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Literature Review: Tele-nursing education to increase adherence fluid restriction in patients with End Stage Renal Disease undergoing hemodialysis

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Abstract

Background: Patients with End Stage Renal Disease (ESRD) should undergoing hemodialysis therapy for excess fluid, solutes and toxins. To achieve hemodialysis success, there are four factors including diet, drug use, fluid intake restriction and the presence of hemodialysis. Limiting fluid intake is important for hemodialysis patients because excess fluid can cause interdialytic weight gain (IDGW) which will have an impact on cardiovascular complications such as congestive heart failure, pulmonary edema and death. However, meeting fluid requirements becomes a problem for HD patients and it is estimated that 30-70% of patients fail to meet fluid requirements. One of the interventions to improve fluid readiness is to increase patient knowledge about fluids. **Purpose:** This literature review aims to determine and review the results of research on the effectiveness of telenursing on fluid adherence in hemodialysis patients. **Methods:** This research is a literature review with a narrative method to explore research results by searching several database including ebcohost, scopus, proquest and sciendirect with keyword: hemodialysis, telenursing, tele education, nurse led telephone follow ups, tele-health, face to face education, education program, education based on behavior, adherence to fluid intake restriction and compliance to fluid intake restriction. The search for these journals is limited in the period from 2012 to 2021, with filters for full text, journals, English language and journals according to the topic which is then carried out critically in each journal to produce research conclusions. **Results:** It was found that telenursing was effective in adjusting use in hemodialysis patients, reducing depression, anxiety and stress in hemodialysis patients. In addition, the provision of direct or face-to-face education programs can also increase knowledge and adherence to direct contact with fluids, but in the results it is recommended to follow up with telephone or use telenursing to improve care and can reduce self-care of HD patients remotely. **Conclusion:** Based on the results based on a systematic basis, it was found that the use of telenursing education can increase adherence to knowledge and fluid compliance of hemodialysis patients and can reduce depression, anxiety and stress.

Keyword: Tele nursing education, ESRD, Fluid Restriction, Hemodialysis

Introduction

Chronic Kidney Disease (CKD) is a public health problem in the world that directly affects the global burden of

morbidity and mortality worldwide. According to Prevalence and Disease Burden of Chronic Kidney Disease data in 2019, the estimated global prevalence of chronic kidney disease is 13.4% (11.7% - 15.1%) and patients with end-stage kidney disease who require kidney replacement therapy are estimated between 4,902 and 7,083 million (Cheng Lv & Zhang, 2019).

The prevalence of chronic kidney disease in Indonesia based on Indonesian Renal Registry (IRR) data showed an increase in prevalence in the 2013-2018 period, from 0.2% to 3.8% per 100 population (RI Ministry of Health, 2018). Chronic kidney disease as a condition of progressive loss of kidney function eventually results in the need for kidney replacement therapy, namely dialysis or transplant (Vaidya & Aeddula, 2021). In Indonesia, the prevalence of patients with end-stage chronic kidney disease undergoing hemodialysis therapy has increased from 2013 to 2018, from 21,759 to 132,142 patients. (PERNEFRI, 2018).

Hemodialysis is a kidney replacement therapy that aims to remove excess fluids, solutes and toxins. Dialysis has a homeostatic function in conditions of acute kidney injury and end-stage chronic kidney failure (Murdeswar HN & Anjum F, 2021). Most of the success of hemodialysis therapy is achieved by adherence to hemodialysis, but research results show that between 30-50% of end-stage renal failure patients do not comply with hemodialysis resulting in medical complications and low survival rates (Rosenthal. A, Ver. Halen & Cukor, 2012 ; Clark, Farrington & Chilcot, 2014). To achieve the success of the hemodialysis program, it depends on four factors including dietary factors, drug use, fluid restrictions and the presence of hemodialysis (Wallsted. D., et al 2010). Limiting fluid intake is important for hemodialysis patients because excess fluid can cause an increase in interdialytic body

weight (IDWG) which has an impact on cardiovascular complications such as congestive heart failure, pulmonary edema and death (Jia et al., 2016).

Excess fluid is closely related to the main cause of increased morbidity and mortality in hemodialysis patients and is a cause of complications in cardiovascular disorders and even death (Mallhi et al., 2016; Hung, Lai, Kuo & Tarng, 2015). However, the results of the study show that fluid restriction is still a problem and a difficult thing for patients. It was found that around 69% of patients undergoing hemodialysis were not compliant with fluid restrictions (Beerendrakumar, Ramamoorthy & Haridasan, 2018). Fluid restriction is considered the biggest stressor for hemodialysis patients, an estimated 30% -70% of hemodialysis patients fail to meet fluid restriction requirements (Y. Kim & Kim, 2015). According to another study conducted by Chironda &

There are factors that influence the adherence of hemodialysis patients to therapy regimens including knowledge of therapy regimens, socioeconomic status, health beliefs, attitudes towards treatment, and culture (Scott L., et al, 2010). To help patients comply with fluid restrictions, health knowledge is needed in the patient. It is stated that limited patient knowledge will lead to low disease control and complications. Health education is an important part of all patient care to deal with the complexities of kidney disease and its treatment (Mohga Selim., et al 2015). Therefore the authors want to conduct a systematic review regarding the effectiveness of tele nursing education on adherence to fluid intake restrictions in hemodialysis patients.

Method

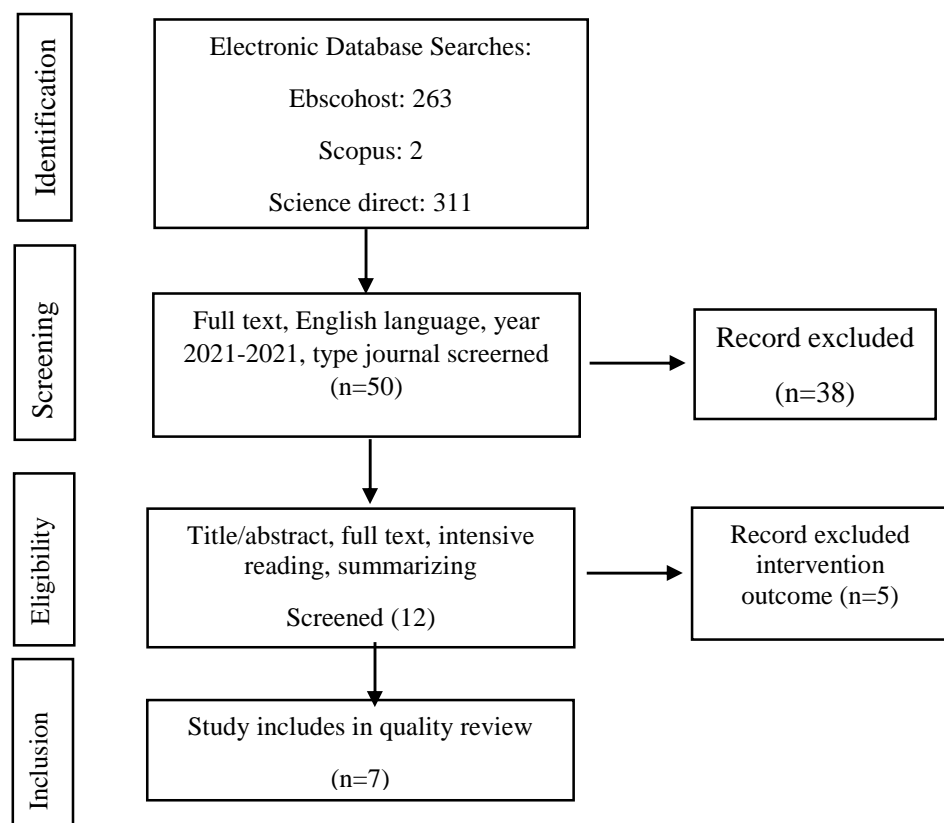
This research is a literature review (literature review) using a narrative method that tries to explore research

results (Nursalam, 2020). Journal search in several databases including ebscohost, scopus, proquest and sciendirect) with keywords: Hemodialysis, telenursing, tele education, nurse led telephone follow ups, tele-helt, face to face education, education program, education based on behavior, adherence fluid intake restriction and compliance to fluid intake restriction. The search for this journal is limited from 2012 to 2021, with full text, journal, English language and journal filters according to the topic.

This literature review begins with a search for articles using the PICO framework (Problem/population= hemodialysis patients, Intervention= telenursing education, Comparison= face

to face education/education programs, and Outcome=Fluid restriction compliance). In the screening process, journal selection was carried out including the language used, namely English, choosing a title and reading the journal abstract. After that, the data obtained was extracted by data extraction in tabular form by including the author, journal name, purpose, sample method and data collection, results and recommendations. Furthermore, the process of critical review (critical appraisal) uses the Critical Appraisal Skills Program to assess the quality of research articles. The search results are displayed in the PRISMA diagram (figure 1).

Figure 1. Literature riview flow diagram



Result

Based on the search results for articles with a database based on filters related to

language, full text and the specified year range, it produces 50 articles which are then carried out intensive reading and summarizing. After screening, the number

of articles was 7 with the population and type of intervention according to the inclusion criteria. This systematic review discusses the effectiveness of telenursing education on compliance with fluid intake

restrictions in patients with terminal renal failure undergoing hemodialysis. A summary of studies that meet the criteria will be discussed in table 1. Summary of studies.

Tabel 1. Article Summary

Author & Researcher location	Population & sampel	Design	Intervention & comparison	Result
Author: Omar pourbalouch, Ali navidian & hasan aksari, Iran	80 patient hemodialysis in the nephrology ward were selected using the convenience sampling method which were then randomized to enter into the distribution of the experimental group and the control group	clinical trial studies. There are 2 groups, namely the experimental group and the control group. Data was collected within 12 weeks	Telephone educational interventions were carried out 2 times a week for 12 weeks with 15-20 minutes between 08:00 and 20:00. Health education includes diet, fluid intake, medicines, fistula care, skin, activity and rest. Each week one topic is discussed according to the patient's priority needs. At the end of the intervention the patient was asked when he would undergo hemodialysis again. The experimental group was asked to fill out a self-care questionnaire.	Patient education and telephone follow-up (telenursing) can improve self-care behavior in hemodialysis patients diet, fluid intake, medication, fistula treatment, skin, activity and rest. The mean score of self-care before the intervention was 24.40 + 14.73 in the experimental group and 19.45 + 14.11 in the control group. After changing to 48.65 + 9.19 in the experimental group and 20.40 + 13.46 in the control group.
Arad, Iran	The sample in this study amounted to 66.	Study in the form of randomized controlled trial. 66 patients were recruited using convenience sampling. And divided into two groups, namely the intervention group and the control group.	Data were collected using demographic questionnaires, laboratory results record sheets and end-stage renal disease adherence questionnaires (ESRD-AQ) which included 4 dimensions, namely the presence of HD, drug use, fluid restriction and dietary recommendations. The intervention group received patient and nurse education programs leading follow-up services via telephone communication and Short Message Service (SMS) for 3 months. All Participants filled out questionnaires before and after the intervention	Implementation of patient education programs and nurse-led follow-up could go a long way hemodialysis adherence in the four dimensions of presence of HD, medication use, fluid restriction, and diet recommendations in HD patients
Hosseini & Ziaeirad, Iran	52 samples that met the inclusion criteria were	Experiment. The sample was divided	to find out the effects of telenursing consultations using the network	telenursing consultation using social

Author & Researcher location	Population & sampel	Design	Intervention & comparison	Result
	selected using the convenience sampling method	into two groups, namely the experimental group and the control group	to promote self-efficacy and weight control in patients undergoing hemodialysis. Treatment consultation intervention was given to the experimental group via telegram for 1 month.	network is effective in increasing self-efficacy and weight control
Selim, Cairo	The population in this study were adult male and female patients who underwent hemodialysis at the AISiny Nephrology Center for 6 months and not more than 1 year. 60 samples were selected using purposive sampling	Pre post test quasi experimental	The research was started with a pre test, then given an educational program through HD therapy regimens, about diseases and treatments that support self-management. Evaluation was carried out for each respondent regarding the effectiveness of the education program after one month and 6 months after the implementation of the program.	The results showed that the provision of educational programs can increase knowledge related to hemodialysis therapy regimens and improve adherence to HD therapy regimens.
Vijay & Kang, India	This study used a purposive sampling technique. Sample size was 110 CKD patients receiving hemodialysis treatment at Kerala India Hospital	Protocol for an RCT. 110 samples were divided into two groups, namely 55 in the experimental group and 55 in the control group.	This study aimed to examine the efficacy of a nurse-led intervention on dialysis-related diet and fluid adherence and morbidity. The intervention was carried out using structured interview techniques and self-reporting will be used during the data collection period. Data was collected during hemodialysis sessions. Outcome measurements at week 6 and 10 in both groups.	needs of hemodialysis patients. The nurse-led intervention found to be effective, this potentially cost-effective program can be implemented in all dialysis centers by providing dialysis-specific and psychologically-inspired training to all hemodialysis nurses that will meet the needs of HD patients.
Jahromi, Iran	The research subjects in this study were randomly selected consisting of 60 patients with chronic kidney disease undergoing hemodialysis at Muthahari Jahrom Hospital.	Randomized clinical trials. The sample was divided into two groups, namely the experimental and control groups, each consisting of 30 patients.	Intervention stage: Respondents filled out the questionnaire before the intervention. The control group only received routine hospital care whereas the intervention group received follow-up calls 30 days after the dialysis shift in addition to conventional treatment. The contents of the call follow the script to ensure consistency. The telephone follow-up consultation is structured and contains the following main subjects: communication, cognition/development,	The results of the study showed that there was a significant difference between the two groups regarding the DASS scale dimension score after the intervention with a P value of 0.05. The telenursing program was associated with lower depression, anxiety, and stress in the intervention compared to the control group.

Author & Researcher location	Population & sampel	Design	Intervention & comparison	Result
			breathing/circulation, nutrition, elimination, sleep, pain/perception, skin/tissue, sexuality/reproduction, activity and psychosocial/spiritual/cultural. All interventions were carried out by the researcher responsible for this experiment. Each session lasts maybe 30 minutes. Finally the DASS scale was filled out by the patients after completion of the study by the two groups.	
Parvan et al, Iran	The population of this study were chronic kidney failure patients undergoing hemodialysis treatment at the Shahid Rahnemun teaching hospital in 2012. From 160 patients who met the criteria, there were 60 participants.	Participants were divided into 3 groups: the face-to-face educational intervention group, the pamphlet group, and the control group. Groups were randomly selected according to the intervention.	Data was collected with a 3-item questionnaire: the first part included questions about personal-social information (age, gender, marital status, education, occupation, year of hemodialysis and background disease); the second part includes the Chronic Hemodialysis Knowledge Survey (CHEKS) (consisting of 23 multiple choice questions with one correct answer). The third section was developed by Hays in 1994 to assess patient adherence to treatment by the Medical Outcome Study (MOS) and included five questions on adherence to general treatment.	The results showed that the increase in the value of HD knowledge and compliance. That is, the face-to-face education group was more effective than the control group and the group that was given pamphlets only.

Discussion

This systematic review discusses 7 articles generated from article searches. These seven articles are quantitative research, 4 articles about the effect of telenursing education on adherence to fluid intake restrictions in hemodialysis patients. These four articles do not specifically discuss the effect of telenursing education on fluid adherence, but generally discuss the treatment regimens of hemodialysis patients, one of which is limiting fluid intake. In 4 articles, 3 articles discussed the effect of telenursing on adherence to HD treatment regimens and one article on the use of telenursing on depression, anxiety and stress in HD patients. While the other 3

articles discussed the provision of education programs on adherence to HD treatment.

Of the 7 articles it shows that in 3 articles the use of telenursing can increase adherence to hemodialysis treatment regimens where one of them is adherence to fluid intake restrictions. While 1 article shows that telenursing can reduce the level of depression, anxiety and stress in HD patients. While the use of the education program in 3 articles is said to be effective in increasing knowledge and adherence to HD treatment regimens. However, it is recommended to use it together with telenursing to improve remote care services.

Based on a review of research conducted by Pourbalouch, Navidian and

Askari (2020), that there is an effect of telenursing education via telephone in improving self-care in hemodialysis patients including diet, fluid intake, medication, fistula care, skin, activity and rest. These results are reinforced by the results of research conducted by Arad et al., (2021) that the implementation of a telephone follow-up patient education program led by a nurse conducted for 3 months via telephone and SMS can improve hemodialysis compliance in four dimensions, namely the presence of HD, the use of medication, fluid restriction, and diet as recommended in HD patients.

In another study conducted by Ziarirad (2016) regarding the impact of telenursing consultation by using the social networks to promote the self-efficacy and weight control in patient hemodialysis, it was found that the results of providing distance education using social networks were proven effective in increasing self-efficacy and weight control in hemodialysis patients and can help nurse services with limited resources and can be used as a new way to improve remote care services. In addition, research with other themes that also utilize telenursing also shows significant results that the use of telenursing can be used to reduce depression, anxiety and stress in HD patients (Jahroni et al., 2015).

In addition to telenursing education, the provision of educational programs can directly increase knowledge and develop problem solving skills, goals, and manage their illness as well as support the management of hemodialysis patient care. The educational material provided includes material on kidney failure, causes, manifestations, treatment regimens, including dietary and fluid restrictions, drugs, hemodialysis, hemodialysis access care and brief knowledge about kidney transplantation, evaluation of the level of knowledge is carried out at 1 month after the

intervention and 6 months after the intervention (Elsawi et al., 2015). This research is also supported by other studies which show that providing education directly can increase knowledge and adherence to treatment regimens (Vijay & Kang, 2015; Parvan, 2015). HD knowledge and adherence values (Parvan et al., 2015).

According to the American Nurses Association explains that tele nursing is a method of providing nursing services through the use of technology which can be in the form of telephones, computers, remote monitoring devices and the internet (Elfrink, 2009). The use of this technology leads to quick access to better services, reduces costs, is easy to perform and improves the quality of providing health services to patients (Massarat, 2011). In addition, continuous patient education also plays an important role in rehabilitation after discharge from the hospital. Several studies have been conducted in Iran on tele-nursing which showed patient education through booklets is not enough to improve treatment adherence in patients, and there is an important need to apply follow-up methods. after leaving the hospital (Fronczek, 2017)

In line with some research results that patient education and nurse-led telephone follow-up (tele-nursing) can improve treatment adherence in patients with acute coronary syndrome (Kamrani et al., 2015). Alikari et al., (2015) used counseling interventions and active participation in clinical decision making to improve treatment adherence. They revealed that the active involvement of patients in educational programs increased their awareness and perception, which led to higher treatment adherence rates in HD patients.

There are several obstacles in the implementation of telenursing education including the short time for giving interventions due to limited grant funds,

small sample size which affects results while hemodialysis centers are located throughout the city. Not doing the equalization of the characteristics of the respondents in each group related to age, education, gender, marital status and others so that it can cause bias because it can affect adherence to fluid restrictions.

Based on the review that has been done, it can be concluded that telenursing education can improve the treatment regimen of hemodialysis patients including adherence to hemodialysis presence, diet, medication, fluid restriction and controlling Interdialytic Weight Gains (IDWG). Besides that, it can also improve the self-care of hemodialysis patients including fistula care, activity and rest. Telenursing can be used by nurses to improve care services, improve patient medication adherence and monitor self-care of hemodialysis patients.

Conclusions

Patients with kidney failure must undergo complex treatment regimens and for a long time so that they require self-management in carrying out hemodialysis treatment regimens. In addition to health education which is carried out when patients visit the hospital, it is hoped that telenursing can also be implemented to conduct education and daily monitoring of hemodialysis patients' self-care so that it is expected to minimize the occurrence of complications of excess fluid.

This systematic review has analyzed the literature on the effectiveness of telenursing education on adherence to fluid intake restriction in hemodialysis patients with the result that the use of telenursing education is effective in increasing adherence to the presence of hemodialysis, diet, medication, fluid restriction and control of Interdialytic Weight Gains (IDWG). As well as providing educational programs can also

increase knowledge and develop skills. However, several studies have stated that education in patient education programs through booklets is not enough to increase medication adherence to patients, and there is an important need to implement follow-up methods after discharge from the hospital, so it is suggested that providing education can be done in both ways, both direct education and using telenursing, to monitor the progress of the patient.

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