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och Sophiahemmet Högskola**

Behavior change intervention and fear of hypoglycemia in type 1 diabetes

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ABSTRACT

Introduction: Individuals with type 1 diabetes require lifelong insulin supply as well as behavioral adjustments for good treatment result. Only a minority reach the goal for glycemic control set in order to reduce the risk of severe long-term complications. Interventions based on cognitive behavior therapy (CBT) have been proposed to improve diabetes-management, but evidence for its efficacy in adults with poorly controlled type 1 diabetes is sparse. One common barrier to optimal diabetes-management is fear of hypoglycemia (FOH), especially in those who have experienced severe hypoglycemic episodes. Thus there is a need for a valid and reliable instrument to assess individuals who are affected by FOH. It is also vital to identify factors associated with FOH in order to find targets for interventions to reduce fear.

Aim: The overall aims of this thesis were to evaluate a CBT intervention for poorly controlled individuals with type 1 diabetes and to explore fear of hypoglycemia in an effort to gain deeper knowledge of possible targets for interventions to reduce FOH.

Methods: All four studies applied quantitative designs. *Study I* was a randomized controlled trial in which a cognitive behavioral intervention was evaluated on poorly controlled adult persons with type 1 diabetes. *Study II* was a psychometric evaluation of a Swedish version of the Hypoglycemia Fear Survey (HFS) in a survey study in adult persons with type 1 diabetes. *Studies III* and *IV* were cross-sectional survey studies employed on adults with type 1 diabetes exploring disease-specific, demographic (studies III and IV) , emotional and psychosocial factors (study IV) related to FOH.

Results and conclusions: *Study I:* The intervention group receiving CBT showed significant improvements in HbA$_{1c}$, diabetes related distress, well-being, FOH, perceived stress, anxiety and depression as well as frequency in self monitoring of blood glucose. *Study II:* A three-factor solution was found for the Swedish version of the HFS with the dimensions *Worry, Behavior* and *Aloneness*. Cronbach's alpha for the total scale was 0.85 and varied between 0.63 – 0.89 in the subscales. Convergent validity was also supported with moderate correlation between Swe-HFS and Swe-PAID-20. The Swe-HFS seems to be a reliable and valid instrument to measure FOH in adults with type 1 diabetes. *Study III:* Seven hundred and sixty-four persons (55%) responded to the questionnaire. The HFS-*Worry* subscale was significantly associated with frequency of severe hypoglycemia, number of symptoms during mild hypoglycemia, gender, hypoglycemic symptoms during hyperglycemia and hypoglycemic unawareness. The HFS-*Aloneness* subscale was significantly associated with frequency of severe hypoglycemia, number of symptoms during mild hypoglycemia, gender, frequency of mild hypoglycemia, HbA$_{1c}$, hypoglycaemic unawareness and visits to the emergency room because of severe hypoglycemia. FOH proved to be more prevalent in females. Frequency of severe hypoglycemia was identified as the most important factor associated with FOH. *Study IV:* A total of 469 (61%) persons responded to the questionnaire. The HFS was significantly associated with The Anxiety Sensitivity Index, the Anxiety subscale of Hospital Anxiety and Depression Scale and Social Phobia Scale. Together with the disease-specific factors the regression model explained 39% of the variance. Support for a positive association between FOH and anxiety was present and previously identified gender differences were confirmed. Differences between the subgroups on factors associated with FOH were found that may have implications in developing interventions.

Key words: type 1 diabetes, fear of hypoglycemia, psychometrics, behavior modification, cognitive behavior therapy, behavioral medicine, glycemic control.