was used as a measure of effect size.

RESULTS

- At baseline patients with CSII therapy did not differ from MDI patients with regard to age, gender, glycemic control, hypoglycemia unawareness diabetes distress, diabetes self-efficacy or empowerment (see table 1).
- The only significant difference at baseline was a longer diabetes duration in people with CSII-therapy compared to people with MDI-treatment (see table 1).
- After 6 months HbA1c reduction was significantly lower in CSII patients than in MDI patients ($-0.0 \pm 0.7 \text{ vs.} -0.4 \pm 1.1\%$, p=.01), whereas the improvements in hypoglycemia unawareness was comparable (see figure 1).
- The impact of the structured diabetes education on diabetes distress and depression (see figure 2) as well as on self-efficacy and empowerment was also comparable in subjects with CSII and MDI-therapy (see figure 2 and 3).
- In figure 4 effect sizes of the CSII and MDI therapy on the above mentioned outcome variables are depicted. Effect sizes were rather small or medium.

CONCLUSION

At baseline, glycemic control of CSII patients was not better than that of MDI patients despite the fact that CSII therapy is the best available therapy option for patients with type 1 diabetes. Furthermore, CSII patients did benefit less from diabetes education than MDI patients with regard to glycemic control. Specific interventions are needed to address the special needs of patients performing a CSII therapy. In a group setting, it can be questioned whether CSII and MDI patients should be mixed.

Table 1: Sample characteristics

Variable	MDI-Therapy N=330	CSII-Therapy N=79	р
Age (yrs) ± SD	44.4 ±14.0	42.2±13.1	.207
% female	44.7	47.4	.665
Diabetes duration (yrs) ± SD	14.0±12.3	22.0±10.8	<.01
BMI $(kg/m^2) \pm SD$	26.4±5.5	25.8±4.0	.38
IU per KG ± SD	0.63±0.60	0.56±0.20	.46
HbA1c (%) HbA1c (mmol/mol)	8.1±1.3 65.4±14.6	8.1±1.1 65.0±11.6	.81 .81
Unawareness Score (HUQ) ± SD	1.6±1.5	1.7±1.8	.59
Diabetes Distress (DDS) ± SD	1.1±0.9	1.1±0.7	.93
Depression (CES-D) ± SD	14.8±9.1	14.9±9.9	.96
Self-efficacy (Self-Efficacy Scale) ± SD	23.1±5.6	21.7±4.9	.03
Empowerment ± SD	24.5±6.1	24.6±5.1	.81

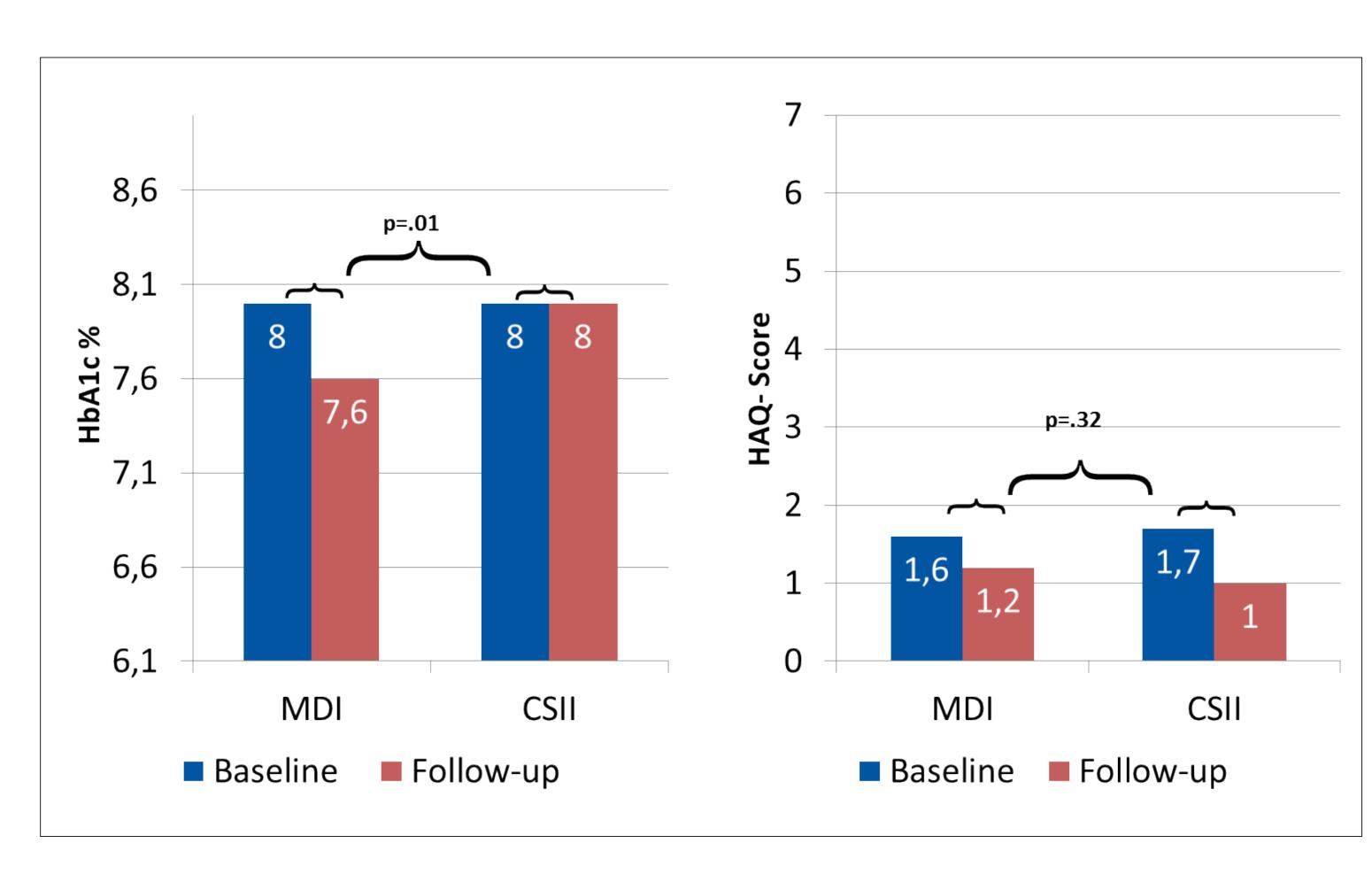


Figure 1: Effect of MDI and CSII – therapy on HbA1c (left) and hypoglycemia-unawareness (right)

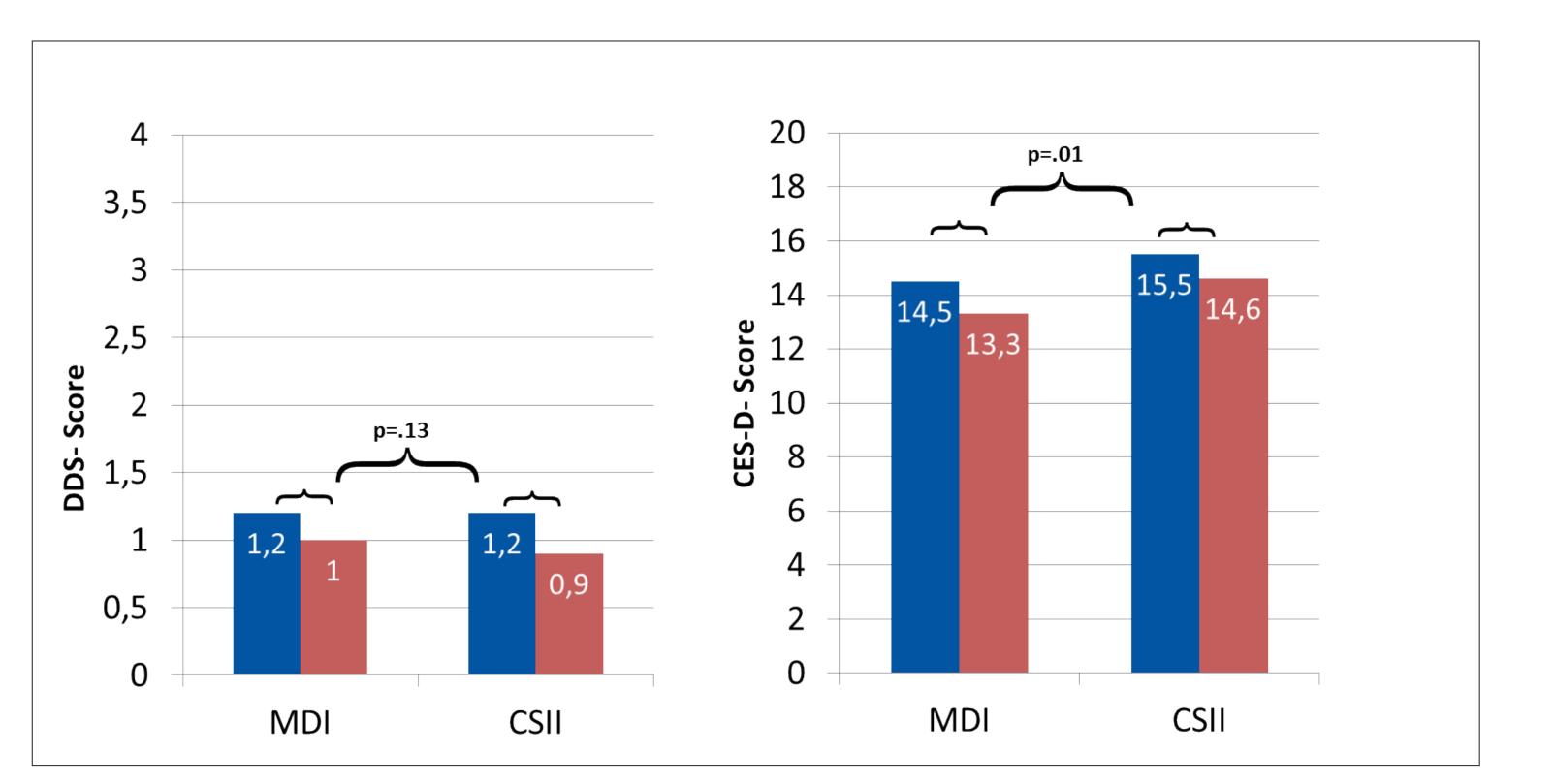
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gure 2: Effect of MDI- und CSII- therapy on diabetes distress (left) and depression (right)

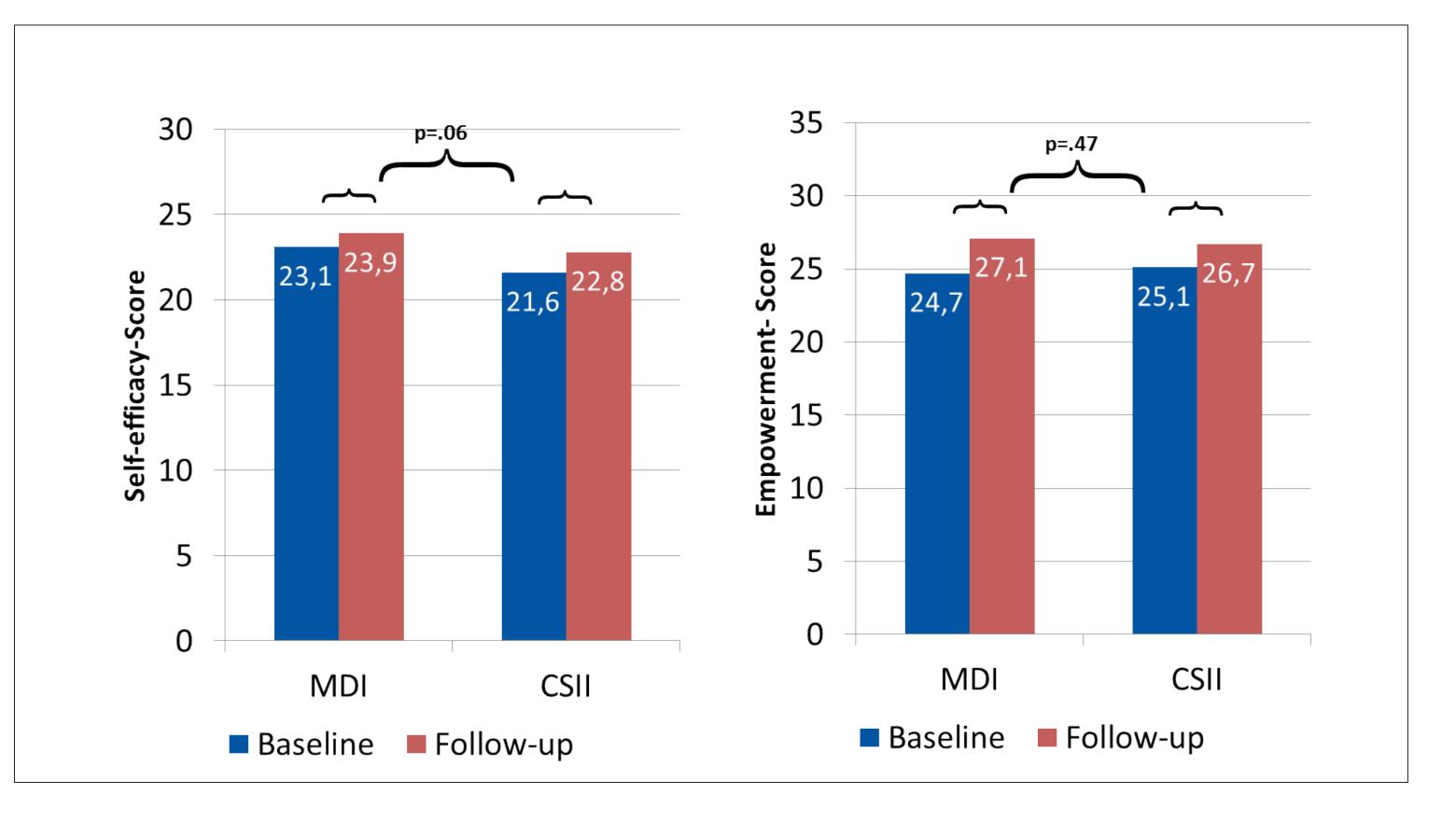


Figure 3: Effect of MDI- und CSII- therapy on self-efficacy (left) and empowerment (right)

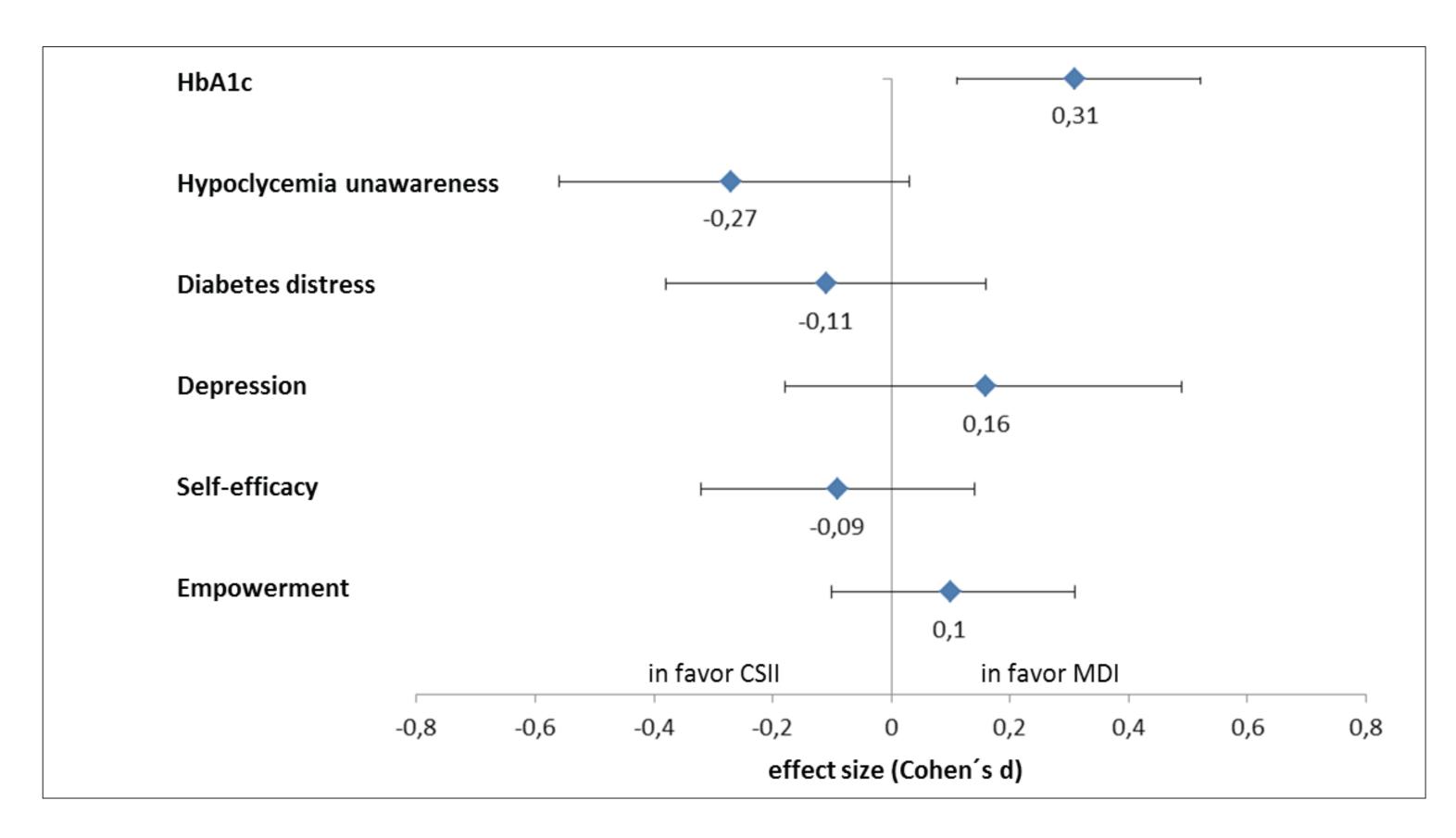


Figure 4: Effect size of diabetes education on different outcomes in CSII and MDI