

Original Article

## Components of the Practical Ability of Chronic Dialysis Nursing

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### Abstract

**Background:** Nurses engaged in chronic dialysis care are required to improve their nursing skills for dialysis. However, no study has clearly analyzed these skills. The present study aims to identify the components of the practical nursing skills for chronic dialysis through a literature review of nursing activities for nurses who are familiar with chronic dialysis nursing.

**Methods:** We searched for articles reporting nursing in chronic dialysis by Dialysis Care and Management of Chronic Kidney Disease Leading Nurses, excluding articles that reported support for perinatal patients and non-dialysis patients, and selected 69 articles. Based on a content analysis, we coded the descriptions related to the nursing skills, and created subcategories, categories, and themes depending on similarities.

**Results:** We identified 7 themes, 22 categories, 64 subcategories, and 465 codes. The themes are Practical care skills during the dialysis; Support skills to introduce / not introduce / change renal replacement therapy; Self-care support skills; Support skills to prevent diabetes and deterioration of foot diseases; Support skills for patients with cancer and their families; Skills to prepare support arrangements for patients who need support to continue treatment; and Skills to engage in quality assurance of nursing for chronic dialysis.

**Conclusion:** With the themes, we identified three skills: to “support the start and stable continuation of the chronic dialysis treatment”, “support chronic dialysis patients to continue treatment”, and “ensure the quality of the nursing in chronic dialysis” as the components of three practical skills in the nursing for chronic dialysis.

**Key Words:** Dialysis nursing, Practical ability, Content analysis

### Background

At the end of 2016, the average age of patients with chronic kidney disease who started dialysis in Japan was 69.4 years, and the number of patients having received dialysis for more than 20 years (n=26,313) accounted for 8.3% of all chronic dialysis patients (n = 318,814) where the length of dialysis treatment was known (Masakane, et al, 2018). One characteristic of chronic dialysis medical care in Japan is such very long durations of hemodialysis and aging of the patients. This has resulted in the number of patients with bone, joint, and muscle disorders accounting for 79.0% of those undergoing hemodialysis for 25 years or longer, and 53.1% of dialysis patients are 65 years or older (Japan Association of Kidney Disease

Patients, 2018). Further, the mobility of patients who need nursing care is significantly lower than non-dialysis care patients (Shimizu, 2010).

Along with the sharp rise in national medical expenses in Japan, as an issue of chronic dialysis medical care, potential reductions of medical expenses arising from chronic dialysis have been suggested, and national medical reimbursements for chronic hemodialysis have been decreased (Ministry of Health, Labour and Welfare, Japan, 2018). It is an urgent issue to maintain the quality of support for chronic dialysis patients because facilities that provide dialysis treatment face the necessity to reduce the costs and to be able to reallocate staff. According to the Japan Academy of Nephrology Nursing, nursing for chronic kidney disease is defined as being in support of patients

with chronic kidney disease so that the patients can continue to receive treatment, improve the quality of life (QOL), and live with dignity, as well as being able to assist in self-care (Japan Academy Of Nephrology Nursing, 2016). In the present study, we define “chronic dialysis nursing” as the nursing provided for patients who need chronic dialysis among nursing activities involved in chronic kidney disease. As qualifications related to chronic dialysis nursing, Japan has a program for qualification as “Dialysis Care and Management of Chronic Kidney Disease Leading Nurse” and “Certified Nurse Specialist in Dialysis Nursing”. Present day society has a demand for improvement in practical nursing skills for chronic dialysis.

To define the practical nursing ability, we consulted the MeSH (Medical Subject Headings) of Pub Med: with “professional competence” defined as ‘The capability to perform the duties of one’s profession generally, or to perform a particular professional task, with skill of an acceptable quality,’ and “clinical competence” as ‘The capability to perform acceptably those duties directly related to patient care.’ In the present study, we define “practical nursing skills” as the ability of nurses to perform the duties directly related to patient care at an acceptable level. Further, the component of practical nursing skills is considered to be “the ability to understand people and situations”, “the ability to provide people-centered care”, and “the ability to improve the quality of nursing (Matsutani, et al, 2010). However, no study has clearly reported the component of practical nursing skills in the field of chronic hemodialysis nursing. This study aims to identify the components that constitute the practical skills of chronic dialysis nursing based on the nursing activities of nurses who are familiar with chronic dialysis nursing.

## Methods

We searched for articles that reported nursing activities for chronic dialysis by Dialysis Care and Management of Chronic Kidney Disease Leading Nurses (DLN) listed in the Dialysis Care and Management of Chronic Kidney Disease Leading Nurse (Hirakata, et al, 2014). Excluding articles that reported support for perinatal patients and patients who did not experience dialysis care, we

selected 69 articles. Table 1 shows outlines of the 69 articles. The data described as related to the component of practical nursing skills, as “the ability to understand people and situations”, “the ability to provide people-centered care”, and “the ability to improve the quality of nursing (Matsutani, et al, 2010), were divided into meaningful contexts and coded by paying attention not to impair the context of the descriptions. Referring to the method of the content analysis, we organized the codes into groups with similar contexts and created subcategories. Further, by focusing on the similarities of the contexts, categories and themes (Graneheim, & Lundman, 2004) were created. The analysis was conducted by researchers familiar with chronic nursing and nurses who are familiar with dialysis nursing.

## Results

We identified 7 themes, 22 categories, 64 subcategories, and 465 codes (Table 1). The headings and italic descriptions in the following represent the themes and categories below.

### Practical care skills during the dialysis

*Adjustment of the dialysis prescription according to the physical conditions* includes the adjustment of the dialysis prescription and dry weights. *Responding to patients who need attention to safety and comfort during the dialysis* shows prevention of the falling of patients with high risk of falling, responding so that patients can stay calm during the dialysis, adjustments to body fluid removal, prevention of blood pressure decreases.

*Support of psychological concerns of the patients* shows interactions to stabilize the mental conditions, building relationships with patients who refuse to undergo dialysis, and responses to patients who are dissatisfied with having to undergo dialysis.

### Support skills to introduce / not introduce / change renal replacement therapy

*Instruction for self-care in the introductory period for dialysis* includes instructions for the self-care addressed to patients and their families, and instructions for dialysis shunt management. *Support for life adjustments after introduction of and changes in renal replacement therapy* includes

support for patients to adapt to life after the introduction and changes in the therapy, support for home care after the introduction, and support to enable early discharge of elderly dialysis patients. *Support for decisions concerning introduction and non-introduction of dialysis* includes coordination between patients, families, and physicians concerning the introduction of dialysis treatment, consideration of the feelings of patients and families after deciding on non-introduction or discontinuation of dialysis.

### Self-care support skills

*Prevention of hyperphosphatemia* includes proposals for the diet, oral support of phosphorus adsorbent, and making support arrangements by family and other professionals. *Prevention of*

*hyperkalemia* includes the creation of opportunities to gain knowledge, and the implementation of dialysis under specific dialysis conditions. *Support for fluid control* includes determining the causes of frequent weight gain, encouraging weight control, responding to inadequate weight control, and encouraging patients to improve their awareness of this.

*Prevention of heart failure for heart failure high-risk patients* includes evaluating and dealing with symptoms, proposing a lifestyle for the prevention, raising the awareness of prevention, and encouraging patients to cope with anxiety. *Dealing with dialysis shunt troubles* includes prevention of shunt troubles in high-risk patients and decision-making related to the treatment.

**Table 1 Outlines of the cases included in the analysis**

Case	n	%	
Self-care related to dialysis	12	17.4	17.4%
Staff education / improvements of performance	11	15.9	15.9%
Patients with foot diseases	7	10.1	10.1%
Patients required to change renal replacement therapy	5	7.2	7.2%
Dialysis patients with cancer	5	7.2	7.2%
Medical treatment of patients with dementia	5	7.2	7.2%
Medical treatment of elderly patients	4	5.8	5.8%
Medical treatment of dialysis patients in need of long-term nursing	4	5.8	5.8%
Medical treatment of long-term dialysis patients	3	4.3	4.3%
Patients who are difficult to build relationships with	3	4.3	4.3%
Patients who are starting dialysis treatment	3	4.3	4.3%
Start or discontinuation of dialysis treatment	2	2.9	2.9%
End-of-life patients	2	2.9	2.9%
Blood pressure decreases during dialysis treatment	1	1.4	1.4%
Shunt trouble	1	1.4	1.4%
Patients using an indwelling catheter for long periods	1	1.4	1.4%

**Table 2 Components of the practical ability of chronic dialysis nursing**

Theme	Category	Subcategory	Number of codes
Practical care skills during the dialysis			
	Adjustment of the dialysis prescription according to the physical conditions	Evaluation of the dialysis prescription according to the physical condition	10
		Adjustment of the dry weights according to the physical condition	11
	Responding to patients to stabilize the dialysis process	Adjustments to body fluid removal according to the dialysis process and body weight increases	4
		Prevention of blood pressure decreases during the dialysis	3
	Responding to patients who need attention to safety and comfort during the dialysis	Prevention of the falling of patients with high risk of falling	3
		Responding so that patients can stay calm during the dialysis	7
		Response to increases in pain during the dialysis	6
	Support of psychological concerns of the patients	Interactions to stabilize the mental conditions of patients	12
		Building relationships with patients who refuse to undergo dialysis	4
		Responses to patients who are dissatisfied with having to undergo dialysis	1
Support skills to introduce / not introduce / change renal replacement therapy			
	Instruction for self-care in the introductory period for dialysis	Instructions for the self-care addressed to the families of patients who started dialysis	7
		Instructions for self-care considering the background of the patient	8
		Instructions for dialysis shunt management considering the background of the patient	4
	Support for life adjustments after introduction of and changes in renal replacement therapy	Support to enable early discharge of elderly dialysis patients	10
		Support for home care after starting dialysis	6
		Preparation of support arrangements for home care to start dialysis treatment	7
		Support for life adjustments after changes in renal replacement therapy	15
	Support for decisions concerning introduction and non-introduction of dialysis	Coordination between patients, families, and physicians concerning the introduction of dialysis treatment	1
		Consideration of the feelings of patients and families after deciding on non-introduction or discontinuation of dialysis	11
Self-care support skills			
	Prevention of hyperphosphatemia	Proposals for the diet to prevent hyperphosphatemia	4
		Support for reliable oral medicine of phosphorus adsorbent	3
		Support arrangements by family and other professionals to prevent hyperphosphatemia	3
	Prevention of hyperkalemia	Creation of opportunities to gain knowledge	4
		Sufficient kalium removal by performing dialysis under specific dialysis conditions	2
	Support for fluid control	Determining the causes of frequent weight gain	6
		Encouraging weight control	7
		Weight control goal setting, efforts and evaluations conducted together with patients	11
		Responding to inadequate weight control	6
		Encouraging patients to improve their awareness of weight control	11
	Prevention of heart failure for heart failure high-risk patients	Evaluating and dealing with heart failure symptoms	4
		Proposing a lifestyle for the prevention of heart failure	7
		Raising the awareness of prevention of heart failure	10
		Encouraging patients to cope with anxiety about heart failure	5
	Dealing with dialysis shunt troubles	Support for decision-making related to the treatment of dialysis shunt troubles	4
		Prevention of dialysis shunt troubles in high-risk patients	1

**Table 2 (continued): Components of the practical ability of chronic dialysis nursing**

Theme	Category	Subcategory	Number of codes
Support skills to prevent diabetes and deterioration of foot diseases	Adjustments for the prevention of deterioration of foot diseases and treatment continuation	Professional follow-up of leg ulcers performed during outpatient visits for the dialysis	15
		Prevention of onset / deterioration of leg ulcers	13
		Paying close attention to patients who have refused leg amputation	7
		Encouraging patients who had a lower limb amputated to maintain the ADL	12
		Efforts to make at-home support arrangements for patients who had a lower limb amputated and/or with severe leg diseases	10
	Encouragement of blood glucose control among patients with diabetes	Understanding of the self-care conditions related to blood glucose control	7
		Proposing methods to control blood glucose levels suited to the patient	8
Support skills for patients with cancer and their families	Support for cancer treatment	Cancer pain control	6
		Symptom control of patients with cancer	6
		Support to receive and continue cancer treatment	10
	Support for life during the treatment based on the wishes of the cancer patients and their families	Confirmation of the will of cancer patients towards a life-sustaining treatment	13
		Evaluation of the support for medical treatments based on cancer patient will	8
		Preparation for an environment considering end-of-life nursing for cancer patients	9
Skills to prepare support arrangements for patients who need support to continue treatment	Preparation of support arrangements for patients with declined cognitive functions	Providing care according to the comprehension of patients with declined cognitive functions	7
		Measures for medication management of patients with declined cognitive functions	9
		Encouraging patients with declined cognitive functions to ingest appropriate meals and w	8
		Preparing support arrangements for home care of patients with declined cognitive functions	15
	Measures to deal with the problems in living for long-term dialysis patients	Providing care in dealing with pain for long-term dialysis patients	4
		Preparation for support arrangements for home care of long-term dialysis patients with decreased ADL	5
	Preparation for support arrangements for patients who need medical treatment at home	Preparation for emergency events with patients who are highly dependent on medical treatment	6
		Support for family members to conduct the medical care	12
	Preparation for support arrangements for patients who need support in living during treatment	Adjustment for life maintenance for patients who need support in living	10
		Support for self-care of patients who need support in living	3
		Preparation for support arrangements for home care of elderly patients with decreased ADL	9
Skills to engage in quality assurance of chronic dialysis nursing	Improvement of the environment to conduct chronic dialysis nursing	Planning and management of education for chronic dialysis nursing staff	10
		Support to improve skills of individual nurses	6
		Participation in efforts to improve the medical care and nursing environment	7
	Preparations for disasters	Preparations for disasters	
		Training and instruction assuming disasters	7
		Making provisions assuming the occurrence of disasters	5

**Support skills to prevent diabetes and deterioration of foot diseases**

*Adjustments for the prevention of deterioration of foot diseases and treatment continuation* includes professional follow-up of leg ulcers performed during outpatient visits for the dialysis, prevention of onset / deterioration of leg ulcers, paying close attention to patients who have refused leg amputation, encouraging patients who had a lower limb amputated to maintain the activities of daily living (ADL), and efforts to make at-home support arrangements for patients who had a lower limb amputated and/or with severe leg diseases. *Encouragement of blood glucose control among patients with diabetes* includes understanding of the self-care conditions and proposing methods to control blood glucose levels suited to the patient.

**Support skills for patients with cancer and their families**

*Support for cancer treatment* includes symptom control, and support to receive and continue treatment. *Support for life during the treatment based on the wishes of the cancer patients and their families* includes confirmation of the will towards a life-sustaining treatment, evaluation of the support for medical treatments based on patient will, and preparation for an environment considering end-of-life nursing.

**Skills to prepare support arrangements for patients who need support to continue treatment**

*Preparation of support arrangements for patients with declined cognitive functions* includes providing care according to the comprehension of patients, measures for medication management, encouraging patients to ingest appropriate meals and water, and preparing support arrangements for home care. *Measures to deal with the problems in living for long-term dialysis patients* include care in dealing with pain and preparation for home care support arrangements. *Preparation for support arrangements for patients who need medical treatment at home* includes preparation for emergency events with patients who are highly dependent on medical treatment, and support for family members to conduct the medical care. *Preparation for support arrangements for patients who need support in living during treatment*

includes adjustment for life maintenance, support for self-care, and preparation for support arrangements for home care of elderly patients with decreased ADL.

**Skills to engage in quality assurance of chronic dialysis nursing** *Improvement of the environment to conduct chronic dialysis nursing* includes planning and management of staff education, support to improve skills of individual nurses, and participation in efforts to improve the medical care and nursing environment. *Preparations for disasters* includes training and instruction assuming disasters, and making provisions assuming the occurrence of disasters.

**Discussion**

The seven themes identified in this study may be interpreted as the components of three practical skills in the chronic dialysis nursing, “Skills to support the start and stable continuation of chronic dialysis treatment”, “Skills to support chronic dialysis patients to continue treatment”, and “Skills to ensure the quality of the nursing in chronic dialysis”. In this section, we discuss these components separately.

**“Skills to support the start and stable continuation of chronic dialysis treatment”**

Three themes are included in this component: Practical care skills during the dialysis, Support skills to introduce / not introduce / change renal replacement therapy, and Self-care support skills, are practical skills necessary for support to ensure the administration of dialysis at every treatment, and to prevent complications during the dialysis. Nurses were involved in *Adjustment of dialysis prescriptions according to the specific physical conditions*. Each time dialysis is performed, it is mainly the dialysis volume and body fluid removal volume that are prescribed, and specifically the prescription of the body fluid removal volume needs attention in relation to the weight gain, changes in blood pressure, and edema conditions. Prescribing dialysis prescription is the role of the physician; however the two largest numbers of hemodialysis patients per specialist in dialysis medical care are 50 – 99 patients (27%) and 100 – 199 (24%) (Nakayama, et al, 2014). These figures suggest that it will be difficult for the specialists to

precisely and flexibly adjust the body fluid removal volumes, and it may be inferred that nurses will be expected to take part in adjusting the body fluid removal volumes as well as to observe patients during the hemodialysis. Adjustment of the body fluid removal volume is performed based on the guidelines for dialysis prescription (Watanabe, et al, 2015). However, nurses do not have sufficient opportunities to undergo training in dialysis prescription. It is necessary to prepare education programs on dialysis prescription for nurses.

### **Skills to support chronic dialysis patients to continue treatment**

Three themes are included in this component: Support skills to prevent diabetes and deterioration of foot diseases, Support skills for patients with cancer and their families, and The skills to prepare support arrangements for patients who need support to continue treatment, are assumed to be practical skills necessary to support the life of patients who have been undergoing treatment for long periods and elderly chronic dialysis patients. In Japan, the number of chronic dialysis patients who are also afflicted with cancer, foot diseases, and dementia has increased. Among the annual deaths of dialysis patients in Japan in 2016, cancer is the third leading cause of death, 9.7% of deaths of dialysis patients, and this number is increasing annually (Masakane, et al, 2018). Dialysis treatment is reported to be an independent risk factor for foot ulcers (odds ratio 4.2; 95% CI 1.7-10,  $p = .002$ ) (Ndip, et al, 2010) Further, in 2010, 9.9% of chronic dialysis patients in Japan suffered from dementia (Nakai, et al, 2012). It is important for dialysis patients to undergo medical treatment specialized for cancer, foot diseases, and dementia, but it is difficult for such patients to visit clinics for these diseases.

According to the International Council of Nurses (ICN), the competencies (appropriate knowledge, skills and characteristics) required by nurses to prevent and manage chronic diseases are defined as the ability to ensure “participating in activities to improve access to a wide range of health care services” and “engaging in activities to enable patients to access health care services in collaboration with other medical professionals” (International Council of Nurses, 2010). As

illustrated by the *Adjustments for the prevention of deterioration of foot diseases and treatment continuation*, *Support for cancer treatment*, and *Preparation of support arrangements for patients with declined cognitive functions*, categories in this study, nurses who support chronic dialysis patients are required to have the ability to make arrangements for patients to receive medical treatment and support specialized to accommodate complications when patients visit the clinic for the chronic dialysis treatment. These abilities would contribute to reducing the burden of the medical treatment specific to the chronic dialysis patients suffering from such complications.

### **“Skills to ensure the quality of the nursing in chronic dialysis”**

*Improvement of the environment to ensure the quality of nursing of chronic dialysis* includes participation in efforts to improve the medical care and nursing environment for the dialysis patients. There are large numbers of nighttime dialysis facilities, full-time dialysis nurses, and full-time dietitians. These have been reported as factors statistically significantly in influencing the one-year survival of patients after starting dialysis treatment (Ogata, et al, 2015). In *Preparations for disasters*, information about the details of preparation at the time of earthquakes that is provided by specific dialysis facilities significantly affected the preparation needed for the chronic dialysis patients (Sugisawa, et al, 2017). *Preparations for disasters* include training and instruction of patients assuming disasters, and it is important to carry out this training together with patients.

As described above, the findings show the importance of nurses providing support for the maintenance of the life of chronic dialysis patients. However, there are no prescribed legal standards for the number of nurses allocated to dialysis facilities in Japan. These also suggest the necessity to perform an evaluation of and provide an appropriate number of nurses in dialysis facilities based on the nursing necessities, and to develop programs to provide information about responses to chronic dialysis patients at the time of disasters so that nurses who provide support for chronic dialysis patients will be able to utilize “Skills to

ensure the quality of the nursing in chronic dialysis”.

### Conclusion

Based on the seven themes identified in this study, the practical ability of chronic dialysis nursing comprises the following three components: “Skills to support the start and stable continuation of chronic dialysis treatment”, “Skills to support chronic dialysis patients to continue treatment”, and “Skills to ensure the quality of the nursing in chronic dialysis”.

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