Association of area deprivation and regional disparities in the treatment of T1 diabetes

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Treatment of the autoimmune disease type 1 diabetes in Germany depends on where the patients live in. In socio-economically weaker regions, insulin pumps and long-acting insulin analogs are used less

frequently. Here, the patients have higher blood glucose levels (HbA1c) and a higher prevalence of overweight. However, the rate of severe hypoglycemia events is lower. This is the result of a study carried out by a team of researchers at the German Center for Diabetes Research (DZD) in Düsseldorf, Neuherberg and Ulm. The results have now been published in the journal *Diabetes Care*.

Despite significant progress in the management of type 1 diabetes in children and adolescents over the past two decades, there are regional differences in treatment. Depending on the federal state, there were differences in the use of insulin pumps and rapid-acting or long-acting insulin analogs, as well as blood glucose levels (HbA1c), the prevalence of overweight and the rate of severe hypoglycemia events. But what are the reasons for these differences? Is there a correlation between the socio-economic conditions of a region and the treatment modalities of children and adolescents with type 1 diabetes? And can this be used to derive differences in treatment outcomes? Researchers at the DZD investigated these questions in the current study.

The researchers evaluated the data from the Diabetes Patient Follow-up Registry (DPV) of 29,284 patients under the age of 20 years. Among other things, they investigated how frequently pump therapy and rapid-acting or long-acting insulin analogs are used and the percentage of use of continuous tissue glucose measurement systems (CGMS). In addition to the type of treatment, treatment outcomes were also assessed. Among other things, the quality of metabolic control (assessed by the HbA1c value) and the prevalence of overweight in young type 1 diabetes patients were analyzed. "The study shows that the regional differences in treatment and treatment outcomes in young type 1 diabetes patients even exist at the district level and that these geographical differences can partly be explained by area deprivation, i.e. by a lack of material and social resources in the area measured by aggregated socio-economic indicators," said Marie Auzanneau, first author and DZD scientist at the

Institute for Epidemiology and Medical Biometry, ZIBMT, at Ulm University.

For the study, the research team used the German Index of Multiple Deprivation 2010 (GIMD 2010) and its quintile subdivisions. This deprivation index was conceived by DZD scientist Werner Maier of the Institute for Health Economics and Health Care Management. The results showed that patients in the most socio-economically disadvantaged regions were less likely to receive long-acting insulin analogs (64.3 percent) than patients in the socio-economically strongest regions (80.8 percent). Continuous glucose monitoring systems (CGMS) are also less frequently used in the socio-economically weakest regions (3.4 percent of patients) than in the socio-economically strongest regions (6.3 percent of patients).

Differences can also be seen in the treatment outcomes. The average HbA1c value is 8.07 percent (65 mmol/mol) in the socio-economically weakest regions and 7.84 percent (62 mmol/mol) in the socio-economically strongest regions. In addition, patients in the most disadvantaged regions are more frequently overweight. The prevalence is 15.5 percent here and 11.8 percent in the socio-economically privileged regions. However, patients in the socio-economically weakest regions are less likely to suffer from severe hypoglycemia. The rate of severe hypoglycemia here is only 6.9 events per 100 patient years compared with 12.1 events in the socio-economically strongest areas.

"Our results suggest that the treatment outcomes of patients in socio-economically disadvantaged regions could be improved by more frequent use of pump therapy and continuous tissue glucose measurement," said DZD scientist Stefanie Lanzinger of the ZIBMT. "In order to elucidate how the individual dimensions of area deprivation are associated with treatment and treatment outcomes in diabetes care, further studies will follow," added Joachim Rosenbauer of the German

Diabetes Center in Düsseldorf.

More information: Marie Auzanneau et al, Area Deprivation and Regional Disparities in Treatment and Outcome Quality of 29,284 Pediatric Patients With Type 1 Diabetes in Germany: A Cross-sectional Multicenter DPV Analysis, *Diabetes Care* (2018). DOI: 10.2337/dc18-0724

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