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Influence of unstable psychological condition on the quality of life of hemodialysis patients

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Abstract

Purpose: Hemodialysis patients tend to be in “unstable psychological conditions” because of complications and physical activity restriction. This study aimed to investigate unusual psychological factors and their influence on the quality of life (QOL) of hemodialysis patients.

Methods: This study targeted 55 patients who had experienced > 1 year of stable maintenance outpatient hemodialysis. The Hospital Anxiety and Depression Scale (HADS) was used to evaluate unusual psychological conditions. The Kidney Disease Quality of Life Short Form (KDQOL-SF) was used to evaluate QOL. Participants were grouped into “unstable psychological conditions” if HADS indicated that “depression is suspected” or “suspected depression, anxiety stated” (“Anxiety/Depression group”); this group was then compared to the “Stable group”.

Results: A total of 18 participants (32.7%) were included in the “Anxiety/Depression group”, and all QOL scores in this group were lower than those in the “Stable group”. In particular, a significantly low value was shown in the respective criteria such as “effects of kidney disease,” “social support,” and “general health perceptions”.

Conclusions: A possibility was suggested that the major causes were the restrictions of social activity by hospital visits and treatment and unique psychological conditions.

Keywords: Hemodialysis patients, Psychological conditions, Quality of life (QOL), Hospital Anxiety and Depression Scale (HADS), Kidney Disease Quality of Life Short Form (KDQOL-SF)

Introduction

The estimated 5-year survival rate of chronic dialysis patients in Japan is 60%. Despite advances in medicine for the past 30 years, this rate remains the same [1]. Dialysis patients have not only chronic diseases with poor prognosis but also physical limitations due to various complications, as well as restrictions of social activity by hospital visits and treatment. For these reasons, dialysis patients encounter various loss experiences and psychological conditions leading to “reactive

depressed state.” Approximately 5–71.4% of dialysis patients are reported to suffer from depressive state [2], and this rate varies widely. This is considered to be due to the difficulty in obtaining an objective diagnosis. Previous studies reported that depression increased the risk of mortality [3–6]. However, only a few studies have evaluated the influence of “unusual psychological conditions” on the quality of life (QOL) of dialysis patients.

“A decline in QOL” due to illness causes “unstable psychological conditions.” On the contrary, “unstable psychological conditions” caused by illness may “decrease QOL,” and “unstable psychological conditions” and “decline in QOL” are mutually vicious cycles. Given

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the varying findings, this study aimed to evaluate the effect of “unstable psychological conditions” such as depression and anxiety on the QOL of hemodialysis patients and to examine possible interventions for this population.

Subjects and methods

This study included patients undergoing maintenance hemodialysis at Seitetsu Memorial Hospital. The inclusion criteria were as follows: (1) dialysis duration of ≥ 1 year, (2) no history of hospitalization for ≥ 1 year, (3) not living alone, and 4) provided consent for participation in this study. A total of 55 hemodialysis patients met the above criteria and thus were included in the study. The study was approved by the Seitetsu Memorial Hospital Ethics Committee (approval number: 011). All patients provided a written informed consent.

The Hospital Anxiety and Depression Scale (HADS) [7] was used for the evaluation of “unstable psychological conditions.” For the evaluation of QOL, the Kidney Disease Quality of Life Short Form (KDQOL-SF version 1.3) [8] was used.

HADS was developed to evaluate anxiety and depressed state of patients with physical symptoms. HADS consists of a total of 14 items (seven items on anxiety (A item) and seven items on depression (D item)) (Table 1), and A and D items are alternately arranged. Each item is assigned 0 to 3 points, which obtains a total score of 21 points: the highest score indicates the poorest state. The reliability and validity of the Japanese version of HADS have been reported [9]. The patients with “unstable psychological conditions” were defined as those who scored

eight points or above in HAD-D items which were to identify those suspected of depression or those who did eight points or above in HADS-A items which were to identify those suspected of anxiety [7, 10]. In order to examine the inspection results and the QOL on “unstable psychological conditions,” patients who satisfied these conditions were grouped as the “Anxiety/Depression group” and the other patients as the “Stable group.”

KDQOL-SF was developed by Hays et al. [11], and the reliability and validity of the Japanese version of KDQOL-SF has been reported [12]. KDQOL consists of 11 items on the kidney-disease-targeted scale and eight items on the general health-related QOL scale. The kidney-disease-targeted scale questionnaire consisted of items on symptoms, physical problems, effects of kidney disease, burden of kidney disease, work status, cognitive function, quality of social interaction, sexual function, sleep, social support, dialysis staff encouragement, and patient satisfaction with dialysis care. Moreover, the general health-related QOL scale questionnaire consisted of items on physical functioning, role functioning (physical), body pain, general health perceptions, vitality, social functioning, role functioning (emotional), and mental health. The higher the score, the better the QOL. For this study, we obtained approval to use the Japanese version of KDQOL-SF version 1.3 from author.

In addition, for the examinations of the patients’ backgrounds, the average annual values obtained from their periodical blood tests were used.

For statistical analysis, χ^2 test, Mann-Whitney’s *U* test, and Pearson’s correlation coefficient test were performed. JMP (JMP 13.2 for Windows, SAS Institute Inc., USA) was used for analysis, with a significance level of less than 5%. Continuous variables are expressed as mean \pm standard deviation; categorical variables are expressed as count.

Results

The mean age of the subjects was 67.3 ± 12.0 years; the mean dialysis duration was 10.0 ± 7.9 years; and 19 patients (34.5%) had diabetes as primary disease (Table 2). Eighteen subjects were diagnosed as having “unstable

Table 1 Hospital Anxiety and Depression Scale

A item
Q1. I feel tense or wound up:
Q3. I get a sort of frightened feeling as if something awful is about to happen:
Q5. Worrying thoughts go through my mind:
Q7. I can sit at ease and feel relaxed:
Q9. I get a sort of frightened feeling like “butterflies” in the stomach:
Q11. I feel restless as if I have to be on the move:
Q13. I get sudden feelings of panic:
D item
Q2. I still enjoy the things I used to enjoy:
Q4. I can laugh and see funny side of things:
Q6. I feel cheerful:
Q8. I feel as if I am slowed down:
Q10. I have lost interest in my appearance:
Q12. I look forward with enjoyment to things:
Q14. I can enjoy a good book or radio or TV program:

Table 2 General characteristics of subjects

Male/female (<i>n</i>)	39/16
Age (years)	67.3 ± 12.0
Vintage of dialysis (years)	10.0 ± 7.9
Dialysis time (min)	244.4 ± 21.9
Diabetes/non-diabetes	19/36
HADS score	
A item	2.5 ± 2.9
D item	5.8 ± 3.2

psychological conditions” based on HADS, which was 32.7% of the total (Fig. 1). Moreover, no significant difference was found between the “Anxiety/Depressed group” and the “Stable group” in terms of patient background (Table 3). In the test results, “Anxiety/Depression group” demonstrated a value significantly lower than that for “Stable group” in Hb level and normal Protein Catabolic Rate (nPCR) respectively (Table 4). The results of KDQOL-SF between the two groups are shown in Tables 5 and 6. The “Anxiety/Depression group” shows low values in all items compared to the “Stable group”. In particular, “effects of kidney disease,” “cognitive function,” “social support,” “general health perceptions,” and “mental health” items show significant low values. There were many missing values for the “sexual function” item; thus, the calculation of its average value was considered inaccurate, and it was subsequently excluded from the analysis.

Discussion

Many dialysis patients suffer from treatment-related stressors such as diet and fluid limitations, temporary restraints during dialysis therapy, itching and general fatigue, and financial problems [13, 14]. Therefore, dialysis patients are more likely to develop depression than healthy people. HADS used in this study does not deal with the items depending on a disease including such as insomnia and anorexia and has been proved to have certain usability as a method to understand the mental states of the patients with a disease [7, 15]. In addition, the effectiveness of Japanese-version HADS has been reported [9]. It is assumed that those patients who scored

Table 3 General characteristics of the Anxiety/Depressed group and Stable group

	Stable group <i>n</i> = 37	Anxiety/depression group <i>n</i> = 18
Male/female (<i>n</i>)	27/10	12/6
Age (years)	67.6 ± 11.2	66.7 ± 14.0
Vintage of dialysis (years)	10.5 ± 8.5	8.9 ± 6.7
Diabetes/non-diabetes (<i>n</i>)	12/25	7/11
Dialysis time (min)	242.4 ± 20.5	248.3 ± 24.8

eight points or more in HADS-A (sensitivity: 0.89/ specificity: 0.88) and those scoring eight points or more in HADS-D (sensitivity: 0.80/ specificity: 0.75) are suspected of suffering from anxiety and depression, respectively [10]. Accordingly, in this study, those patients presenting eight points or more in any one of these tests were defined as the group of patients who took on “unstable psychological conditions” (“Anxiety/Depression group”).

In a meta-analysis, Palmer et al. revealed that the prevalence of interview-based depression in chronic kidney disease stage 5D was 22.8% and that using self- or clinician-administered rating scales was 39.3% [16]. In an international collaborative research using the Center for Epidemiological Studies Depression Scale (CES-D) score, which included 5872 patients and 1603 dialysis patients in Japan, depressive symptoms become stronger or depression symptoms appear more frequently in patients with CES-D score of ≥ 10 points at an estimated prevalence rate of 40.0%, which is almost equal to those reported in foreign countries [17].

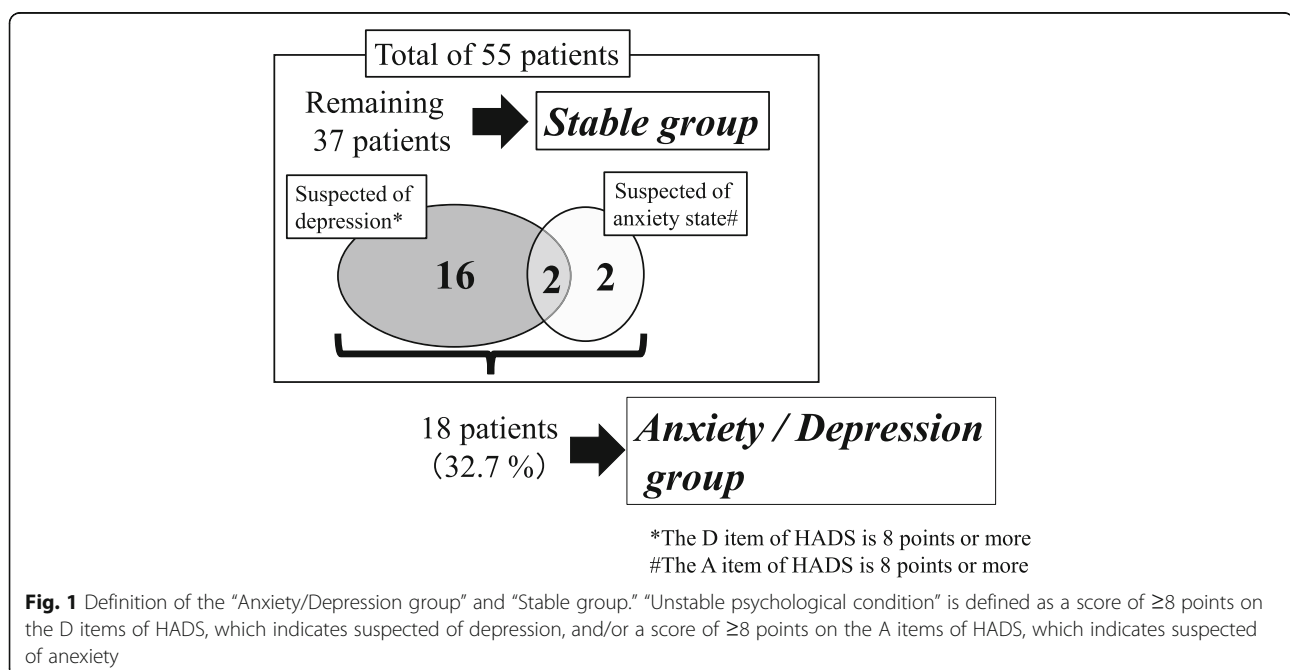


Table 4 Blood test of the Anxiety/Depressed group and Stable group

	Stable group	Anxiety/depression group	<i>p</i> value
Albumin (g/dL)	3.47 ± 0.34	3.35 ± 0.61	0.597
adjusted calcium (mg/dL)	8.94 ± 0.30	8.73 ± 1.49	0.360
Phosphorus(mg/dL)	5.83 ± 1.04	5.53 ± 1.08	0.441
Creatinine(mg/dL)	10.52 ± 1.91	10.49 ± 2.77	0.409
Hemoglobin(g/dL)	11.71 ± 2.35	10.56 ± 1.55	0.015
Kt/V	1.55 ± 0.24	1.50 ± 0.32	0.823
nPCR (g/kg/day)	0.89 ± 0.11	0.83 ± 0.18	0.029
%CGR (%)	102.12 ± 18.14	100.79 ± 26.77	0.146

The number of patients who were suspected of suffering from “depression” in this research (scoring eight points or more in HADS-D) was relatively small, 16 patients (29.1%), which was assumed to be attributable to the fact including that different diagnostic criteria were used.

Depression in hemodialysis patients has been reported to increase the risk of mortality [3–6]. In the Dialysis Outcomes and Practice Patterns Study (DOPPS), depression is considered to be a risk factor of death and hospitalization; DOPPS is an international observational study on the contents of medical treatment of chronic hemodialysis patients and their treatment results [4, 17]. The same result was found among hemodialysis patients in Japan [17]. In contrast, a lower health-related QOL using KDQOL-SF was associated with a higher risk of death and hospitalization [18].

“Anxiety/Depression group” showed a low value in respective tests of KDQOL-SF in this research as well, and therefore, it was thought that attentions should be paid from both mentally and QOL. Also, comparing to “Stable group,” “Anxiety/Depression group” demonstrated a significantly lower score in Hb level and nPCR. A multivariate logistic regression analysis was performed for blood test (Table 7). The risk of developing “unstable psychological conditions” was significantly lowered as

increased of Hb and PCR (adjusted odds ratio 0.150 and 5.244e–7, 95% confidence interval 0.034–0.656 and 1.59e–7–0.017, respectively).

Anemia has been reported to be related to depression [19–21]. There is a possibility that anemia can cause or worsen depression because dyspnea or general fatigue caused by anemia can decrease physical and social activity. In dialysis patients, easygoing interventions for treating anemia is dangerous. In dialysis patients, an increase in Hb may increase the risk of embolism. Therefore, it is considered necessary to examine target Hb in dialysis patients in the future from a mental point of view as well.

There has been some reports on the correlation between the indexes for nutritional statuses and mental states [22, 23]. It was considered to be significant to take enough protein while paying attention to the serum phosphorus level.

“Anxiety/Depression group” demonstrated low KDQOL scores in general and also showed significantly low ones especially in the respective criteria such as “effects of kidney disease,” “cognitive function,” “social support,” “general health perceptions,” and “mental health” (Tables 5 and 6). Looking at the questions of “Effects of kidney disease on your daily life,” significantly low values were obtained with regard to the question of “Your

Table 5 Scores on Kidney Disease Quality of Life Short Form (kidney-disease-targeted scale)

	Stable group	Anxiety/depression group	<i>p</i> value
Symptoms and problems	88.06 ± 10.45	84.24 ± 18.65	0.2922
Effects of kidney disease	88.22 ± 12.45	80.94 ± 18.55	0.0384
Burden of kidney disease	50.51 ± 27.77	48.31 ± 32.83	0.1443
Work status	22.97 ± 25.26	22.81 ± 27.37	0.4846
Cognitive function	95.68 ± 10.09	90.45 ± 18.52	0.0358
Quality of social interaction	96.40 ± 6.21	88.83 ± 21.99	0.1350
Sleep	81.76 ± 18.09	78.71 ± 19.93	0.0841
Social support	86.91 ± 16.76	81.51 ± 22.81	0.0183
Dialysis staff encouragement	77.03 ± 15.45	72.29 ± 18.94	0.3931
Patient satisfaction with dialysis care	86.48 ± 11.68	80.90 ± 19.13	0.1956

Table 6 Scores on Kidney Disease Quality of Life Short Form (general health-related quality of life scale)

	Stable group	Anxiety/depression group	<i>p</i> value
Physical functioning	72.97 ± 25.40	72.24 ± 23.78	0.5337
Role functioning (physical)	67.57 ± 44.82	62.50 ± 43.04	0.3050
Body pain	79.93 ± 29.13	77.40 ± 27.58	0.2557
General health perceptions	50.27 ± 20.14	45.01 ± 23.76	0.0230
Vitality	67.70 ± 25.13	59.08 ± 26.69	0.0579
Social functioning	88.85 ± 23.90	88.58 ± 21.18	0.4493
Role functioning (emotional)	90.09 ± 29.26	80.55 ± 36.46	0.0597
Mental health	85.95 ± 12.60	76.53 ± 22.22	0.0023

ability to travel?" and "Stress or worries caused by kidney disease?" Collectively, a possibility was suggested that the major causes were the restrictions of social activity by hospital visits and treatment and unique psychological conditions. The important measures were considered to be the removal of patients' anxiety through the continuous provision of detailed information on their individual clinical conditions by medical staff including doctors and the medical staffs from their surroundings including family members. In addition, personal psychotherapy on the bedside during dialysis therapy was found to improve depression symptoms, QOL, and fluid adherence [24]. The involvement of medical staff is also important. The improvement in these particularities and the support of dialysis patients are deemed to become significant from now on.

Incidentally, compared with the "Stable group," the "Anxiety/Depression group" also showed significantly lower "cognitive function" items. Therefore, "cognitive function" may affect the HADS result. We will need to pay due attention to the influence of cognitive function in the future, considering the ever-increasing number of elderly dialysis patients.

CVD and other complications could affect the HADS scale. However, HADS was developed to evaluate anxiety and depressed state of patients with physical symptoms. And no significant difference between the two groups

Table 7 Multivariate logistic regression analysis for risk factor to develop "unstable psychological conditions"

Variable	Odds ratio (95% CI)	<i>p</i> value
Albumin	23.602 (0.799–696.807)	0.067
adjusted calcium	2.559 (0.225–29.113)	0.449
Phosphorus	1.496 (0.419–5.337)	0.535
Creatinine	1.321 (0.707–2.470)	0.383
Hemoglobin	0.150 (0.034–0.656)	0.012
Kt/V	3.983 (0.155–102.457)	0.404
nPCR	5.244e-7 (1.59e-11–0.017)	0.006
%CGR	1.011 (0.950–1.076)	0.737

has been observed in the items of "symptoms and problems," "physical functioning," and "body pain". For these reasons, we concluded that the impact of complications on HADS would be insignificant.

The issues of this study are the small-sized examination at a single facility and cross-sectional study. A larger-scale study based on multicenter facilities and observations would be necessary in the future.

Conclusions

About 30% of hemodialysis patients experienced "unstable psychological conditions." Patients with "unstable psychological conditions" overall had a low KD-QOL, especially related to items for "effects of kidney disease," "social support," and "general health perceptions." A possibility was suggested that the major causes were the restrictions of social activity by hospital visits and treatment and unique psychological conditions.

Abbreviations

QOL: Quality of life; HADS: Hospital Anxiety and Depression Scale; KDQOL-SF: Kidney Disease Quality of Life Short Form; ADL: Activities of daily living; CES-D: Center for Epidemiological Studies Depression Scale; DOPPS: Dialysis Outcomes and Practice Patterns Study

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Authors' contributions

JT designed the research and wrote the paper. TA, MK, NS, and YT performed the research. TM and JS analyzed the data. KF and KO provided methodological advice on study design. TK and WO kindly reviewed and revised the manuscript. All authors read and approved the final version of the manuscript.

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Availability of data and materials

The datasets analyzed during the present study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study was approved by the hospital's ethics committee of Seitetsu Memorial Hospital (approval number: 011) and was conducted under the Declaration of Helsinki.

Consent for publication

All authors agreed on the publication of this study.

Competing interests

The authors declare that they have no competing interests.

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