Information Technology Helps Self-Management among Chronic Kidney Disease (CKD) Patients

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Abstract: Background: Self-management becomes an important part of Chronic Kidney Disease (CKD) therapy to achieve maximum therapeutic results. Methods to improve self-management in CKD patients have developed, one of them is through the use of Information Technology (IT). The development of IT today makes everyone to access a lot of things. Therefore, the development of technology enables clients to improve self-management. This systematic review aims to know the effectiveness of IT using in Self-management among CKD patients. Methods: Literatures are obtained through several databases including Science Direct, Scopus, and PUBMED. This search is restricted from 2011 until 2017. Results: Based on a study of 10 selected journals, obtained some types of information technology that is used to improve self-management in CKD patients. The technologies include mobile phone applications, SMS, teleconferencing and web-based. Conclusion: IT is effective to improve self-management in CKD patients.

1 INTRODUCTION

Chronic renal failure or renal disease is a disorder of renal function, progressive and irreversible where the ability of the body fails to maintain metabolism and fluid and electrolyte balance, causing uremia (Corwin, 2009). Clinically the disease is characterized by kidney damage and/or decrease in Glomerular Filtration Rate (GFR) of less than 15ml / min. (Center for Data and Information MoH RI, 2017).

The prevalence of End Stage Renal Disease (ESRD) patients in the United States are 661,648 inhabitants (USRDS, 2015). While in Indonesia in 2013 as many as 499,800 people suffering from kidney disease, and as many as 30,554 of them are chronic renal failure undergoing haemodialysis (HD). The prevalence of kidney failure patients is expected to rise as the number of aging population and the incidence of diabetes mellitus and hypertension (PERNEFRI (Society of Nephrology Indonesia), 2015).

One treatment that can be performed on patients with terminal renal failure is HD. Haemodialysis is a renal replacement therapy by using a semipermeable membrane to remove the remnants of the metabolism of blood circulation, kidney failure patients can also be combined with pharmacological therapy to obtain optimal results. Complexity of this treatment often result in patient non-compliance (Brunner & Suddarth, 2011).

The active participation of people with CKD are paramount to the management of CKD. Self-management becomes an important part of therapy CKD to get maximum therapeutic results. Self-management in CKD patients is shown in the concept of the management of fluid restriction, restrictions on food (diet), the treatment and management of vascular access care. Measurement of fluid restriction weight using Interdialytic Weight Gain (IDWG). Methods to improve self-management in CKD patients have developed, one of them is through the use of information technology (IT). The development of information technology today makes the individual to access a lot of things. Therefore, the development of technology is very possible, enables clients to improve self-management. This systematic review aimed to review the use of information technology in the self-management in clients with CKD.

2 METHODS
The method used in this systematic review begins with the selection of topics, and then determined the keywords to search the journal in English through several databases including Science Direct, Scopus, and PUBMED. This search is restricted from 2011 until 2017. Journals selected for review based on studies in accordance with the inclusion criteria. Criteria for inclusion in this literature review are journals that discusses the use of information technology on the client CKD, the study Randomized Control Trial, Quasi-Experimental, Pre and Post experimental and research on clients with age> 18 years. Researchers analyzed the literature obtained by the selected 10 journals to do systematic review.10 journals are then examined, analyzed and evaluated. Then conducted systematic review in accordance with the results of Critical Appraisal has been done before.

3 RESULTS

Based on a study of 10 selected journals, obtained some type of information technology that is used to improve self-management in CKD patents. The technologies include mobile phone applications, SMS, teleconferencing and web-based. Research selected in this review as much as 6 journals using RCT research design and quasi-experimental.

3.1 Self Management

Self management in CKD patients is shown in the concept of the management of fluid restriction, restrictions on food (diet), the treatment and management of vascular access care. Measurement of fluid restriction weight using Interdialytic Weight Gain (IDWG). Food management in haemodialysis patient care is an important aspect of self-care management to maintain nutritional status and electrolyte balance. End Stage Renal Disease patients undergoing haemodialysis typically consume large amounts of drugs to various circumstances, further vascular access is a lifeline for haemodialysis patients that required treatment (Ishani et al., 2016).

3.2 Information Technology

Information technology (IT) is a term that describes the technology that helps people to create, modify, store, communicate or disseminate information. IT brings together computing and high-speed communications for data, voice, and video. Examples of Information Technology is not only a personal computer, but also telephone, television, and modern devices (e.g. mobile phones) (Ong et al., 2016). Today the use of information technology also play a role in health. Various studies conducted to determine the effectiveness of the use of information technology to health. Some types of information technology used in the 10 journals in this review include:

Mobile Phone Application
Mobile Phone Application / application on the mobile phone into other alternatives in helping to improve self-management on the client. The high number of mobile phone user is now possible to manufacture an application therein. CKD management applications can include user profiles, activity tables, fluid intake and output diary, diet, and treatment table. Clients include every activity in the application, then the application will calculate the fluid balance and activity. Diary on this application, enables clients to save activities, and assist nurses in evaluating the success of fluid restriction, diet and medication. Further, the application is also equipped with an alarm to add or drop client fluid consumption (Agapito et al., 2017).

Short Message Service
Short Message Service (SMS) is a technology that allows it to receive and transmit messages between mobile phones. SMS, which means short message service, then the data can be accommodated by SMS is very limited. One SMS being sent contains a maximum of 140 bytes, which when converted in the form of a character is 70-160 characters. The limited number of characters in an SMS makes nurses must pay attention to the effectiveness of SMS content. SMS will be sent to clients each day. SMS contains information about the client's health and treatment schedule CKD (Millman and Hartog, 2015).

Teleconference
Teleconference is a meeting held by two or more persons who do pass the phone or network connection. The meeting can use the voice (audio conference) or using the audio-video (video conference) which allows participants to see and hear what is discussed, as well as regular meetings. Teleconference in CKD management allows for interaction between clients and health workers. Clients have previously been taught how to use cam, oxymetri pulse, and blood pressure monitor. Clients report measurement results that have been done, then health officials will determine what actions to take (Chen et al., 2011).
Web-Based Support Community

Website is a collection of web pages containing information in the form of text, images, sounds, and others that were presented in the form of hypertext and can be accessed by software called a browser. The website is an internet facility that can link documents locally and remotely. The concept is similar to the use of web based applications on mobile phone use, but the media used is a computer. Clients report of fluid intake, activity and medication everyday, then health officials will examine the client reports (Diamantidis et al., 2012).

The entire journals evaluate the effect of the use of IT to self-management. The entire journal using samples aged> 18 years. Measurement of self-management is shown by various indicators. Each journal evaluates self-management through management components on the client with CKD, including IDWG, Hospitalization, medication adherence and GFR. 67% of the research carried out within a period of 6 months, 13% was done for 6 weeks, and 20% implemented> 6 months.

Based on a review of 10 journals about the effectiveness of the use of information technology there is only one journal that shows the results ineffective. Research conducted by Ishani, et.al in 2016 showed that the use of telemedicine does not show any significant differences in the intervention and control. These results contrast with 9 other journals showing that the effective use of IT for the scaling up of client self-management in CKD. Research carried out by the year showed that the use of videoconferencing may increase client self-management in CKD. Research conducted by Chen et.al in 2011 showed that the use of telemedicine does not show any significant differences in the intervention and control. It is caused by complex process of blood pressure measurement and oxymetri to be done by the client. Previous clients have been educated about the use of the tool, but still found obstacles at the time of execution.

These results contrast with the results of 9 other journals showing that the effective use of IT for the scaling up of client self-management in CKD. Technologies used include mobile phone applications, SMS, videoconferencing and web usage. Research conducted by Chen et.al in 2011 showed that the use of videoconferencing may increase client self-management in CKD. Improved self-management is analyzed through GFR and hospitalization numbers. GFR was higher in the intervention group (29 116 versus 15 726 mL / min) number of hospitalization was lower in the intervention group (5 versus 12, p> 0.05).

The influence of the use of IT on increase self-management among CKD patients is closely with the client's behaviour patterns in the search for health information through the use of smartphones and the Internet. The use of these various technologies do not require a lot of energy and can be done anywhere. CKD patients with symptoms of fatigue tend to choose this way to find out information about his health. IT gives easy access for users, so that it can really help a client with chronic disease (Ann et al., 2017).

The successful use of information technology is caused by several factors, individual internal and external factors. Internal factors include understanding, ability and health condition. The external factors include the existence of the Internet network and errors on the tool. Therefore before determining the type of technology will be applied, firstly researchers must analyze the situation of individuals and the environment. Thus the use of IT can provide a positive influence on the client.

survey conducted in the United States in 2014 reveals that a 64% of adults own a smartphone, 90% of adults have a mobile phone with 81% used for SMS. While in Indonesia, the MCIT estimated 2018 active users of smartphones reaches> 100 million users. This fact offers an opportunity to resolve health problems through the use of information technology (Murali, Arabic, Vargas, and Rastogi, 2013).

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Implications For Nursing Practice

Use of IT to improve self-management clients CKD should be considered to be one of the nursing interventions. This is in line with the increasing accessibility of the Internet in Indonesia. Nurses have to identify the needs and communication patterns of the client first, so as to determine the right type of IT. Each community / client has vary communication patterns, it makes interventions can’t be equated to all clients.

The use of IT in healthcare in Indonesia has been progressing. IT widely applied to clients with chronic illnesses. It’s because clients with chronic illnesses tend to bored with the treatment, so it is often decreased motivation to the management of the disease. Therefore, the application of IT to improve self-management in CKD client can be applied in Indonesia.

5 CONCLUSION

Based on the review conducted in 10 journals selected, it can be concluded that the effective use of IT to improve self-management in CKD client. Researchers first have to analyze the needs and the resources available, so as to determine the most appropriate type of technology.

REFERENCES


