COMPONENTS OF A ROY'S ADAPTATION MODEL IN PATIENTS UNDERGOING HEMODIALYSIS

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ABSTRACT

Cross-sectional study aimed to identify the components of a Roy's adaptation model in patients undergoing hemodialysis at a dialysis center. 178 patients participated in a dialysis center in the Brazil Northeast region. Data collection occurred from October/2011 to February/2012 through the use of interviews and physical examinations. The components identified were: adaptive problems, behaviors and stimuli. The main adaptive problems were: intracellular fluid retention, hyperkalemia, hypothermia, edema, intolerance for performing daily activities. The behaviors were: anuria, hydroelectrolyte imbalance, gain of weight in a short period of time, elevated serum potassium concentrations, body temperature below 36° C, fluid retention, fatigue, difficulty performing activities of daily living. The stimuli were: renal injury, cardiopulmonary bypass, hemodialysis, failure to observe fluid intake restriction, electrolyte disorder, cold environment, adverse effects related to treatment. We conclude that the identification of these components, classified as physiological mode, contribute to the planning of specific nursing interventions focused on the adaptation of the clientele.

Descriptors: Nursing. Nursing theory. Renal dialysis.

RESUMO

Estudo transversal, objetivando identificar os componentes do modelo teórico de Roy em pacientes submetidos à hemodiálise em um centro de diálise. Participaram 178 pacientes de um centro dialítico no Nordeste do Brasil. A coleta de dados ocorreu de outubro/2011 a fevereiro/2012, por entrevista e exame físico. Os componentes identificados foram: problemas adaptativos, comportamentos e estímulos. Os principais problemas adaptativos foram: retenção de líquido intracelular, hipercalemia, hipotermia, edema, intolerância à atividade. Os comportamentos foram: anúria, desequilíbrio hidroeletrolítico, aumento de peso em curto período, aumento do potássio sérico, temperatura corporal abaixo de 36°C, retenção de líquidos, fadiga, dificuldade em realizar atividades de vida diária. Os estímulos foram: lesão renal, circulação extracorpórea, hemodiálise, não seguimento da restrição hídrica, distúrbio eletrolítico, ambiente frio, efeitos adversos relacionados ao tratamento. Conclui-se que a identificação desses componentes, enquadrados no modo fisiológico, contribui para o planejamento de intervenções de enfermagem específicas e voltadas para a adaptação da clientela.

Descritores: *Enfermagem. Teoria de enfermagem. Diálise renal.*
Título: *Componentes do modelo teórico de Roy em pacientes submetidos à hemodiálise.*

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RESUMEN

Estudio transversal, objetivando identificar los componentes del modelo teórico de Roy en pacientes sometidos a hemodiálisis en un centro de diálisis. Participaron 178 pacientes de un centro de diálisis en el Noreste de Brasil. La recogida de datos ocurrió de octubre/2011 a febrero/2012 por entrevista y examen físico. Los componentes identificados fueron: problemas de adaptación, comportamientos y estímulos. Los principales problemas adaptativos fueron: retención de líquido intracelular, hiperpotasemia, hipotermia, edema, intolerancia a la actividad. Los comportamientos fueron: anuria, desequilibrio electrolítico, aumento de peso en corto período de tiempo, aumento del potasio sérico, temperatura corporal por debajo de 36°C, retención de líquidos, fatiga, dificultad para realizar actividades de la vida diaria. Los estímulos fueron: lesión renal, circulación extracorpórea, la hemodiálisis, no sigue restricción hídrica, alteración electrolítica, ambiente frío, efectos adversos relacionados con el tratamiento. Se concluye que la identificación de estos componentes, clasificados en el modo fisiológico, contribuye a la planificación de las intervenciones de enfermería específicas y dirigidas a la adaptación de esta clientela.

Descriptores: *Enfermería. Teoría de enfermería. Diálisis renal.*
Título: *Componentes del modelo teórico de Roy en pacientes sometidos a hemodiálisi.*

INTRODUCTION

Kidney disease has increased steadily each year in epidemic proportions, constituting a public health problem in Brazil and all over the world. In Brazil, the estimated number of patients with chronic kidney disease (CKD) undergoing dialysis treatment, in 2011, was 91.314[1].

CKD is defined by a decrease in glomerular filtration rates, associated with loss of regulatory, excretory and endocrine functions of the kidney[2]. Among the options of treatment, most Brazilian patients (90.6%) undergo hemodialysis[3]. This therapy consists in the removal of nitrogenous waste from the blood and removal of excess fluid accumulated in the body's tissues[4].

Patients with chronic renal failure undergoing hemodialysis experience many changes in their daily lives caused by fluid and dietary restrictions; the regimen of continuing treatment (medication) and the dependence upon receiving renal dialysis to maintain life[5]. CKD and hemodialysis interfere directly with the individual's perception of life: the support services provided to improve his/her quality of life, the physical limitations and changes in social life[6].

In this context, chronic renal patients undergoing hemodialysis are exposed to several stimuli that affect their behavior, interfering negatively in personal adaptation and maintenance of integrity. Thus, systematic nursing care focused on patient adaptation to the limitations imposed by chronic disease and treatment is required. Systematic care requires that nurses have knowledge of a specific theory that will form the basis of their technical skills.

It is believed that Roy's Adaptation Model of Nursing can guide nursing care to patients with chronic kidney disease undergoing dialysis, in an attempt to find ways to support these people in their adaptation to the limitations of the disease, in order to improve their quality of life. The use of nursing theories such as the Roy's Adaptation Model of Nursing adopted in the present study also represents an effort to validate such theories, of work organization, of production of knowledge and use of nursing specific terms. Likewise, offering high quality care, based on systematic assistance and nursing theories, also contributes to professional development and to a better relationship between the patient and family members.

In the theoretical model proposed by Roy, the individual is perceived as a holistic adaptive system, which issues adaptive or inefficient responses; the environment is understood as all the conditions, circumstances and influences that surround and affect the individual's development and behavior. Health is revealed as a state and a process of being and becoming an integrated and whole person. And finally, the goals of nursing are seen as the promotion of adaptive responses of the individual in the universe of the four adaptive modes [7].

The four adaptive modes are: physiological mode, self-concept, role playing and interdependence, and were developed to serve as a framework for assessing the behavior generated by the stimuli[7].

The practice of nursing is accomplished by the nursing process (NP). The NP described in Roy's adaptation model has six steps: behavioral assessment, evaluation of stimuli, nursing diagnosis, goal setting, intervention and evaluation[7].

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The assessment of the individual's behavior involves actions and responses to specific circumstances. The stimuli trigger responses. They are classified as focal, contextual and residual. The focal stimuli are those which immediately confront the individual. Contextual stimuli are all the other stimuli present and that contribute to the effect of the focal stimulus. And residual stimuli are individual's features that impact the situation, though in a way that is obscure and difficult to measure; [7].

The third phase, the nursing diagnosis, reflects the judgment of the nurse on the level of adaptation of the patient, and it may be an indicator of positive adaptation or adaptive problems. The first step is intended to improve the positive life process and promote adaptation. On the other hand, adaptive problems are defined as major areas of interest in adaptation and describe the deviations base on the positive adaptation indicators. Roy identified a typology of indicators of positive adaptation and adaptive problems associated to each of the four adaptive modes[7].

Goal setting is the fourth step, and the goals are the final behavior to be achieved by the individual. The fifth step, intervention, is described as the selection of nursing care. And finally, the sixth step is the evaluation, which involves judgment of the effectiveness of nursing intervention on the behavior of the human system[7].

Therefore, considering the changes in the patient's life after diagnosis of chronic kidney disease and continuous hemodialysis treatment, and the importance of validating nursing theories in clinical practice, the present study proposes the identification of the components of Roy theoretical model in patients undergoing hemodialysis in a dialysis center.

METHOD

Cross-sectional study carried out in a private dialysis center linked to Brazil's Unified Health System (SUS), located in a city in Brazil's Northeast region.

This study is part of a masters dissertation entitled "Nursing diagnoses in patients undergoing hemodialysis: similarities between the Adaptation Model and NANDA International"[8], which was approved by the Research Ethics Committee of the institution responsible for the study (Protocol no 115/11) with Ethical Certification (no 0139.0.051.000-111). The patients have expressed their acceptance in participating in the study by signing the Free and Informed Consent form.

The population consisted of 330 registered, regularly monitored patients undergoing hemodialysis in the referred clinic. For sample calculation, finite population correction was used[9], considering the level of confidence of the study of 95% ($Z\alpha = 1.96$), the sampling error of 5%, the population size of 330 people and the prevalence of adaptation problems according to Roy's Adaptation Model of Nursing of 50%. Since we found no studies that estimated the prevalence of adaptation of people with CKD using Roy's Adaptation model, a conservative value of 50% was considered. A sample of 178 individuals was obtained with the formula .

Inclusion criteria were: diagnosis of chronic kidney disease; registered and undergoing hemodialysis in the referred clinic; age between 20 and 65 years; be in physical and mental conditions to participate in the study at the time of data collection. And exclusion criteria were: CKD patients with other diseases without renal involvement that might change the profile of adaptive problems in these patients, such as: cancer, neurological disease, advanced heart disease, advanced lung disease, progressive liver disease and cerebrovascular, coronary or extensive peripheral disease.

The instruments for data collection were two forms: one interview and a physical examination based on the Roy theoretical model[7]. The patients were selected by consecutive sampling, from October 2011 to February 2012.

The procedure for data collection started with a 10-hour training course given by three nurses and coordinated by the project mentor. The course addressed physiopathology of renal disease, hemodialysis treatment, the Roy's adaptation model, and general and specific physical examination. After training, the data were collected at the beginning of the hemodialysis session of each patient, by three nurses and by five fellow initiates.

For data organization and analysis an individual process of clinical judgment of adaptive problems was used, according to Roy's adaptation model. This judgment was conducted in two phases: analysis, which includes the categorization of data and the identification of gaps; and synthesis, which comprises grouping, comparison, identification and relationship of etiological factors[10].

The results were peer-reviewed to ensure agreement and greater accuracy.

Then, a database was constructed using Microsoft Excel application for recording data on socioeconomic aspects, hemodialysis, adaptive problems, stimuli and behaviors identified. For data analysis we used SPSS version 16.0, generating descriptive statistics and the p value for Kolmogorov-Smirnov test for normal distribution. The most frequent adaptive problems were analyzed according to their percentile ranks. Moreover, for descriptive analysis of quantitative variables the mean and standard deviation were calculated.

RESULTS

The patients in the study were, on average, 46.6 years old (± 12.3), were mostly male (52.2%), had mates (62.9%) and religiousness (69.1%). Family income ranged from one to 30 minimum wages, with most of them (92.1%) earning one minimum wage (the value of the minimum wage being R$ 622,00 at the time of the research). Regarding education, the average number of years was 8.5 years (± 4.8). Concerning hemodialysis data, the duration of treatment ranged from 4 to 252 months, with a mean of 72.7 months (± 62.4), that is, 6 years. And the predominant vascular access was the arteriovenous fistula (93.8%).

Although Roy classified nursing diagnoses in adaptive problems and positive adaptation, in the present study the patients showed only adaptive problems. A total of 22 adaptive problems were identified, which are shown in Table 1. Kolmogorov-Smirnov test showed asymmetric distribution (not normal) for the number of adaptive problems of the patients ($p < 0.001$). The median number of adaptive problems identified in the patients was 6.

For the development of nursing diagnosis according to Roy's adaptation model, the nurse should consider the clinical judgment of behaviors and stimuli. In this study, only the behaviors and stimuli of adaptive problems above 75th percentile (Table 2) will be presented. It should be noted that no residual stimuli related to these problems were found, only focal and contextual stimuli.

DISCUSSION

The Brazilian Society of Nephrology reveals that the percentage of male patients undergoing dialysis is 57%, aged 65 years or more (30.7%)[3]. A similar profile was found in one study[11] on the main intradialytic complications, where the sample was constituted by 61% of men aged 25-80 years. In another study[6] it was found that 51.5% of the subjects were married, 60.6% had 2-8 years of education and 84.8% had religious orientation. These facts corroborate the results of our study.

Regarding hemodialysis, the length of this treatment was six years, and the predominant vascular access was the arteriovenous fistula. When a patient with chronic renal failure in dialysis uses a definitive vascular access such as the arteriovenous fistula, this is associated with a better therapeutic outcome, extending patient survival and improving quality of life[6].

Regarding Roy's adaptation model, the adaptive problems above 75th percentile were: Intracellular fluid retention (99.4%), Hyperkalemia (64.6%), Hypothermia (61.8%), Edema (53.9%) and Intolerance for performing daily activities (47.2%). Some Brazilian studies[12-15] used this model. However, none of them concern patients on dialysis.

The adaptive problems (AP) intracellular fluid retention, edema and hyperkalemia established a relationship with the focal stimulus renal injury and with the contextual stimuli failure to observe fluid intake restriction and electrolyte disorder. And also showed a relationship with the behaviors: anuria, hydroelectrolyte imbalance, gain of weight in a short period of time and elevated serum potassium concentration. Intracellular fluid retention and edema in patients with renal insufficiency are compensatory mechanisms of the body to maintain sodium balance[16].

Hyperkalemia is not frequent in patients with chronic kidney disease in the terminal stage, but it may be caused by the following circumstances: worsening of nephropathy, causing intense oliguria; excessive intake of potassium, through medications or substances that replace salt; hypercatabolic states that reduce the ability of potassium; administration of drugs that retain potassium[16].

Potassium excretion occurs via the kidneys, and at the terminal stage of CKD, excretion of this ion is limited. Thus, in an attempt to maintain the balance of potassium, the patient should restrain the intake of this ion, since high plasma potassium levels cause serious consequences, such as cardiac arrhythmias[16].

Table 1 – Distribution of adaptive problems according to Roy's adaptation model in patients undergoing hemodialysis (n = 178). Natal, RN, 2012.

Adaptive problems	n	%	
1. Intracellular fluid retention	177	99.4	
2. Hyperkalemia	115	64.6	
3. Hypothermia	110	61.8	
4. Edema	96	53.9	
5. Intolerance for performing daily activities	84	47.2	P75
6. Failure to perform regular activities	76	42.7	
7. Potential for lesion	66	37.1	
8. Hypocalcemia	63	35.4	
9. Walking and/or coordination restricted	63	34.8	
10. Sexual dysfunction	51	28.7	
11. Deficiency of a primary sense: sight	50	28.1	P50
12 Sleep deprivation	45	25.3	
13. Chronic pain	28	15.7	
14. Deficiency of a primary sense: hearing	27	15.2	
15. Low self-esteem	22	12.4	
16. Acute pain	20	11.2	P25
17. Loss of self-care ability	20	11.2	
18. Impaired skin integrity	12	6.7	
19. Constipation	10	5.6	
20. Deficiency of a primary sense: touch	5	2.8	
21. Diarrhea	2	1.1	
22. Eats less than the body needs	2	1.1	

Legend: P25- 25th Percentile; P50- Percentile 50; P75- 75th Percentile

Therefore, control water balance by restraining fluid intake and recommend and monitor a diet low in potassium for these patients are key activities of the nursing team. So, the nurse professional promotes patient adherence to the therapeutic regimen established. However, it is known that this fluid and dietary restriction is difficult to be obtained.

Hypothermia is contemplated in Roy's physiological mode regarding the basic need for protection[7]. It was related to the focal stimulus cardiopulmonary bypass, and the contextual stimulus cold environment. And the behavior was body temperature below 36°C. One study[17] that involved 65 patient records, aimed to analyze the complications in hemodialysis patients, revealed that hypothermia was the second most prevalent complication in this population.

Hypothermia is related to blood cooling by extracorporeal circulation, because the blood line and/or dialysate solution are exposed to room temperature, which causes loss of heat by convection[18]. In order to prevent hypothermia in patients undergoing hemodialysis, dialysis solutions should be preheated before taken to the dialysis machine. Likewise, the machines should have mechanisms for precise temperature adjustment[16].

Thus, maintaining the patient's body temperature around 37°C is an important intervention of the nursing team to provide comfort to these clients.

And, finally, the AP intolerance for performing daily activities showed a relationship with the focal stimulus hemodialysis and with the contextual stimulus adverse effects related to treatment. The behaviors included: fatigue experienced in perfor-

Table 2 – Distribution of behaviors, focal and contextual stimuli of adaptive problems according to Roy's adaptation model above 75th percentile in patients undergoing hemodialysis (n = 178). Natal, RN, 2012

Adaptive problem/ Adaptive mode	n	%
Intracellular fluid retention / Physiological mode		
Behaviors		
Anuria	177	100
Hydroelectrolyte imbalance	177	100
Gain of weight in a short period of time	177	100
Presence of adventitious noises	11	6.2
Distended jugular vein	1	0.5
Fluid retention	1	0.5
Focal stimulus		
Renal injury	177	100
Contextual stimulus		
Does not observe fluid intake restriction	110	64.3
Hyperkalemia/ Physiological mode		
Behavior		
Elevated serum potassium concentration	115	100
Focal stimulus		
Renal injury	115	100
Contextual stimulus		
Electrolyte disorder	115	100
Hypothermia/ Physiological mode		
Behavior		
Body temperature below 36°C	110	100
Focal stimulus		
Cardiopulmonary bypass	110	100
Contextual stimulus		
Cold environment	110	100
Edema/ Physiological mode		
Behaviors		
Anuria	96	100
Hydroelectrolyte imbalance	96	100
Fluid retention	96	100
Gain of weight in a short period of time	1	1.0
Focal stimulus		
Renal injury	96	100
Contextual stimulus		
Failure to observe fluid intake restriction	69	71.8
Intolerance for performing daily activities/ Physiological mode		
Behaviors		
Experiences fatigue in performing daily activities	84	100
Difficulty in performing daily activities	84	100
Focal stimulus		
Hemodialysis	84	100
Anemia	56	66.6
Contextual stimulus		
Adverse effects related to treatment	84	100

ming daily activities and difficulty in performing daily activities.

Intolerance for performing daily activities may be a result of anemia, which is one of the complications of chronic kidney disease. Anemia can be caused by relative deficiency of erythropoietin and iron deprivation[16]. The hormone erythropoietin is produced in the kidneys and has the function of producing red blood cells. Thus, when a person has kidney disease, the kidneys cannot produce sufficient levels of this hormone, causing a reduction in the number of red blood cells and the development of anemia [19].

Evidence reveals that anemia accelerates the decline of renal function and its correction may interfere favorably in the evolution of CKD[16]. Therefore, the nursing staff should focus on the correction of anemia, with consequent reduction of transfusion requirements and hospitalizations, thus improving the quality of life, cognitive ability and physical performance in daily activities.

CONCLUSION

Twenty-two (22) adaptive problems according to Roy's adaptation model were identified in the patients undergoing hemodialysis, and the most frequent were: intracellular fluid retention, hyperkalemia, hypothermia, edema and intolerance for performing daily activities. These problems were inserted in the physiological mode of Roy's adaptation model.

The focal and contextual stimuli related to these problems were: renal injury; extracorporeal circulation; hemodialysis; failure to observe fluid intake restriction; electrolyte disorder; cold environment, and adverse effects related to the treatment. And the behaviors were: anuria, hydroelectrolyte imbalance, gain of weight in a short period of time, elevated serum potassium concentration, body temperature below 36°C, fluid retention, experiences fatigue in performing daily activities; and difficulty in performing daily activities and difficulty in performing daily activities.

According to Roy's adaptation model nursing care involves continuous interaction with the environment, being focused on the need to transform adaptation problems of patients into positive indicators. Thus, the application of this model to the care of patients with chronic diseases, as is the case in this study, certainly contributes to the promotion of individual's adaptation and integrity. Furthermore, the use of the nursing process in the context of a theory gives scientific credibility to the nursing profession and supports healthcare.

One limitation of this study is that the sample consisted only of patients with chronic kidney disease. Thus, we suggest that further studies on patients with acute kidney failure or in the early stages of treatment are carried out, in order to establish the most important aspects related to the quality of life of these patients.

REFERENCES

1 Sociedade Brasileira de Nefrologia (SBN). Censo SBN 2011 [Internet]. 2011 [citado 2013 Maio 15]. Disponível em: www.sbn.org.br.

2 Bastos MG, Bregman R, Kirsztajn GM. Doença renal crônica: frequente e grave, mas também prevenível e tratável. Rev Assoc Méd Bras [Internet]. 2010 [citado 2012 Set 30];56(2):248-53. Disponível em: http://www.scielo.br/pdf/ramb/v56n2/a28v56n2.pdf.

3 Sesso RC, Lopes AA, Thomé FS, Lugon JR, Santos DR, Watanabe Y, et al. Diálise crônica no Brasil: Relatório do censo brasileiro de diálise de 2011. J Bras Nefrol [Internet]. 2012 [citado 2013 Maio 30];34(3):272-7. Disponível em: http://www.scielo.br/pdf/jbn/v34n3/v34n3a09.pdf.

4 Smeltzer SC, Bare BG, Brenda G, Hinkle JL, Cheever, KH. Brunner & Suddarth: tratado de enfermagem médico-cirúrgica. 12ª ed. Rio de Janeiro: Grupo Editorial Nacional Participações S/A (GEN); 2011.

5 Queiroz MVO, Dantas MCQ, Ramos IC, Jorge MSB. Tecnologia do cuidado ao paciente renal crônico: enfoque educativo-terapêutico a partir das necessidades dos sujeitos. Texto & Contexto Enferm. 2008;17(1):55-63.

6 Frazão CMFQ, Ramos VP, Lira As1ºLBC. Qualidade de vida de pacientes submetidos a hemodiálise. Rev Enferm UERJ [Internet]. 2011 [citado 2012 Set 30];19(4):577-82. Disponível em: www.facenf.uerj.br/v19n4/v19n4a12.pdf.

7 Roy C, Andrews HA. The Roy Adaptation Model. 3ª ed. Upper Saddle River: Pearson; 2009.

8 Frazão CMFQ. Diagnósticos de enfermagem em pacientes submetidos à hemodiálise: semelhanças

entre o modelo de adaptação e a NANDA Internacional [dissertação]. Natal (RN): Programa de Pós-Graduação em Enfermagem, Universidade Federal do Rio Grande do Norte; 2012.

9 Arango HG. Bioestatítica teórica e computacional. Rio de Janeiro: Grupo Editorial Nacional Participações S/A (GEN); 2009.

10 Cerullo JAS, Cruz DALM. Raciocínio clínico e pensamento crítico. Rev Latinoam Enferm. 2010;18(1):124-9.

11 Ribeiro RCHM, Ferrari RR, Bertolin DC, Canova JCM, Lima LCEQ, Ribeiro DF. O perfil sócio-demográfico e as principais complicações intradialíticas entre pacientes com insuficiência renal crônica em hemodiálise. Arq Ciênc Saúde [Internet]. 2009 [citado 2013 Jul 12];16(4):175-80. Disponível em: http://www.cienciasdasaude.famerp.br/racs_ol/vol-16-4/IDK6_out-dez_2010.pdf.

12 Rocha LA, Silva LF. Adaptação psicossocial de pessoas portadoras de insuficiência cardíaca: diagnósticos e intervenções de enfermagem. Rev Eletr Enferm [Internet]. 2009 [citado 2012 Set 28];11(3):484-93. Disponível em: http://www.fen.ufg.br/revista/v11/n3/v11n3a04.htm.

13 Gurgel EPP, Rolim KMC, Galvão MTG, Caetano JA. Abordagem assistencial ao neonato portador de mielomeningocele segundo o modelo de adaptação de Roy. Rev Esc Enferm USP [Internet]. 2010 [citado 2012 Set 30];44(3):702-7. Disponível em: http://www.scielo.br/pdf/reeusp/v44n3/21.pdf.

14 Krauzer IM, Brocardo D, Scarsi T. A metodologia de Callista Roy aplicada em clientes submetidos à intervenção hemodinâmica. Rev Enferm UFSM [Internet]. 2011 [citado 2013 Jul 12];1(2):183-93. Disponível em: http://cascavel.cpd.ufsm.br/revistas/ojs-.2.2/index.php/reufsm/article/view/2513/1631.

15 Costa IKF, Nóbrega WG, Costa IKF, Torres GV, Lira ALBC, Tourinho FSV, et al. Pessoas com úlceras venosas: estudo do modo psicossocial do Modelo Adaptativo de Roy. Rev Gaúcha Enferm [Internet]. 2011 [citado 2013 Jul 12];32(3):561-8. Disponível em: http://www.scielo.br/pdf/rgenf/v32n3/18.pdf.

16 Riella MC. Princípios de nefrologia e distúrbios hidroeletrolíticos. 5ª ed. Rio de Janeiro: Grupo Editorial Nacional Participações S/A (GEN); 2010.

17 Silva GLDF, Thomé EGR. Complicações do procedimento hemodialítico em pacientes com insuficiência renal aguda: intervenções de enfermagem. Rev Gaúcha Enferm [Internet]. 2009 [citado 2012 Set 30];30(1):33-9. Disponível em: http://www.lume.ufrgs.br/bitstream/handle/10183/23618/000702865.pdf?sequence=1.

18 Schell HM, Puntillo KA. Segredos em enfermagem na terapia intensiva. Porto Alegre: Artmed; 2005.

19 Ammirati AL, Watanabe R, Aoqui C, Draibe SR, Carvalho AB, Abensur H, et al. Variação dos níveis de hemoglobina de pacientes em hemodiálise tratados com eritropoetina: uma experiência brasileira. Rev Assoc Méd Bras [Internet]. 2010 [citado 2013 Jul 12];56(2):209-13. Disponível em: http://www.scielo.br/pdf/ramb/v56n2/a21v56n2.pdf

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