# 外国語要旨

学位論文題目

**Improving adherence to dietary and fluid restrictions among patients receiving hemodialysis**

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## Introduction

In Japan, the number of patients receiving hemodialysis (HD) has grown to over 300,000. Long-term survival, risk of complications, quality of life, and treatment success depend on a patient's behavior concerning their therapeutic regimen, which includes dietary and fluid restrictions. Therefore, dietary and fluid adherence—meaning that patient behaviors were in line with the agreed-upon recommendations from a health care provider—is required. Nevertheless, successful dietary and fluid adherence is problematic for many patients owing to their complex and rigorous regimens. Thus, adequate assessment and intervention strategies are required to improve dietary and fluid adherence. This study aimed to explore patient characteristics that make successful adherence difficult and propose concrete intervention strategies with the perspective of patient-centered care.

## Study1　Identifying specific behaviors related to adherence to dietary and fluid restrictions among patients receiving hemodialysis

Study 1 aimed identify the specific behaviors and experiences related to dietary and fluid restrictions among adult HD patients by developing and validating the dietary and fluid behaviors assessment scale (DFBA). Study 1-1 employed a descriptive exploratory design

comprising individual semi-structured interviews, to explore the specific behaviors related to dietary and fluid restrictions in adult patients undergoing HD. In Study 1-2, we collected data using a cross-sectional multicenter design. Behavioral subscales, extracted by factor analysis, were used to examine and validate the relationship between objective and self-reported adherence measures.

**Study 1-1 Extraction of specific behaviors related to dietary and fluid adherence among patients receiving hemodialysis**

In Study 1-1, a descriptive exploratory design was implemented for 43 Japanese patients receiving HD. A total of 46 categories of specific behaviors related to dietary and fluid restrictions in patients receiving HD were identified. Categories were divided into two types (intentional and unintentional) and both types of behavior included examples of adherence and non-adherence.

**Study 1-2 Development of a dietary and fluid behaviors assessment scale for patients receiving hemodialysis**

In Study 1-2, a cross-sectional multicenter design was used to collect data from 4 Japanese dialysis centers in 3 cities (n = 577). Using 34 items of specific dietary and fluid behaviors (based on the finding of Study 1-1), behavioral subscales, extracted by factor analysis, were used to examine and validate the relationship between objective and self-reported adherence measures. Five subscales (factors) were extracted and tested for reliability and validity. These subscales were: “adjustment by preparation (cooking/purchasing),” “combination of foods,” “self-monitoring,” “portion control,” and “irregular diet.” Aside from “irregular diet,” all subscales were composed only of intentional behaviors that involve conscious management. Although irregular diet did include unintentional behaviors and was associated with

adherence when assessed using the objective measures (geriatric nutritional risk index, serum phosphorus, and inter-dialytic weight gain [IDWG]), it was not adequately related to adherence when assessed using the self-reported measures. Irregular diet may be an important behavior for improving adherence, regardless of how conscious a patient is of their treatment. Assessing both intentional (e.g., self-care) and unintentional behavior, using the DFBA, is important for improving adherence.

**Study 2　Factors contributing to self-reported non-adherence to dietary and fluid management regimens**

Study 2 aimed to examine the items, including objective measures and/or behaviors related to non-adherence, associated with self-reported non-adherence to dietary and fluid restrictions. The extent to which each item predicted self-report non-adherence was examined using multivariable logistic regression analysis, controlling for demographic confounders. For subordinate variables, “subscale scores of DFBA developed in Study 1,” “objective measures” (serum albumin levels, serum phosphorus levels, and serum potassium levels), and “items related to non-adherence” (BMI, appetite, dry weight [DW] change) were used. IDWG（an increase in DW of 5% or more between 2 days during the dialysis interval) predicted self-reported non-adherence for both dietary and fluid management. In addition, dietary adherence was predicted by serum potassium levels greater than or equal to 5.5, a low frequency of “adjustment by preparation (cooking/purchasing),” and low scores on “combination of foods.” Similarly, fluid adherence was predicted by a low frequency of “adjustment by preparation (cooking/purchasing), low scores on “self-monitoring,” and a BMI of 20.0 to 21.9. Some items that predicted self-reported adherence, such as body weight or examination data, were assumed to be consistent with recognition of themselves as adhering/not adhering to their regimen when classified as “non-adherence” by objective indicators. However, some items

that did not predict self-reported adherence, such as serum phosphorus levels and malnutrition risk, may not easily be recognized by patients as “non-adherence,” even if the items were considered “non-adherence” when evaluated by objective indicators This suggests a possibility of inconsistencies in the recognition of adherence between patients and medical personnel.

**Study 3　Association between inter-dialytic weight gain, perception of dry weight, and dietary and fluid behaviors, according to body mass index, among patients receiving hemodialysis**

According to Studies 1 and 2, IDWG is likely to be related to dietary/fluid behaviors and patients recognize their behavior as non-adherence when it is evidenced by IDWG. However, IDWG occurred in more than half the cases of non-adherence and it is assumed that there are “situations where proper management is impossible even if known.” Therefore, Study 3 aimed to gain crucial insight into these cases and to suggest appropriate intervention strategies, by identifying the specific dietary and fluid behaviors correlating with IDWG and stratifying patients according to BMI (< 20, 20–21.9, 22–24.9, ≧ 25). The differences in dietary and fluid behaviors, demographic characteristics, and perception of DW were compared between relative IDWG non-adherence (average relative IDWG ≧ 5% a month) and adherence subgroups. The results showed that the types of dietary practices and fluid behaviors of relative IDWG non-adherent patients were different according to their BMI group. In addition, BMI groups also showed differences in perception of DW and demographic characteristics, including gender, age, and employment status.

**Study 4　Development of educational tools for improving dietary and fluid adherence: Focusing on weight gain during dialysis**

Study 4, we developed an educational booklet that can provide tailored knowledge and practical information for each "type" of patient; patients were classified into 8 types based on factors that correspond to non-adherence associated with BMI. In addition, we examined the feasibility of this booklet as an educational tool by seeking opinions from professionals engaged in dialysis medicine. First, we developed the booklet. It included 1) a flow chart for use in identifying patient type; 2) sections providing information on IDWG non-adherence cause/coping strategies, divided by patient type; and 3) a practice section, containing menu presentation/self-monitoring tool. At the same time, we prepared a "booklet utilization manual," which explains how the booklet should be used. We received feedback from the professionals, who confirmed the possibility of implementing this tool and the validity of the content. Based on their evaluations, we suggest that it will be necessary to verify the effectiveness this tool in reducing IDWG due to non-adherence.

**Conclusion**

This study focused on adherence to dietary and fluid restrictions among patients receiving HD, which is known as a problem area for the self-management of chronic diseases. We examined the suggested assessment methods, by identifying characteristics related to non-adherence, which included specific behaviors, physical factors, and psychosocial factors. Results may lead to proposals for intervention strategies designed to suit a range of individual patient characteristics, by promoting the understanding of patients' adherence patterns using objective/self-report measures, which are the center of adherence assessment. This may be an important outcome, not only for patients receiving HD but also for other chronic disease patients who are required to undertake self-managements regimens, including dietary management. In the future, further research is required to more deeply understand both

individual factors related to patients' non-adherence and how the medical staff and facilities can approach patients to develop strategies for improvement.