Fluid Chart on Fluid Intake Management Adherence among Hemodialysis Patients: A Literature Review

Zaky Mubarak[1], Endang Mahati[2] and Anggorowati[3]
[1]Master of Nursing Student, Faculty of Medicine, Diponegoro University, Indonesia
[2]Lecturers of the Faculty of Medicine, Diponegoro University, Indonesia
[3]Masters of Nursing Lecturers, Faculty of Medicine, Diponegoro University, Indonesia

Keywords: Fluid Chart, Adherence, Haemodialisis Patient.

Abstract: The purpose of this literature is evaluate the effect of fluid chart on fluid intake management adherence among haemodialysis patients. The method that was used in this writing is a literature review study and the analytical method that was used here is PICOT (Population, Intervention, Comparison, Outcome, dan Time). This literature review used five bibliography databases (CINAHL, Scientdirect, Proquest, Pubmed, and MEDLINE) from their inception in Januari 2010 to Desember 2017. The Inclusion criteria in this study are articles published in 2010 to 2017 that are available in full text and in English laguange. The subject of the study was patients in Hemodyalisis. A total of 27 articles had been identified and a total of 21 articles excluded. Finally, there are 6 studies met the criteria. The results of all of the articles mention that the fluid management of patients undergoing haemodialysis can be enhanced with paper-based monitoring interventions. The majority of old haemodialysis patients is the basic reason why paper-based monitoring is considered effective. Fluid Chart was one of the conventional monitoring media that has long been used by health workers. Cost effectiveness and practicality were advantages of conventional reminder systems. Strategies that were directed towards improving compliance behavior must target the barriers that underlie compliance. Therefore, reminders provide useful additions to compliance improvement strategies.

1 INTRODUCTION

Management of limiting poor fluid intake will have an impact on weight gain between two dialysis times. Fluid restriction is less obeyed in self-management of CKD patients (McLafferty et al., 2014). Weight gain between two dialysis times (IDWG) is influenced by several factors, namely: environment, nutrition, behavior, physiology, and psychology (Hung et al., 2008). Juan (2005) reveals that the more the percentage of IDWG, the worse the long-term prognosis and the resulting high blood pressure predialysis.

New hemodialysis patients in Indonesia from 2007 to 2012 increased significantly with details of 4977 people (2007), 5392 people (2008), 8193 people (2009), 9649 people (2010), 15353 people (2011), 19621 people (2012) The number of new patients in East Java alone in 2012 reached 11672 people with 2796 people being patients with terminal kidney disease. This number is the second highest after West Java Province (Indonesian et al., 2015).

Complications often occur in hemodialysis patients are weight gain between two hemodialysis times (Interdialytic weight gain = IDWG) caused by the inability of the kidney excretion function, so that whatever amount of fluid is consumed by the patient, weight gain will always be present. In other words, zero ml weight gain is impossible. Adding too high an IDWG can cause negative effects on the patient's condition, including hypotension, muscle cramps, hypertension, shortness of breath, nausea and vomiting, and others (Kugler, Maeding and Russell, 2011). Excess fluid complications in patients with CKD are hypertension, peripheral edema and ascites. The ideal weight gain between two hemodialysis times is 1.5 kg (Bame, Petersen and Wray, 1993).

Fluid balance refers to the balance between the volume of water lost from the body and the volume of water (McLafferty et al., 2014). *Fluid Chart* has been a document in the health care system for more than 50 years and is a non-invasive tool to assess the

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hydration status of patients (Malster, Dougherty and Lamb, 1999). *Fluid Chart* This is a chart documenting the input and output that the patient has taken in and out in a 24-hour period (Chung, Chong and French, 2002).

Kaveh & Kimme (2000) and Abuelo (1998) reveal that good fluid management is due to restrictions on fluid intake, limiting up to 1 liter per day is important to reduce the risk of excess volume of fluid between dialysis times. Kimmel (2000), Leggat (1998), Port (2004), Saran (2003) in Welch (2006) suggested that a person with CKD who does not adhere to fluid restriction can worsen the prognosis of the disease with a high rate of morbidity and mortality.

This article aims to find out that conventional media in this case is illustrated by a *fluid chart* that can help hemodialysis patients to achieve fluid fulfillment in accordance with how to adhere to a defined fluid management.

2 METHODS

2.1 Search Strategy

Our search (Table 1) is limited to the PUBMED database, CINAHL Science Direct, and Medline. We use the Fluid chart search terms " and 'Fluid management' or 'fluid blocking compliance' AND 'hemodialysis patients', and we limit the search to full text articles published between January 2010 and 2018. To be considered as candidate articles for review, Fluid chart " AND 'Management of fluids' or' adherence to repair of fluids' AND 'patients with hemodialysis must be stated in title or abstract. Studies are included in our review if they focus on Fluid charts, fluid management or compliance with fluid restriction and hemodialysis patients. Because we are interested in conventional (paper based) media as a medium to meet fluid management, especially compliance with fluid restriction in hemodialysis patients. Morbidity and mortality of hemodialysis patients depend on patient compliance in carrying out hemodialysis treatment regimens, one of which is fluid management. We also check the reference list of papers included to identify possible additional studies that might be missed during database searches.

Literature analysis using PICOT (Population, Intervention, Comparison, Outcome, and Time). Based on the analysis found 2 themes, namely fluid management in hemodialysis and *fluid chart* patients as a fluid management compliance medium.

2.2 Search Outcome

The search resulted in six candidate publications, which are briefly described in Table 2. 5 studies discussed fluid charts and 1 drastic study of fluid management in hemodialysis patients. Three studies were completed in England (Jeyapala *et al.*, 2015) (Chung, Chong and French, 2002) (Tang and Lee, 2010); two in Australia (Georgiades, 2016) (Daffurn et al., no date); and one in Hong Kong (Chung, Chong and French, 2002).

Table 1: Search Strategy.

Stage 1: initial search	
Keywords	Fluid chart AND fluid management
Results	55737
Keywords	Fluid chart AND fluid management OR fluid adherence retrictions
Results	10275
Keywords	Fluid chart AND fluid management OR fluid adherence retrictions and hemodialysis patient
Results	360
Stage 2: screening	
Filter	Fluid chart AND fluid management OR fluid adherence retrictions and hemodialysis patient
	2010 - 2018/Full text articles
Results	159
Filter	Fluid chart AND fluid management OR fluid adherence retrictions and hemodialysis patient
	Title/Abstract/2010-2018/Full text articles
Results	27
Filter	Title/Abstract/'Related articles' examined for relevance
Results	12 and 8 'related'
Filter inclusion/exclusion criteria	Articles examined for relevance. 'Related articles' of relevant articles examined for relevance. Manual searching in bibliographies of relevant articles.
	Consultation of experts
Results	6
Criteria	
Inclusion	Fluid chart AND fluid management OR fluid adherence retrictions and hemodialysis patient
Exclusion	Nutrition management on hemodialysis patient Chart on industri building

2.3 Appraisal

There is little consensus on how to assess qualitative and quantitative articles. Quantitative studies are

assessed in terms of relativity and validity, while the evaluative criteria for qualitative studies are based on trust. Thus, we use some interesting general points, as presented by Dixon-Woods et al 2010. and Kearney 2007, to evaluate the accuracy of the study included.

One qualitative study provides an explanation of the effectiveness and suitability of fluid balance charting by Lai Har Chung who analyzed 250 medical records and opinion surveys, 55 doctors and 98 nurses participated in this survey. The result is that 50% of medical records have fluid balance charts and in this case they make 12-16% themselves in medical records. Infusion fluids and urine catheter production were recorded in almost 70% of the reasons for using fluid balance charts. 32% of FB charts were found to be incomplete and inaccurate. 46% of doctors and nurses report that they believe FB charts do not always provide if not needed. Doctors believe that so far only those who have to stop the FB chart, nurses cannot provide intervention except with the doctor's approval. The end result is that the design of the chart must be modified to accommodate different goal. Regarding quantitative studies, fluid input / output charts in hospitalized patients is a valuable source of information for doctors who review intravenous fluid prescriptions, but are known to be incomplete and inaccurate. The lack of awareness of the importance of fluid balance between nursing staff and the advantages of unnecessary monitoring are two factors that contribute to this problem. Vincent conducted a quality improvement project on the respiratory ward in a large district general hospital which aimed to specifically address these two factors. Pre-intervention audits show that only 53% of input / output monitoring is clinically indicated, with an average 50% graph completion. By using e-Learning and verbal presentations to raise awareness about fluid balance, we implemented a new system where daily medical reviews of charts lead to rationalization of monitoring. Post-intervention audits show a 93% reduction in unnecessary monitoring, with appropriate improvements in completion (40%) and accuracy (48%) of the remaining charts. In conclusion, education has allowed cultural changes in wards that drastically improve the quality of monitoring fluid balance.

2.4 Data Abstraction and Synthesis

All research included illustrates the experiences experienced by victims of disability and returns to work. To compare qualitative and quantitative findings, the reviewer (CT) isolates and categorizes the findings of the findings and summarizes them into relevant themes (thematic analysis): fluid management in hemodialysis and *fluid chart* patients as a fluid management compliance medium. Furthermore, quantitative in-depth and complementary qualitative findings from questionnaires were integrated and divided into *'Fluid charts'* and' fluid management compliance. This abstraction and synthesis process is also discussed with fellow authors.

2.5 Fluid Chart on Fluid Adherence Management in Hemodialysis Patient

Table 2: Studies included in the literature review.

Tittle, Author, origin	Design	Sample	Data collection	Employment variables/themes
A Balancing Act: Maintaining Accurate Fluid Balance Charting, Dimitra Georgiades Australia	article	-	Critical appraisal	examined the contributing factors that inhibit accurate fluid balance charting such as lack of time related to patient acuity and inadequate training and education
Management of Fluid Status in Hemodialysis Patients: The Roles Of Technology and Dietary Advice Elizabeth Lindley et al. UK	Clinical mangement	-		The implementation of bioimpedance measurements to assist in the optimisation of the patient's target weight, and the use of salt restriction to avoid excessive fluid gains, should enable most haemodialysis patients to stay close to normal hydration throughout the interdialytic period

Table 2: Studies included in the literature review. (cont.)

Tittle, Author, origin	Design	Sample	Data collection	Employment variables/themes	Tittle, Author, origin
Improvement of fluid balance monitoring through education and rationalisation, Masaki Vincent, Thabo Mahendiran, UK	Quantitative study	117 patient: 1. Whether daily fluid balance monitoring was happening. 2. Whether daily fluid balance monitoring was clinically indicated. 3. Whether "totals" boxes had been completed (eg 12 hours total for oral input, 24 hours total for oral input, 12 hours total for IV input, etc). 4. Whether "totals" boxes were accurate. We defined a sum as "accurate" if the error in the final sum was inferior to 10% of the sum itself.	two main group interventions	Fluid balance monitoring can be improved by the implementation of a system where daily medical review of fluid charts allows rationalisation of monitoring, reducing unnecessary workload and improving chart completion and accuracy in patients who need it. In order to make such a cultural change succeed on a ward, it is crucial to raise awareness and education around the importance of fluid balance.	Statistical analysis
Fluid balance chart: do we understand i ?, Vincent CY Tang and Elaine WY Lee, UK	Quantitative study	13 patient of surgical patient requiring intravenous fluid and catheterized for urine output monitoring from all five surgical wards on the same day	two main group interventions	Fluid balance chart is a useful monitoring tool of patient hydration status, however it can be counterproductive and dangerous if the documentation is poor and interpretation incorrect.	Statistical analysis
The efficiency of fluid balance charting : an evidance – based management project, Lai Har Chung et al, Hong Kong	Qualitative study	250 medical records and an opinion survey. 75 doctors and 98 nurses participated in the survey.	Collection of data the survey method	In the case of fluid balance charting in this study, it could be said that the major cause of inefficiency is that those who are making the observation are not empowered to make the decision to terminate the chart when they are thought unneccessary. In addition, the design of chart does not seem to encourage a distinction record, output observation and fluid balance observation.	Conducted all of the interviews and data recording
Fluid Balance charts : do they measure up ?, Kathrine Daffurn et al, Australia	Quantitative study	The study was conducted in two parts. The first part used a questionnaire designed in consultation with a psychologist attached to the critical care research unit. The second part of the study involved groups of nurses in a practical exercise to estimate fluid gains and losses. Forty-five registered nurses were selected, using a random number table, from the population of nurses rostered on the chosen study date.	Conducted 2 parts	This study has shown that nurses rate FBCs highly, although some discrepancies were identified in the way that they are used. Nurses may be commencing FBCs unnecessarily and doctors do not always look at them. Nurses can estimate fluid volumes with reasonable accuracy, which is encouraging as they do not or cannot always measure the fluids being recorded.	Statistical Analysis

3 RESULTS

3.1 Management of Fluid in Hemodialysis Patients

Fluid management is a skill in identifying problems, setting goals, solving problems, making decisions in response to fluctuations in signs and symptoms, taking action in response to physiological responses to lack of body fluids, monitoring and managing symptoms (Lindberg, Wikström and Lindberg, 2010). It is important to remember about the causes of thirst. Thirst is a direct result of too much salt in water, food and also salt added to food. Too much salt diet will cause sodium levels to increase and activate the thirst mechanism in the brain, for that it is necessary to drink enough liquid to normalize sodium. A more important aspect of maintaining normal IDWG in patients with hemodialysis and peritoneal dialysis is to reduce the amount of salt and use spices and spices to add flavor (Santos and Peixoto, 2008).

The advantages of IDWG may not always be the cause of the patient's lack of understanding about limiting fluid intake. Increased fluid-filled food and appetite for patients will increase IDWG, and this fact can be obtained in detail in dietary studies, indications of high protein and calories such as fluids in jelly, ice cream, sauces and soup. Excess IDWG can be prevented by daily fluid intake of 500-750 ml in the situation of dry urine production. Sodium intake of 80-110 mmol per day, will be enough to control thirst and help patients regulate fluid (Sezer *et al.*, 2002).

3.2 Fluid Chart as a Fluid Management Compliance Media

Fluid charts are widely used in most hospitals as a guide to the patient's fluid status. The time the nurse uses to map fluid intake and output can be very significant in some cases (Chung, Chong and French, 2002).

Paper graph based reminders are conventional media from the support system of clinical decision making (Decision Support System / DSS). According to Kawamoto et al., A significant increase in clinical practice can be found if the DSS contains all of the following special features: (1) provision of decisions as part of the clinical workflow; (2) providing recommendations and not just assessments; (3) providing decision support at the time and location of decision making; and (4) computer-based decision support.[6] This reminder system processes the first three characteristics of successful DSS but not computer-based or assisted by informatics. However, Ansari et al. shows that simple reminders on input - output fluid reports can increase physician compliance with the use of drugs which regulate fluid intake and output for patients with chronic renal failure with Hemodialysis.[6] Paper-based graphs prove that conventional reminder systems are attached to paper charts during Clinical workflows can facilitate the awareness of doctors and nurses to evaluate current fluid status.

4 DISCUSSION

Fluid Management Monitoring is done by recording fluid intake and expenditure and body weight. Liquid intake includes the type and amount of food and liquid. While fluid expenditure is the amount of urine, vomiting and diarrhea. *Fluid Chart* is one of the conventional media that has long been used for fluid management, especially patients with chronic diseases. Patients with CKD with Hemodialysis are very at risk with fluid calculations, factors of patient disobedience to fluid management are found in the clinical domain. *Fluid Chart* is useful for calculating the management and fluid balance of hemodialysis patients. By recording all the liquid consumed by the patient and recording all the fluids released by the patient, both from the urine, sweat and vomit of the patient. Patients who follow and carry out the instructions to maintain fluid balance can help maintain IDWG 2.5% to 3.5% dry weight or not exceed 5% dry weight. The IDWG value (*interdialytic weight gain*) is calculated based on the patient's body weight before hemodialysis (wet weight) minus weight after hemodialysis (dry weight). The normal value of IDWG is less than 3% dry weight (Malster, Dougherty and Lamb, 1999).

Factors of patient adherence in adhering to the amount of fluid consumption determine the achievement of optimal dry weight (Riyanto (2011). Kimmel, et al (2000) showed that age is a strong factor in the level of patient adherence. Patient aged. Fefendi (2008) explained that patients with productive age feel motivated to recover, have a higher life expectancy and as the backbone of the family (Cvengros, Christensen and Lawton, 2004).

5 CONCLUSIONS

Fluid Chart is one of the conventional monitoring media that has long been used by health workers.

Cost effectiveness and practicality are advantages of conventional reminder systems. Repeated telephone calls, text messages, pager systems, or advanced appointments for a condition, require relatively high costs and labor to be prepared. Repeated monitoring can also be seen as instructive rather than helpful (Hung et al., 2008).

Fluid management of patients undergoing hemodialysis can be improved by paper-based monitoring interventions. Hemodialysis patients who are mostly elderly are the basic reasons why paper-based monitoring is considered effective. The physiological aging process which includes a blurred vision, decreased memory, and a lack of knowledge about modern technology is a consideration for the use of conventional media as a monitoring medium. Strategies that are directed towards improving compliance behavior must target the barriers that underlie compliance. Therefore, reminders can provide useful additions to compliance improvement strategies (Kugler, Maeding and Russell, 2011).

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