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Knowledge of Nutrition Care for Children on Peritoneal Dialysis at National Hospital of Pediatrics, Vietnam

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ABSTRACT

Background: Nutrition is critically important for chronic kidney diseases, especially for children on CAPD (continuous ambulatory peritoneal dialysis). Nutrition not only plays the role of medication but also can control most abnormal metabolism disorders and preserve the residual renal functions. However, most patients' families just focus on peritoneal dialysis while ignoring nutrition for the patients.

Objective: Survey the knowledge of nutrition care for children with CAPD prescription.

Method: Cross-sectional study on the nutritional status of 31 children undergoing CAPD. Interview and assess knowledge on kidney diseases with peritoneal dialysis, knowledge on nutrition care and nutrition practice of 31 mothers with children undergoing CAPD via a designed questionnaire.

Result: The ratio of malnutrition of children on CAPD was 37.8%. Knowledge on caregiving and hygiene for CAPD was good with 74.4% mothers knowing about complications of peritonitis, 64.4% was aware of peritoneal catheter exit-site infection. However knowledge on nutrition was limited, only 25.8% mothers having knowledge on nutrition for the children. 9.7% mothers could meet the requirement in nutrition practice.

Recommendation: It is necessary to enhance nutrition communication and counselling to achieve the expected treatment outcomes.

Keywords: Nutrition knowledge, nutrition care practice, continuous ambulatory peritoneal dialysis in children, end-stage renal disease.

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BACKGROUND

Chronic kidney disease – CKD is the permanent and continuous damage of renal functions, leading to end stage renal disease – ESRD. There is a growing rate of CKD and ESRD, making them global health issue¹. Most CKD patients progress to ESRD and need kidney transplant or dialysis. Peritoneal dialysis (PD) is becoming more common due to its simplicity, convenience and because it can be conducted at home, especially for children at school age². In Vietnam in 2000, PD was applied for the treatment of chronic kidney in some large hospitals. Since 2014, this method has become more popular with nearly 1,700 cases, helping prolong patients' life. Proper nutrition plays an important role in treatment, preservation of residual renal functions, supports the recovery of injury, maintains health and nutritional status, and ensures quality of life³. However, most ESRD patients have poor economic status and limited knowledge on clinical nutrition, therefore significantly impacting their nutritional status and health recovery. To optimize the treatment outcome, it is necessary to combine medication and nutrition. Therefore, the knowledge and practice of mothers who directly provide nutrition care for children is really important. That is why we carried out this study to understand well the mothers' knowledge and capacity in providing nutrition care for PD children, in order to establish reasonable and effective communication contents and methods.

METHOD

Cross-sectional study was carried out on 31 pairs of mothers-children undergoing PD at Vietnam National Hospital of Pediatrics from October 2015 to August 2016. These patients had the dialysis bags changed 3 times/day, revisited for check after 1 month (if without complications). The study did not cover patients with other critical diseases such as serious heart and liver failure, serious immune deficiency and who disagreed to join the study. These children's heights and weights were assessed, BMI was

calculated and nutritional status was classified according to WHO 2006.

31 mothers (*the direct people who provide nutrition care for patients*) of children on PD were interviewed once to collect information on:

The family: The questionnaire about parents, caregivers' age, profession, academic level, address, and number of children in the family.

Knowledge of the caregivers on ESRD with PD prescription

Questions were used to understand the knowledge of caregivers on CKD, PD, medication, progress and prognosis of diseases, symptoms of critical illness, complication.

Knowledge of the caregivers on nutrition care for PD

Knowledge on the nutrition care for the children and therapeutic compliance. Knowledge on the role of nutrition with PD. Knowledge on special diets and how to deal with malnutrition and anorexia.

Mothers' practice of nutrition care for PD children (over the last 1 month)

The practice that complies with clinical nutrition diet. Practice of food selection and preparation. Practice of handling malnutrition and anorexia.

Scoring: Scoring method for knowledge and practice: "1" for correct answers and "0" for incorrect answers. For each session, summarize the total points and divide by the number of questions to have the average score of each session. These scores are converted to percentage. Knowledge and practice are considered as qualified if the score (in percentage) $\geq 50\%$ and unqualified if the score $< 50\%$ of the total points.

Data was input and analyzed by the software Statistical Package for Social Sciences (SPSS16.0). Anthropometrical data was analyzed by the software Anthro of WHO 2006.

RESULTS

From October 2015 to August 2016, with 31 pairs of parents and children on CAPD, the result was as follows:

1. Common characteristics of the patient group

In the result (table 1), the average age of children with the disease is 8.5 years with 25.81% children under 5 years old, 38.71% children aged 5-10 and

35.48% children aged 10-15. The ratio of the patients is 51.6% girls and 48.4% boys. There were 23 children (74.2%) that had PD period under 1 year and 8 children (25.8%) that had PD period ≥ 1 year.

Table 1: Age characteristic of children on PD

Age group (year)	n	%
<5	8	25.81
5-10	12	38.71
10-15	11	35.48
Average age	8.5±4.2	Max: 15 Min: 2

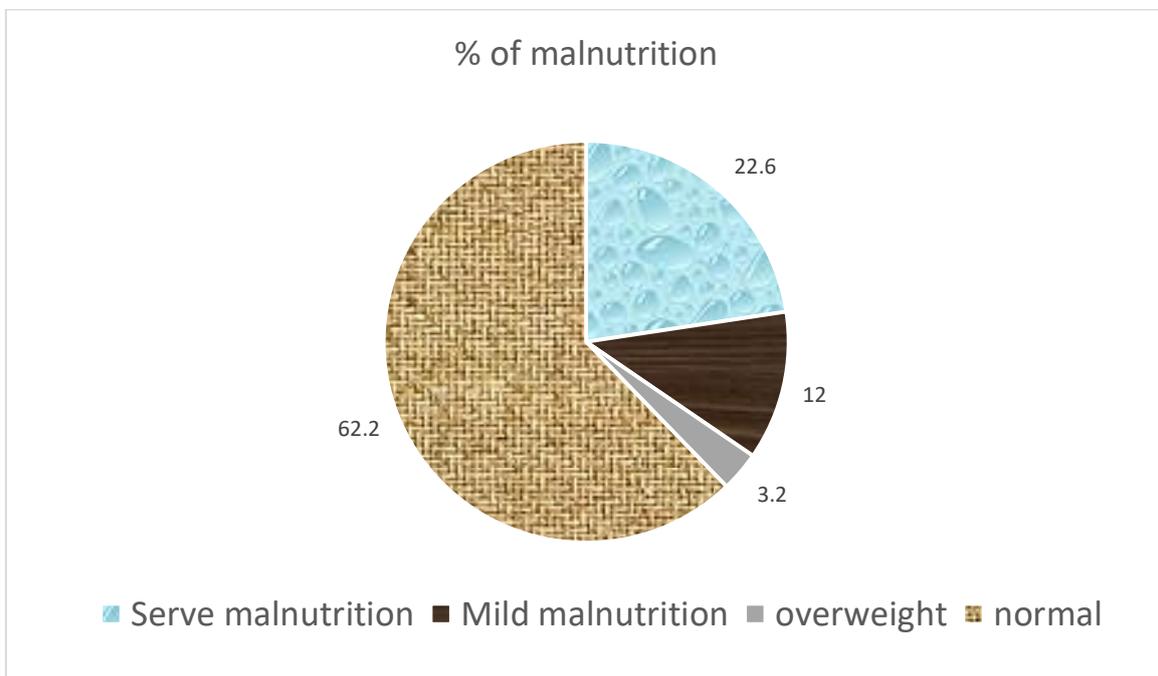


Fig 1: Nutritional status of PD children The nutritional status was calculated by BMI and classified according to the instruction of WHO 2016.

Malnutrition ratio of children on PD: 22.6% with severe malnutrition, 12% with mild malnutrition and 3.2% with overweight (Fig 1).

2. Characteristics of PD children’s parents

PD children had parents at working age with average age of mother of 35.4 and father of 38.4. The academic level of parents, who directly provided nutrition care for children, was low and 64.5% children had parents who are farmers (table 2).

When testing mothers’ knowledge on ESRD and possible complications of CAPD (table 3), 77.4% mothers knew that the infection-related complication in dialysis is peritonitis, 64.5% knew about catheter exit-site infection, 51.6% knew about stuck catheter and even 3.2% knew about high blood glucose due to absorption from dialysis fluid, 12.9% knew about fluid overwhelming. However there were still 25.8% who just followed their habits without understanding of ESRD and PD.

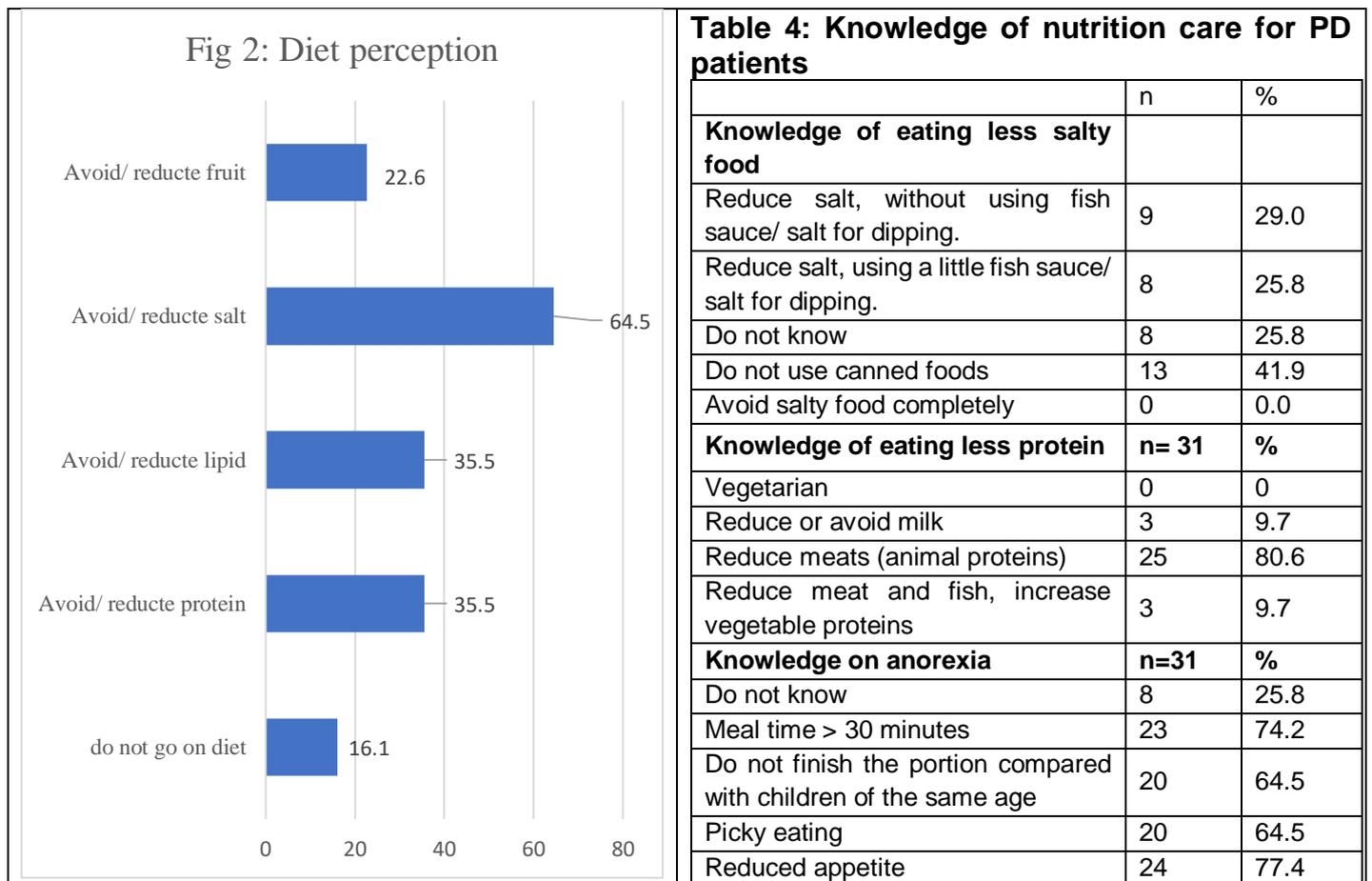
3. Mothers’ knowledge, practice on CKD and PD

Table 2: Characteristics of PD children’s parents

		Father	Mother
Average age		38.4 ± 7.4	35.4 ± 7.2
Profession	Farmers	20 (64.5%)	20 (64.5%)
n (%)	Others	11 (35.5%)	11 (35.5%)
Academic level	Under high school	12 (37.8)	17 (54.8)
n (%)	High school or higher	19 (61.2)	14 (45.2)

Table 3: Knowledge on common complications of PD

Complications and prevention	n=31	%
Peritonitis	24	77.4
Catheter exit-site infection	20	64.5
High blood glucose due to dialysis fluid	1	3.2
Stuck catheter	16	51.6
Fluid overwhelming	4	12.9
Do not know	8	25.8



*: Anorexia was described by the mothers who directly provided nutrition care

4. Mothers’ knowledge, practice of nutrition care for PD children

Knowledge on nutrition care

When being asked about dieting perception (Fig2), 16.1% mothers assumed that PD children do not need to go on diet because excessive nutrients are removed by PD. 35.5% assumed that due to renal failure, to reduce pressure on the kidney, it is necessary to reduce protein and

lipid. 64.5% assumed that it is necessary to reduce salt and 22.6% assume that it is necessary to restrict fruits due to their high potassium contents. But when being asked to describe a less salty diet (table 4), 25.8% mothers could not answer, similarly, there were different answers when they were asked about less protein diets. 25.8% mothers did not know how to recognize anorexia.

Table 5. Knowledge classification

Knowledge score	n=31	%
Unqualified	23	74.2
Qualified	8	25.8

Health officials: including all doctors, nurses and dieticians

According to the score table, with 18 as the maximum score, only 8 mothers (25.8%) had score of knowledge for PD children ≥ 50% (table 5).

When being asked about the reasons for dieting, 64.5% children were instructed by health officials, 29% self-studied.

Some practices on nutrition care for PD children

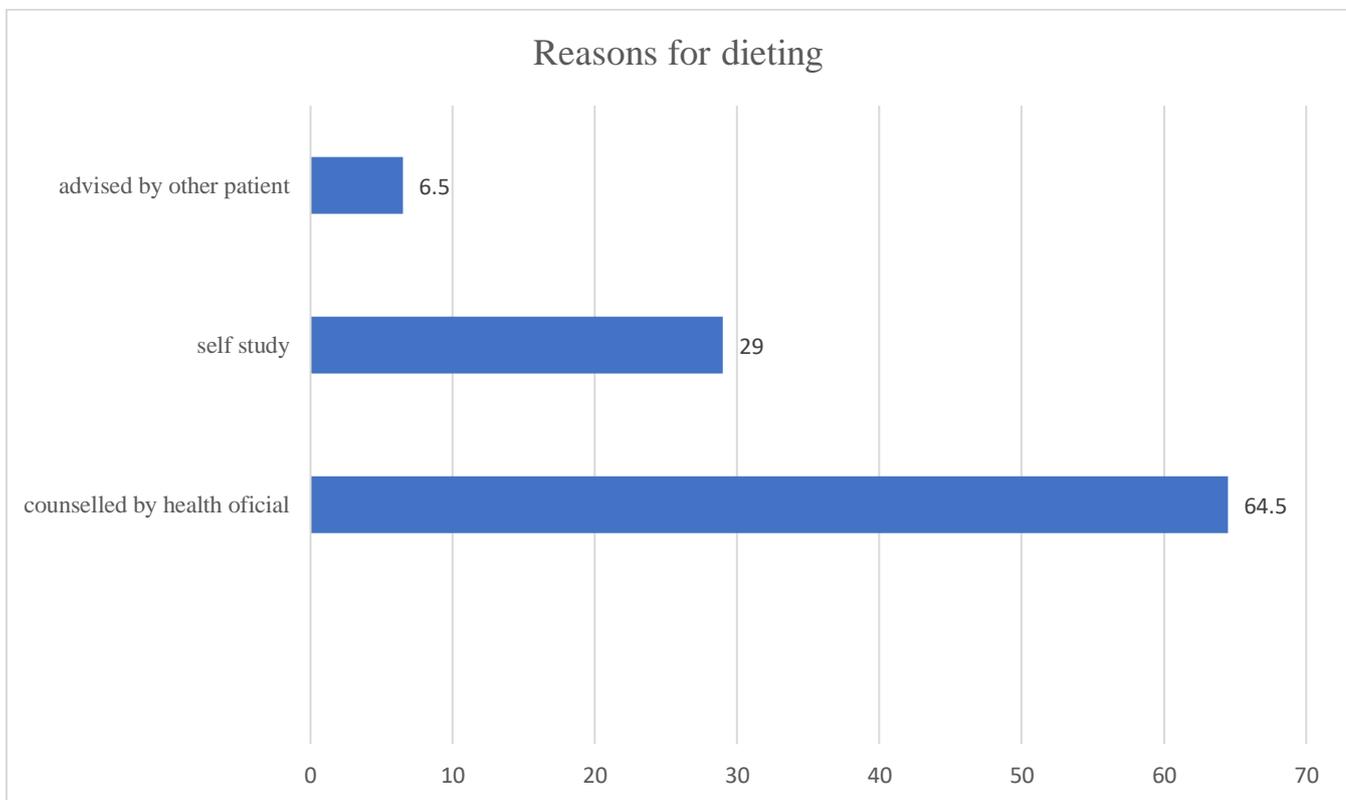


Fig 3. Reasons for dieting

Table 6: Practice of nutrition care for PD children

Practice when children are malnourished	n=11	%
Do nothing	6	54.5
Consult medical doctors	1	9.1
Consult dieticians	2	18.2
Change on their own	2	18.2
Reasons for incompliance of clinical nutrition diets	n=21	
Cannot estimate food amount	1	4.8
The family cannot do/ are too busy	8	38
Anorexia so cannot eat much	11	52.4
Think that it is unimportant	1	4.8
Practice of quantifying foods for children	n=31	
By bare eyes	25	80.7
By popular bowl/ utensils	4	12.9
Weight	1	3.2
Do not use any tools	1	3.2
Practice of cooking less salty foods for children	n=31	
Cook normally	0	0.0
Avoid salt completely	8	25.8
Use less salt in cooking, dipping into mixed seasoning/ fish sauce	23	74.2

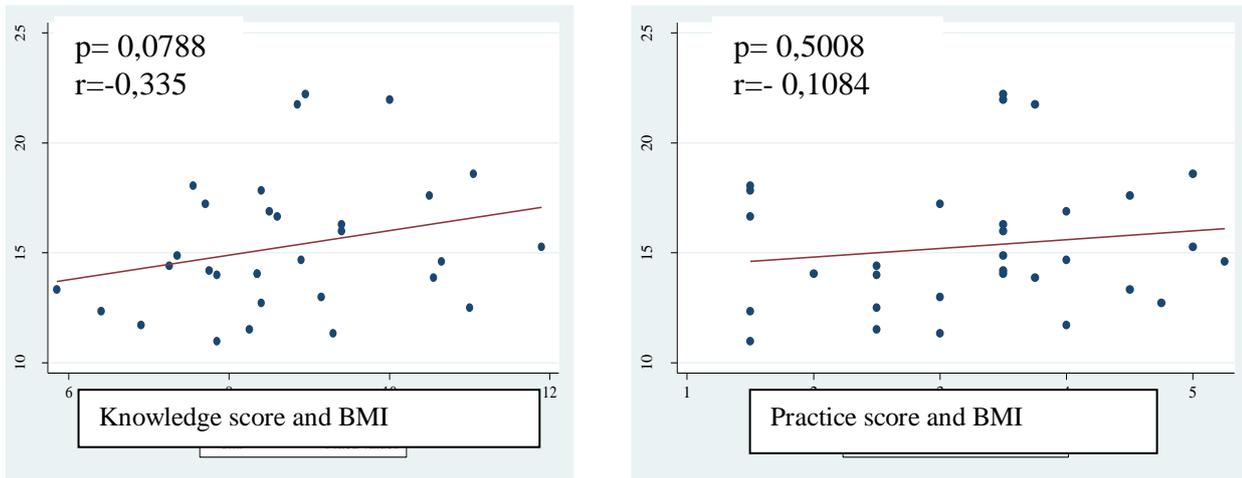
When actually assessing what mothers did when their children had malnutrition (*table 6*), 54.5% mothers did nothing, 18.2% tried to improve on their own. 18.2% mothers came to dieticians for counselling but 52.4% did not comply with clinical nutrition diets because their children had poor appetite and could not eat much. When

quantifying foods for children, 80.7% just used bare eyes.

Practice score: Total practice score is 20. There were 28 patients (90.3%) had scores that was unqualified (< 50% total score) (*table 7*).

Table 7. Practice of nutrition care for PD children

Practice score	n=31	%
Unqualified	28	90.3
Qualified	3	9.7



*(Fisher exact test)

Fig 4: Correlation between knowledge, practice score and BMI

The correlation between knowledge, practice score and BMI (Fig 4) showed that knowledge score was inversely proportional with BMI (r=-

0,335; p<0,05); practice score had no correlation with BMI (r=- 0,1084; p>0,05)

Table 8: The correlation between parents' academic level, knowledge and practice

Item		Mother's academic level				p*	Father's academic level				p*
		Under high school		Above high school			Under high school		Above high school		
		n	%	n	%		n	%	n	%	
Knowledge	Un-qualified	13	81.3	6	42.9	0.02	10	90.9	9	47.4	0.009
	Qualified	3	18.8	8	57.1		1	9.1	10	52.6	
Practice	Un-qualified	16	100	11	78.6	0.09	11	100	16	84.2	0.279
	Qualified	0	0	3	21.4		0	0.0	3	15.8	

*(Fisher exact test)

The result (table 7) showed that there was a correlation between parents' academic level and knowledge score, with p< 0,05. There was no correlation between parents' academic level and practice score, with p> 0,05 (Fisher exact test).

DISCUSSION

End-stage renal disease is a chronic condition as specified by permanent and continuous damage of renal functions, making the children completely depend on kidney transplant. Peritoneal dialysis is a popular treatment method nowadays, because (table 1) most patients are at school age: 5-10 years old

(38.7%), 10-15 years old (35.48%), continuous ambulatory peritoneal dialysis is considered a method with lots of advantages and is appropriate for children to maintain their life and study at some extent. Therefore, ESRD children need special care. Malnutrition continues to worsening the condition, complication and mortality. Controlling malnutrition by clinical nutrition and improving knowledge on nutrition practice of ESRD children's caregivers has an important role in the general treatment for patients. The objective of this study is to survey the knowledge, practice of parents in providing nutrition care for ESRD children.

According to a study of Betul Sozeri et al. in Turkey from October 2007 to May 2008, ESRD patients with BMI $<-2,5$ SD have mortality risk of 60% higher than children with BMI $>-1,5$ SD⁴. Malnutrition is a significant risk of complication and mortality, especially for children with ESRD. Nowadays, BMI is used to follow disease progress and evaluate mortality risk of CKD patients. The study result (*Fig 1*) showed that 22.6% patients had severe malnutrition, 12% had mild nutrition and 3.2% had overweight based on BMI and gender. Similarly, according to Alison (2014), nutritional status was also evaluated based on BMI and the rate of malnutrition in this study was 35%, in which mild malnutrition was 15%³.

For CKD children, especially those on PD, it requires special and comprehensive care. Therefore, caregivers have very important role is this process. Knowledge, attitude and practice of parents and the patients themselves (*for older children*) are greatly important in delaying the disease progress and complications, improving quality of life and increasing life expectancy. A study of Yuexian⁵ showed that therapeutic imcompliance (for medicines, fluid, nutrition, etc.) due to knowledge deficiency can greatly affect treatment outcome, increase the risk of hospitalization, complication and mortality rate. However, the result showed that 9-21% PD patients did not have enough nutrition knowledge, 9.7-45.9% lacked complete knowledge of medicines and treatment process. There is a close correlation between knowledge, practice of nutrition care for children and the disease outcome. Compared with normal parents, parents of ESRD children need higher skills in taking care of the children, solving problem, searching information, practice, financial management, etc. They must be flexible, healthy, have knowledge and skills in many fields to take care of their children well and achieve the treatment outcome. The average age of patients' parents in our study was 38.4 for fathers and 35.4 for mothers, these are the age

groups that are healthy and active enough to provide special care for PD patients.

For PD patients, treatment method is not only dialysis but also the combination with diet. Some patients assumed that with PD, they can eat freely as residues are discharged by dialysis. For most parents in our study, although their academic level was low as most of them are farmers (*table 2*) so they did not know the location of the kidneys, what their functions are, what the causes of disease are; they still knew why it is necessary to carry out PD and they only knew that the success of treatment depends on dialysis, therefore they had good knowledge on complications and taking care of catheter. 77.42% knew how to prevent pretonitis and 64.52% knew how to take care of catheter (*table 3*).

For PD patients, their nutritional diets are more improved than those with CKD who have not experienced kidney transplant, so they are usually counselled to eat a diversity of food, increase protein intake compared with before dialysis, however they still have to follow rules of diet for PD children patients⁶. If the patients eat too much protein, salt, potassium, phosphate, etc. each dialysis will not be able to discharge all these substances, which remain in the body, make the patients more exhausted and worsen their condition. To change this perception, knowledge and practice are important, the patients need nutrition counselling for food selection and how to convert the amount of raw foods into cooked foods, how to eat right and enough. Although most parents assumed that nutrition has great impact on treatment outcome, their knowledge was limited. However, there were more parents with knowledge on the disease, only 25.8% parents have not had knowledge on the disease (*table 3*).

Due to limitation in nutrition knowledge and dieting perception, most patients did not have enough food intake compared with recommendation. Dieting perception for PD patients were different (*Fig 2*) with 64.5% assumed that it is necessary to avoid salt and protein, 35.5% assumed it is

necessary to avoid lipid and 22.6% assumed it is necessary to avoid fruits. 16.1% parents assumed that it is unnecessary to go on diet. Most patients in our study restricted salt, protein, fruits because their parents could not differentiate different stages of CKD, different diets for patients that have not undergone or are undergoing dialysis; therefore many parents assumed that it is necessary for CKD patients to restrict protein, salt and potassium. However, 25.8% did not understand what a less salty diet is, 18.2% did not understand protein-reduced diets, 25.8% were not aware of anorexia (*table 4*). Anorexia is common in CKD^{4,7}, it is both the cause of malnutrition and consequence of hemolytic uremic syndrome. In PD patients, peritoneal dialysis can induce anorexia due to stomachache, dialysis fluid unpleasantness, absorption of dialysis substances and other factors from the fluid. According to Jonas, anorexia could be seen in 40-50% PD patients⁸. In our study, anorexia was described by caregivers but the description still could show a high prevalence of anorexia in children. In the diet for CKD children on PD, it is only necessary to reduce salt intake within the allowance limit of Ministry of Health 2007^{6,9}, it is unnecessary to avoid salt completely. However, the result showed that the number of mothers with proper understanding of less salty diet was too low (25.8-41.9%), they also did not understand clearly that besides reducing salt in cooking, it is necessary to pay attention to available salt content in the foods. Similarly, with protein-restricted diets, (*table 4*) children caregivers only understood partly the fact that it is unnecessary to restrict protein in PD patients. The result (*table 5*) also showed that 74.2% mothers had knowledge score that was unqualified. This score was much lower than that of caregiving and executing PD at home. Theoretically, PD execution and caregiving for children that ensure hygiene and normal life of the child is much more difficult than nutrition care. So, the reason may be the patients and their families do not pay much attention to nutrition, which is considered important but not

as important as medication and especially the dialysis because this process helps the patients' survival. Regarding the result (*table 6*), when actually considering how mothers provided care for PD children even when they were malnourished, 18.2% families can change on their own, only 18.2% children were nutritionally counselled, while a great portion of 54.5% actually did nothing. Similarly, (*Fig 3*), 29% families study the dieting on themselves, while 64.5% children were instructed by health officials. Effat El-Karmalawy (2010)'s study on ESRD with dialysis in Egypt showed that 63.7% subjects had knowledge score that was unqualified¹⁰. In our study, the ratio of knowledge score that was unqualified was higher, because dialysis patients had dialysis 3 times per week at the hospital, so they could communicate, consult health officials more frequently than PD outpatients who just visit the hospital for checking once a month.

From knowledge to practice is a long way due to a lot of barriers. Our study showed that 16.1% parents assumed that PD children did not need to diet but actually 67.74% children did not go on diet, not because of the knowledge that it is unnecessary to go on diet but other reasons (*table 6*): 52.4% because of anorexia, 38% because the families cannot do or parents were busy, 4.8% because parents cannot quantify foods. When the children were malnourished, 54.5 parents did not do anything, 18.2% families tried to find their own way to change or sought for nutrition counselling (*table 6*). One of difficulties in nutrition practice was that parents did not know how to quantify foods for children. Only 3.2% families quantify cooked foods with weight, 12.9% families quantify cooked foods with small bowl, the remaining did not quantify cooked foods but just estimated. Similarly, about the practice of less salty diet, own study could not investigate the specific salt amount of the patients' daily intake, because the patients did not know how to quantify salt correctly, did not know the amount of salt in 1ml fish sauce, the reason might be that the patients had not

listened carefully to nutrition counselling, or did not have the habit of reading nutrition facts on products' label. Therefore, 74.2% (table 6) families applied less salty diets for their children by reducing salt in cooking, while still using mixed seasoning/fish sauce for dipping, this was also an advantage when mothers can self-study to cook for their children if they have knowledge. In our study, there were 90.3% parents who have unqualified practice score (table 7). Effat El- Karmalawy (2010)¹⁰ conducted study on CKD children with dialysis, the study showed that 34% children who were not malnourished had good score of knowledge on nutritional diets. The result (Fig 4) showed the inversely proportional correlation between mothers' knowledge and children's BMI ($r = -0,335$; $p < 0,05$), while there was no correlation between practice score and nutritional status by BMI ($r = -0,1084$, $p > 0,05$). Maybe it was because our sample size was not big enough, moreover, patients underwent CAPD so they just visited the hospital once a month, therefore their knowledge and practice were limited, also the PD period was short so nutritional status was not significantly affected. It is necessary to have more studies in the future to clarify this point. The academic level had relationship with caregiving practice. Table 8 showed that there was no correlation between parents' academic level and practice score, with $p = 0.09$ and $p = 0.279$ (Fisher exact test). From our study, it is shown that one of important duties of health officials is to provide nutrition communication and education for ESRD patients. To accelerate nutritional knowledge and practice for patients, there should be communication materials, health talks, clubs for CKD especially ESRD patients, etc. to impart knowledge; exchange experience in nutrition, caregiving, encouraging patients, appropriate prevention and treatment. It is necessary to have agreement and collaboration between medical doctors and dieticians in the whole treatment process.

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