

Nursing Care of Arteriovenous Fistula for the Patient Undergoing Hemodialysis

Vasuki R¹, Kim Jeongmi²

Research Assistant, Department of Preventive medicine and Public health, Ajou University
Associate Professor, Department of Nursing, KAYA University, Korea.
E-mail vasuki81@daum.net

Abstract

Purpose: This study aimed to review the recent scientific literature regarding nursing care of arteriovenous fistula (AVF) for the patients with Chronic Renal Failure (CRF) undergoing hemodialysis. Methods: An integrative review was conducted and articles were searched from Cochrane library, Medline, PubMed, Science direct and CINAHL databases by using the terms “nursing”, ‘Chronic Renal Failure’, ‘Haemodialysis’, renal failure’, ‘or ‘AV Fistula’ nursing care’, ‘self-care’. The inclusion criteria were articles published in English in the year of 2015-2020 with availability of free full text. Reviewed data were carefully analyzed and charted regard to the nursing care of the patient with AVF. Results: 12 articles papers met the inclusion criteria. Three themes were derived from the data: (a) Intervention (b). Patient and nurse education (c) KPA Assessment of (Knowledge, Practice and Attitude) Conclusions: This review indicates the challenges that nursing care of AVF patients undergoing hemodialysis. The identified themes can be used in the development of more effective educational- programs. Future studies should focus on the development and evaluation of educational programs that include these selected themes.

Key words: Hemodialysis; Nursing Care; Arteriovenous Fistula. CRF, Dialysis Catheter;

1. Introduction

The burden of chronic kidney disease (CKD) is one of serious condition increasing in proportion all worldwide. Chronic renal failure (CRF) is considered as a permanent deterioration in renal function [1]. It is considered a deadly and life-threatening illness, in which the survival can only be sustained by Haemodialysis (HD) or peritoneal dialysis. End stage renal disease is a lifelong illness that requires continuity of care that includes hemodialysis, which proceed by dreadful sequel of arteriovenous fistula [2]. In globally, higher incidence of CRF has been noted in Asians of Indian includes 14% of the population but 25% of dialysis patients and 30% of patients on the renal transplant waiting list; this is another pointer to the higher incidence of CRF in this population as well as haemodialysis [3]. An average conservative estimation of incidence of CRF at 100/million population/year, and a population approaching 1.2 billion and an estimated 120,000 fresh

patients are likely to reach CRF in every year. The prevalence are likely to be much lower, however, as most patients facing severe complications due to lack of maintenance AVF fistula during the dialysis [4].

Maintenance dialysis is a well-recognized method of treating patients with CRF. According to the Guidelines for Maintenance Hemodialysis in India, most of patients all over the world are surviving and achieving reasonable quality of life on maintenance dialysis. According to the Indian Nephrology in 2017, in the world about one million and 200,000 people are under hemodialysis treatment. In Brazil, there are approximately 87,044 patients per year, of which 89.4% are in renal substitutive therapy program [5].

Hemodialysis for arteriovenous Fistula is a therapeutic modality of greater choice, being a long-lasting and safe access, adds that the arteriovenous fistula (AVF) presents a survival adequate and has low rate of complications [6]. Also, Daugirdas [7], explained that, hemodialysis with performing an arteriovenous fistula, which formed by a subcutaneous anastomosis of one artery by a native vein adjacent, allowing the direct flow of the artery to the vein. AVF is a simple procedure, but need proper planning of the site of anastomosis, which performed in preoperative and postoperative setting [8].

In the first two years of dialysis, the percentage of admission caused by complication of AVF in hemodialysis access was high as 72.0%, occupying 20.5% of the admission caused by end-stage renal disease [9]. During the process of internal fistula usage, repeatedly puncturing at the same place may cause blood vessel injury, fibrosis, hardening blood vessel and narrowing lumen and influence quantity of blood flow; moreover, fixed puncture point may also cause pseudoaneurysm; slow blood flow inside the aneurysm may cause thrombus and large aneurysm may have rupture and bleeding and infection [10].

The people with CRF undergoing haemodialysis facing hard time to maintain the fistula care and need to develop the knowledge and practice on care of AVF: thrombosis, lower blood pressure, narrowing of vessel, decreased flow because repeated punctures, bruises, hemorrhages, ischemia etc [10].

However, investigator need to acquire extensive scientific knowledge of nursing care and maintenance of AVF care through narrative review of published scientific articles in order to develop future intervention studies regarding care of Haemodialysis patient. Therefore, this study was planned to review the published scientific literature in narrative manner by stated self-care management of AVF. The purpose of this study was to review the scientific literature regarding nursing care, self-care and maintenance of AVF care and develop the education module for CRF patients undergoing hemodialysis.

2. Methods

2.1 Research design

This study focused Narrative review design to find the scientific literature of nursing care or interventions of A fistula for the CRF patients undergoing Hemodialysis.

2.2 Search methods

A narrative review was conducted and articles were searched from Cochrane library, Medline, PubMed, Science direct, and CINAHL databases by using the terms “nursing”, ‘Chronic Renal Failure’, ‘Haemodialysis’, ‘End stage of renal failure’, nursing care’, ‘self-care’.

2.3 Selection Criteria

Studies were selected from original articles published in national and international journals. The inclusion criteria were articles published in English in the year of 2015-2020 with availability of free full text. Exclusion criteria were articles with other than English language, not relevant to nursing care, patients undergoing peritoneal dialysis.

appraisal was conducted collaboratively by the primary author and co-authors.

2.4 Data extraction

The articles were properly selected and data were extracted by using a form that included: author's name, publication year, methods, used instruments and main results. As done in the selection process, the extracted data were reviewed by two researchers to ensure the data reliability.

3. Results

The initial databases search identified 640 articles, of which 312 duplicates were removed. 68 articles selected for careful review of title and abstracts. 31 articles were eliminated not meeting the criteria. There were 37 articles included for in depth review, whereas only 10 articles filtered with full text for final analysis as shown in in Figure 1.

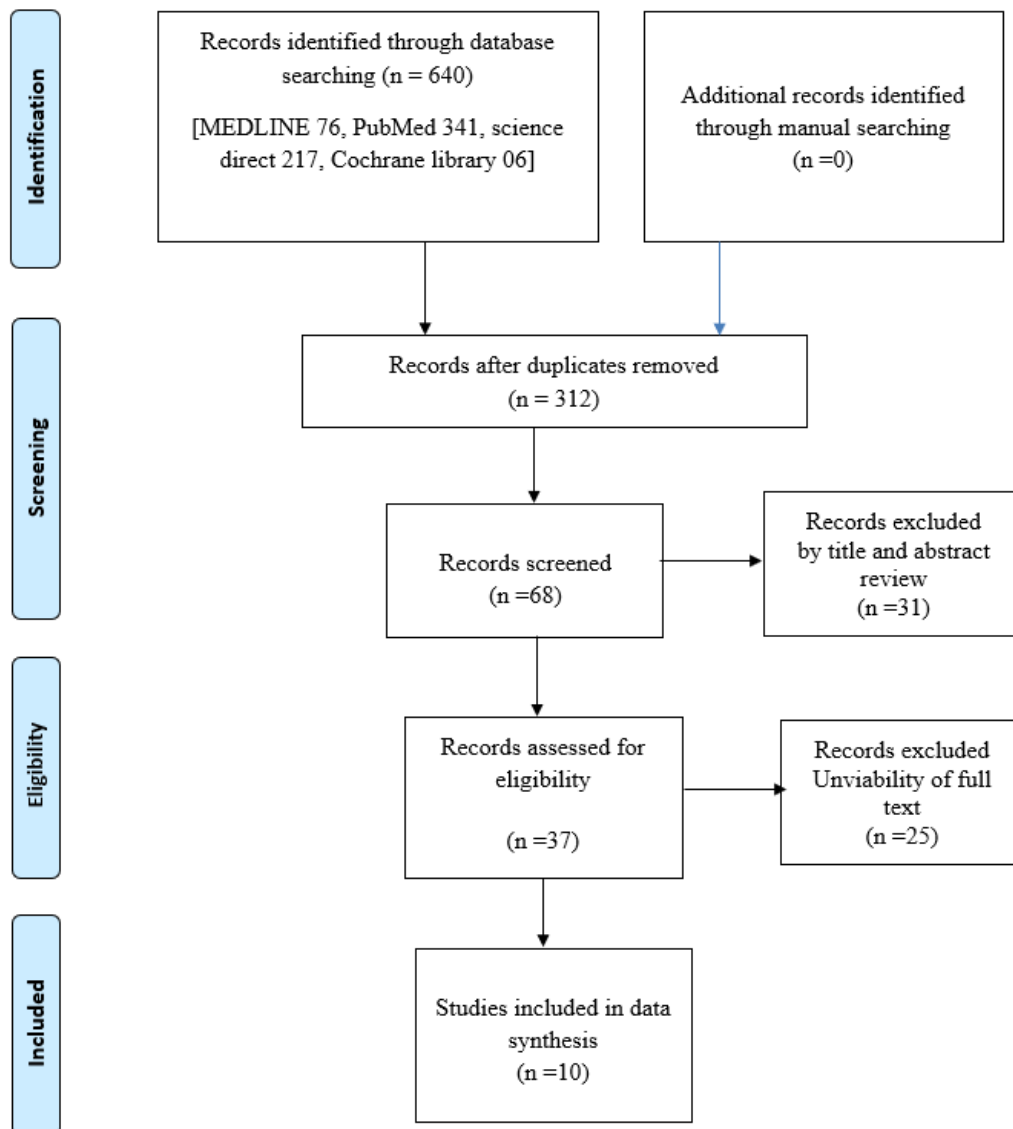


Figure 1. Flow diagram for the literature search and article selection process

Out of the 10 studies reviewed, in research design: most of the studies focused on experimental design with control group and intervention group, three studies on cross sectional and descriptive study, one perspective study and Non-comparative study towards nursing or self-care of AVF for the patient undergoing haemodialysis. All of the studies were conducted in hospital and dialysis unit setting with duration of an average of 6months, 9months and 18months. Most of the studies used measurement tool such as self-structured questionnaire, few were interview with self-care behavior scale and less number chose check list methods. Despite differences in sample size and duration of haemodialysis. Studies were conducted in many countries such as Brazil (n=1), Canada (n=1), china (n=2), Egypt (n=2), India (n=1), Saudi Arabia (n=1) and Spain (n=1). All the outcomes suggested to develop Educational module or programme for the patients with CRF undergoing Haemodialysis (Table-1).

Table 1. Description of selected studies.

Author/Year/ Country	Purpose	Method		
		Design	Population /setting/duration	Measurement Tool
Hong Yan QIN, 2016, China	To analyze the effect of nursing strategies on patients with chronic renal failure (CRF) undergoing maintenance hemodialysis (MHD) treatment	Experimental design randomized control and observation group	57 patients (control group: 29 & observation group -28) Hospital/ 6months	Self-assessment questionnaire (Complication rate and dysfunction rate during internal fistula perioperative period, fistula usage time and effect on life quality of patients (18months of follow-up))
Li Liu et Al, 2016, China	To assess the knowledge and self-management behavior of patients undergoing maintenance haemodialysis.	Experimental design with control group	Eighty-six patients were included (n=43 per group)/ /hospital/ 6months	Self-management behavior scale (control of body mass, reasonable diet, correct drug intake, physical activity, correct fistula care, disease condition monitoring, psychological and social behaviors)
Huixia Yu et. Al, 2020, China	To assess the effect of personalized nursing on thrombolytic hemodialysis patients after arteriovenous fistula occlusion.	Quasi Experimental Control group design By enrolled survey	92 patients (control group -46) and an intervention group - 46).	Thrombolysis success rate
Hammad & Elkareem 2020, Saudi Arabia	To evaluate the effectiveness of an educational program on the knowledge and quality of life	Quasi-experimental study with a pre-and posttest design/	205 patients from 3 dialysis centers	Self-structured knowledge questionnaire

Fontseré, N et. Al, 2016, Spain	To determine whether a postoperative ambulatory controlled exercise program can increase AVF maturation at 1 month	Non-comparative studies or small trials	69 Patients (Exercise group- 31 patients and control group -38 patients)	Post-operative assessment (clinical maturation (expert nurse inspection) and ultrasonographic maturation (flow >500 mL/min, venous diameter and depth)
Author/Year/ Country	Purpose	Method		
		Design	Population /setting/duration	Measurement Tool
Diab T M & Mostafa N M 2019, Egypt	To assess self-care behaviors for arteriovenous fistula in hemodialysis patients	Descriptive exploratory research design	100 adult patients with 18-60years/hospital/ 6months	Self-care behaviors scale
Bayoumi M et. Al, 2019, Egypt	To evaluate the nurses' practices toward applying infection control measures at dialysis unit	A cross-sectional study	Nurses in Hemodialysis Unit	Infection control in end stage renal disease (NOTICE) checklist
Lori E. Harwood et. Al., 2016, Canada	To find attributes of excellence in nursing practice around AVF cannulation that could then be used to cultivate successful interventions	Qualitative descriptive study	Eighteen HD (haemodialysis unit) nurses/ Hospital	Interview guide with semi-structured questions.
Pessoa N C et. Al, 2015. Brazil	To identify the knowledge, attitude and practice in self-care patients receiving dialysis with AVF	Descriptive study and cross-sectional quantitative approach	30 patients using the AV fistula Dialysis hospital	Interviews using a structured questionnaire of knowledge, practice, attitude
Kandula, Usha, et. Al, 2018, India	To assess the knowledge of patients about home care management of AV Fistula	Quantitative research approach and descriptive research design	30 patients undergoing haemodialysis/ hospital/ 2weeks	Self-structured knowledge questionnaire

In this review Hong Yan QIN [12] conducted nursing strategies on AVF in an experimental study among 57

patients (control group: 29 & observation group -28) at Hospital with 6months duration. Measurement tool were Complication rate and dysfunction rate during internal fistula perioperative period, fistula usage time and effect on life quality of patients (18months of follow-up). it resulted nursing strategies were highly improved the patient's quality of life of patients.

Huixia Yu et. Al, [13] conducted personalized nursing intervention pre and post group experimental with 92 patients to assess the effect of personalized nursing on thrombolytic hemodialysis patients after arteriovenous fistula occlusion with ore and post test experimental design, it results, Personalized nursing intervention not only increase thrombolysis success rate but also improve the patient satisfaction.

Another study investigated an effects of a knowledge-attitude-behavior health education model on acquisition of disease-related knowledge and self-management behavior by patients undergoing maintenance haemodialysis. An experimental study with control group proceed among 86 haemodialysis with self-management behavior scale focused control of body mass, reasonable diet, correct drug intake, physical activity, correct fistula care, disease condition monitoring, psychological and social behaviors. The intervention group scored higher knowledge than the control group [14]. All the supported reviews were suggested to develop an experimental nursing intervention programme in order to reduce the complication rates, improve knowledge of self-care management and behavior of the patients undergoing Haemodialysis

b. Education (Nurse and patient education regarding AVF care))

There were four articles supported this study and conducted educational programme implementation among patients with AVF undergoing haemodialysis in selected hospitals. Hammad & Elkareem [15] explained in an pre and posttest design study to evaluate the effectiveness of an educational program on the knowledge and quality of life among 205 haemodialysis patients from 3 dialysis centers with self-knowledge questionnaire, which showed educational group achieved more knowledge than the control group. In addition, Fontseré, N et, al, [16] exhibited in a non-comparative study regarding to determine whether a postoperative ambulatory controlled exercise program can increase AVF maturation at 1 month with 69 patients, whereas post-operative assessment of the exercise group showed greater clinical maturation, but not ultrasonographic significance, maturation than control group. A study explained in a cross sectional with dialysis unit in educational focus of the nurses' practices toward applying infection control measures at dialysis unit with Infection control in end stage renal disease (NOTICE) checklist, resulted the 1st and 2nd observations which notice that nurses ignore hand hygiene, and not committed to wear clean gloves as need.

In supporting the results explained by Santana et. Al, in systematic from the entrance of the patient out of this hemodialysis session. The nurse should use the role of educator to educate patients about AVF. Therefore, above review insisting to develop an educational programme regarding patients and the part of AVF self-care.

c. KPA Assessment (Knowledge Practice and Attitude)

There were five studies reviewed as a cross sectional descriptive and prospective study design focused assessment of self-structured questionnaire regarding knowledge, practice, attitude and self-care behavior and management in order to avoid unwanted complications and discomfort before and after care of AVF for the CRF patients undergoing haemodialysis.

Selfcare behavior scale used to evaluate self-care frequency and factors that influenced such frequency of AVF among 101 haemodialysis patients, concluded that, frequency of self-care behaviors was lower than expected and below an appropriate standard. In extension of other cross-sectional studies too assessed the knowledge of

patients about home care management of AV Fistula (Usha Rani K, et al,2018), showed most of them had moderate knowledge and knowledge, attitude and practice in self-care patients receiving dialysis [22] revealed Inadequate Knowledge, Practice and Attitude among the haemodialysis patients undergoing AVF. The mixed method of interview and self-structured questionnaire used among nurses [19], with the purpose of find attributes of excellence in nursing practice around AVF cannulation that could then be used to cultivate successful interventions and 100 adults To assess self-care behaviors for arteriovenous fistula in hemodialysis patients at hospital setting, exhibited 78%) of patients had inadequate self-care behaviors and (22%) of them had adequate self-care behaviors [20]. A study to assess the nurse's knowledge in around AVF cannulation that could then be used to cultivate successful interventions with 18 haemodialysis nurses with an interview results derived Four common themes, including patient-centered care, teamwork, opportunity and skill and nurse self-awareness, (Lori E. [21]. Above findings, showed most of the patients had inadequate and moderate knowledge of care and behavior of AVF. Therefore, its necessary to develop an innovative intervention or education module to improve the self-care knowledge, practice and attitude with management.

Ove all the study results suggests, that, development of educational module and proper implementation would be very helpful to improve the self-care knowledge and behavior of patients with CRF undergoing Haemodialysis.

5. Conclusion

The study made it possible to meet the nursing care to arteriovenous fistula, which must be in order to improve the quality of life of patients with CRF undergoing hemodialysis.

The narrative review was to conducted to find scientific articles regarding nursing care of AVF for the CRF patients undergoing haemodialysis. Articles were searched from the electronic data bases with inclusion criteria, finally 12 articles were extracted for in depth review and discussion. Study attributes three themes and extracted in this review should be included as important components when developing an educational program. This Narrative review would be definably helpful to develop future studies on community based educational module with further modification in order to include the suitability for nursing practice. The development of standard multidisciplinary education models for patients undergoing haemodialysis should be pursued in order to enhance their applicability to all part of the haemodialysis procedure. In order to improve the self-management of AVF, researchers should explore the development and evaluation of educational programs including the identified themes.

Conflicts of interest

All authors in this manuscript declare no potential conflicts of interest.

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