DEVELOPING STANDARD OF CARE FOR PATIENTS UNDERGOING MAINTENANCE HEMODIALYSIS IN PORT-SAID CITY

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ABSTRACT

End-stage renal disease (ESRD) has become a public health concern worldwide as the total number of ESRD patients requiring renal replacement therapy has been growing dramatically. In Egypt, there is an increase in prevalence and incidence of ESRD exerting a great burden on the health system. Moreover, in Egypt there is insufficient information about the quality of nursing care of hemodialysis patients. **The aim,** develop standard of care for patients undergoing hemodialysis**. Study question,** what are the minimal hemodialysis nursing intervention standards for safe, effective nurses' performance? Exploratory **design** was used in the current study .The present study was carried out in hemodialysis units in Port- Said general hospital, El-Mabara hospital and Port-Fouad general hospital in Port- Said city. **The sample** of this study consisted of: All hemodialysis unit nurses, physicians, nurse educators who had at least three years of experience in the field of study, the **total number** of experts was 78. The data were collected using. **Tool I:** Basic nurses' Competences opinionnaire sheet for hemodialysis patients. It included four parts. **Part A:** demographic data, **Part B:** related to nurses competencies (process): and **Part C** related to structured unit standards and **Part D** related to outcome. The **results** of this study indicated that all experts (100%) agreed about all structures elements, all nursing competencies & outcome. All experts (100%) thought that nurses could assume the responsibility of evaluating the basic nursing care/ activities performed for hemodialysis patients, the most common items of structure not available in all studied hospitals. **Concluded**, The developed hemodialysis standards of nursing care were highly reliable according to Spearman-brown confection test. **Recommended**, The developed standards of nursing care for management of patient undergoing hemodialysis should be available in Arabic and English language in all hemodialysis units and should be revised and updated annually; motivation and financial rewards should be done regularly to encourage hemodialysis nurses to do their best.

Key words: DEVELOPING, STANDARD, CARE FOR PATIENTS, HEMODIALYSIS

INTRODUCTION

Hemodialysis is the most common renal replacement therapy for renal failure. Dialysis is used to remove excess fluids and waste products and restores chemical and electrolytes balance. Hemodialysis involves passing patient's blood through an artificial semipermeable membrane (dialyzer) to perform the filtering and excretion of waste products. ***(Dewit & Kumagia, 2013)***.

Currently, the majority of patients receiving hemodialysis are treated as outpatients in hemodialysis units in large hospitals. In most of these units, the nurses handle the entire dialysis procedure with little supervision from the physicians. Therefore, the nurse is the one member of the health team that has the most contact with the patients. Thus, the nurse must have a thorough knowledge of the pathophysiology of renal failure, mechanics and technical aspects of the dialyzer, expected outcomes and complications of hemodialysis particularly the needs of the hemodialysis patient. ***(Ignatavicius & Workman, 2013).***

Nephrology nurses can lead the way to implementing numerous proactive interventions before, during، and post hemodialysis because they often have more contact with patients than other clinical personnel and are in an ideal position to optimize assessment, management, and monitoring of clinical issues likely to affect patients on dialysis, including anemia, malnutrition, inflammation, vascular access-related infection, and volume status. They also serve integral roles in minimizing risk for medication- related issues by reconciling medication lists and improving discharge documentation and practices.

According to Donabedian model, a standard of care is defined as a professionally agreed level of performance appropriate to the population addressed. Standard of care is classified to structure standards, process standards and outcome that describe the criteria for the achievement of this standard. ***(Abruzzese 2006; American Nurses Association, 2008).***

Nursing standards are authoritative statements used by the nursing profession to describe the responsibilities for which practitioners are accountable. Standards of clinical nursing practice are based on the American Nurses Association (ANA)

format, which have been structured to include all levels of nursing care providers in a variety of settings and described the collaborative care to ensure optimal patient outcomes for diagnostic and therapeutic procedures. In addition, the standard of care is used for purposes of health maintenance, restoration, or palliation. It also indicated by using standard of care for different types of diseases that include renal failure and hemodialysis. ***(American Nurses Association, 2004).***

The changing nature of today's health care, including pressure to reduce costs, improve the quality of care and meet stringent guidelines, has forced health care professional to re-examine how they evaluate their performance. Nursing, as a service provided by nurses, is essential to the patient's life and welfare. As nursing became a profession, it began to develop its own standards of practice. ***(Yehia, 2007; American Nurses Association 2009; Abdel Mowla, 2012).***

Standards of practice are essential because they serve as guidelines of providing and evaluating nursing care. They help to ensure high quality care and serve as criteria in legal questions of whether adequate care was provided. Nurses are the key to quality in the health care delivery system. Holding a unique role as care coordinators at the interdisciplinary intersection of patient care delivery, nurses manage quality issues and do much of the quality surveillance and monitoring. ***(Ann & Judith 1999; Yehia, 2007; Anderson 2008; Abdel Mowla, 2012).***

Quality improvement strategies based on standards of nursing care for hemodialysis delivery was the focus of this study. Therefore, the purpose of this study was to develop nursing care standard of care for patients undergoing maintenance hemodialysis based on in review of the Canadian Association of Nephrology Nurses and Technologists standards of practice and Egyptian Guidelines for hemodialysis nurses

AIM OF STUDY:

The present study aims at developing standard of care for patients undergoing maintenance hemodialysis.

Research Questions:

- What are the minimal hemodialysis nursing intervention standards for safe, effective nurses' performance?
- What is nursing knowledge in relation to the developed hemodialysis standards of nursing care?
- What are nursing performances based on the developed hemodialysis standards of nursing care?

SUBJECT AND METHODS:

Design

The study is an exploratory study investigated the actual knowledge and performance of nurses' care patients undergoing maintenance hemodialysis, in order to develop nursing intervention standards for patients undergoing maintenance hemodialysis.

Sample:

The subjects of the study were a convenient sample of seventy eight experts from nurses, physicians and nurse educators was included in the study as follows:

a. Fifteen faculty members of Medical Surgical Nursing Department and five members of the nursing administration Department of Faculty of Nursing, University of Alexandria , Port said University, El-Mansorua University and El- Zagazig University. In addition, university educator was selected possesses a lot of experience.

b. Twenty three physicians had more than three years of experience working in the hemodialysis units at Port- said general hospital, El-Mabar hospital and Port-Fouad general hospital

c. Thirty five nurses with more than three years of experience working in the hemodialysis units at Port- Said general hospital, El-Mabar hospital and port-Fouad general hospital.

Study Tool

The tool was developed by the researcher based on the review of recent related literature to collect the necessary data for this study.

Tool (1): Basic Nurses' Competences Opinionnaire Sheet for hemodialysis patients

This tool was developed by the researcher after thorough reviewing of the related literature to elicit the opinions of experts (group one) about basic required nurses' competencies for nursing care of patients undergoing hemodialysis, pre, during and post hemodialysis. It included three parts.

Part A: Demographic Data:

It includes data related to nurses, physicians and nurse educators' socio- demographic data such as sex, qualifications and years of experience.

Part B: related to nurses competencies (process): (appendix1-a)

It covered fifteen major broad competencies which were subdivided into nursing activities and skills to score as agree (1) and (zero) disagree. In addition, a blank space

was provided for experts' comments. The following were the suggested basic nursing competencies required for patients undergoing maintenance hemodialysis.

The hemodialysis nurse should ensure that:

1. All staff follows ethics and patient's right in the hemodialysis unit.

2. All staff follows professionalism.

3. The hemodialysis unit environment is ready to receive the patient.

4. The hemodialysis unit environment is safe to receive the patient.

5. All infection control measures are properly followed in all procedures.

6. All persons are properly attired for hemodialysis.

7. Assemble and setup hemodialysis machine.

8. All required health in for are given to new patient on hemodialysis.

9. Perform pre-evaluation for the patient undergoing the hemodialysis procedure.

10. Evaluate and prepare the vascular access.

11. Initiate hemodialysis treatment process.

12. Monitor hemodialysis treatment.

13. Respond to emergencies during hemodialysis.

14. Terminate hemodialysis set.

15. Disassemble hemodialysis machine.

Part C related to structured unit standards

It comprised thirteen structured standards for patients undergoing maintenance hemodialysis subdivided into elements/criteria. The answers by expert members and respondent reaction were scored as following: very important (4), important (3), slightly important (2) and not important (1). The suggested elements and criteria of hemodialysis unit structure are:

1. Mission to care for hemodialysis patients.
2. Philosophy and objectives.
3. The plan of the organizations to implement and to facilitate achievement of the unit objectives.
4. Policies and procedures manual.
5. Performance appraisal system.
6. Job description for the nursing staff.
7. Sufficient number of well trained personnel (multidisciplinary team) .
8. Sufficient number of well trained dialysis technician.

9. Establish a system for administrative records and reports.

10. Guidelines, protocols, standards and pathways for the quality of hemodialysis patients care.

11. Communication channels.

12. Unit design (Condition of physical environment).

13. Appropriate supplies and equipment to deliver competent hemodialysis patient care.

Part D related to outcome

1. Maintain the stability of the blood pressure, pulse, temperature and blood sugar.
2. Maintain vascular access site without any complications.
3. Accumulate waste products removed.
4. BUN and creatinine restored to baseline levels.
5. Electrolytes restored to baseline levels.
6. Accumulated fluid removed; dry weight restored.
7. Acid – base balance restored.
8. Ensure gradual performance of physical activity.
9. Provide nursing instruction for patients and their families

RESULTS

Table (1) shows that socio-demographic characteristics of expert(group I), according to the table it was found that nursing educators ratio experts, one quadrate from the total experts, nurses are 44.9% and selected expert physician with represents 29.5% total expert. Shows the characteristics of expert group who had experience in the hemodialysis e.g. sex, qualification and years of experience the total number was 78 experts. Nursing educators in Zagazig were15.0%, in Port-said 20 %, in Damanhur 5 %, in Mansoura 20 %, in Ain Shams 5.0% and 35% in Alexandria. With regards to sex, it was noticed that all nursing educators and nurses were females, while most of the physicians were males. Concerning the qualifications, it was noticed that the largest part of nursing educators were professors 45 %, 25 % had doctoral degree, physicians with master degree represented 30.4%, those having bachelor degree represented 69.6 %. Furthermore, most of the nurses had diploma degree 94.3%. Regarding the years of experience in the hemodialysis field, it can be noticed that; nursing educators had (10+) 51.4 %, (5+) 28.6% and (<5) 20.0, while physicians had (10+) 30.5%, (5+) 13.0% and (<5) 56.5. In addition, the nurse had (10+) 34.8%, (5-) 8.7%, (<5) 56.5 %. Furthermore, had mean years of experience of it was noticed that; nursing educators (7.8±2.4), while physicians (9.0±6.7) and nurse (11.0±6.2).

Table (2) shows expert groups' opinions regarding the process standards of basic

nursing competencies required for patients undergoing hemodialysis. All experts (100%) agreed about all nursing competencies required for patients undergoing hemodialysis**.**

Table (3) shows expert group's opinions related to the outcome standards, competency criteria for patients undergoing hemodialysis. All experts (100%) thought that nurses could assume the responsibility of evaluating the basic nursing care/ activities performed for hemodialysis patients.

Table (4) shows expert groups' opinions regarding the standard elements of the hemodialysis unit structure items. All experts (100%) agreed about all structures elements as components of the hemodialysis unit structure.

Table (5) shows test- retest, Spearman-Brown Coefficients reliability testing of basic nursing competencies for patients undergoing hemodialysis. It can be noticed that test- retest had very strong reliability for all basic nursing competencies items in patients undergoing hemodialysis where (r=1.0 to 0.70). Regarding Spearman-Brown reliability test, Spearman-Brown reliability coefficients constructed opinionnaire regarding the basic nursing competencies items for patients undergoing hemodialysis showed very strong value being (r=1.0 to 0.70) and moderate being (0.40-0.60) which indicates consistency of the opinionnaire (Part B)

Table (6) shows test- retest, Spearman-Brown Coefficients reliability testing of the hemodialysis unit structure standard items for patients undergoing hemodialysis. It can be noticed that reliability correlation was very strong for all the hemodialysis unit structure items for patients undergoing hemodialysis where (r=1.0). Regarding Spearman-Brown reliability test, Spearman-Brown reliability coefficients constructed opinionnaire regarding the hemodialysis unit structure items for patients showed very strong value being (r=1.0) which indicates consistency of the opinionnaire Part B.

Table (7) shows test- retest, Spearman-Brown Coefficients reliability testing of the hemodialysis outcome standards of competency criteria for patients undergoing hemodialysis. It can be noticed that reliability correlation was very strong for all the hemodialysis outcome items for patients undergoing hemodialysis where (r=1.0). Regarding Spearman-Brown reliability test, Spearman-Brown reliability coefficients constructed opinionnaire regarding the hemodialysis outcome items for patients a very strong value being (r=1.0) was found indicating consistency of the opinionnaire.

Table (I): Socio-demographic characteristics of expert (group I) n (78)

Socio-demographic characteristics	Nursing Educators (n=20)		Physicians (n=23)		Nurses (n=35)	
	No	%	No	%	No	%
Faculty of nursing:						
Zagazig	3	15.0	0.0	0.0	0.0	0.0
Port- said	4	20.0	0.0	0.0	0.0	0.0
Damanhur	1	5.0	0.0	0.0	0.0	0.0
Mansoura	4	20.0	0.0	0.0	0.0	0.0
Ain shams	1	5.0	0.0	0.0	0.0	0.0
Alexandria	7	35.0	0.0	0.0	0.0	0.0
Sex:						
Male	0.0	0.0	21	91.3	0.0	0.0
Female	20	100.0	2	8.7	35	100.0
Qualification:						
Diploma degree	0.0	0.0	0.0	0.0	33	94.3
Bachelor degree	0.0	0.0	16	69.6	2	5.7
Master degree	0.0	0.0	7	30.4	0.0	0.0
Doctor degree	5	25.0	0.0	0.0	0.0	0.0
Assistant professors	6	30.0	0.0	0.0	0.0	0.0
Professors	9	45.0	0.0	0.0	0.0	0.0
Experience (years):						
<5 years	0.0	0.0	13	56.5	7	20.0
5+ years	13	65.0	3	13.0	10	28.6
10+ years	7	35.0	7	30.5	18	51.4
Range of experience (years)	6-11		3-26		5-28	
Mean ±SD of experience	7.8±2.4		9.0±6.7		11.0±6.2	
Total	20	25.6	23	29.5	35	44.9

Table (2):- Expert groups' opinions regarding the process standards of basic nursing competencies required for patients undergoing hemodialysis.

Process standards	Nursing educators opinions (n=20)		Physician's opinions (n=23)		Nurses opinions (n=35)	
	Agree		Agree		Agree	
	No	%	No	%	No	%
Ensures that all staff follows ethics and a patient's right in the hemodialysis unit.	20	100.0	23	100.0	35	100.0
Ensures that all staff follows professionalism.	20	100.0	23	100.0	35	100.0
Ensures that the hemodialysis unit environment is ready to receive the patient.	20	100.0	23	100.0	35	100.0
Ensures that the hemodialysis unit environment is safe to receive the patient.	20	100.0	23	100.0	35	100.0
Ensures that all infection control measures are properly followed in all procedures.	20	100.0	23	100.0	35	100.0
Ensures that all persons are properly attired for hemodialysis.	20	100.0	23	100.0	35	100.0
Assemble and setup hemodialysis machine.	20	100.0	23	100.0	35	100.0
Ensures that all required health education is given to new patient on hemodialysis.	20	100.0	23	100.0	35	100.0
Perform pre-evaluation for the patient undergoing the hemodialysis procedure.	20	100.0	23	100.0	35	100.0
. Evaluate and prepare the vascular access.	20	100.0	23	100.0	35	100.0
. Initiate hemodialysis treatment process.	20	100.0	23	100.0	35	100.0
. Monitor hemodialysis treatment.	20	100.0	23	100.0	35	100.0
. Respond to emergency crisis during hemodialysis.	20	100.0	23	100.0	35	100.0
. Terminate hemodialysis set.	20	100.0	23	100.0	35	100.0
. Disassemble hemodialysis machine.	20	100.0	23	100.0	35	100.0

Table (3):- Expert groups' opinions regarding the hemodialysis unit structure element.

Structure standards	Nursing educators opinions (n=20)		Physician's opinions (n=23)		Nurses opinions (n=35)	
	Agree		Agree		Agree	
	No	%	No	%	No	%
1. Mission.	20	100.0	23	100.0	35	100.0
2. Philosophy and objectives.	20	100.0	23	100.0	35	100.0
3. Organization.	20	100.0	23	100.0	35	100.0
4. Unit policies and procedures.	20	100.0	23	100.0	35	100.0
5. Performance appraisal system.	20	100.0	23	100.0	35	100.0
6. Job description.	20	100.0	23	100.0	35	100.0
7. Hemodialysis unit staffing.	20	100.0	23	100.0	35	100.0
8. Dialysis technician.	20	100.0	23	100.0	35	100.0
9. Documentation system.	20	100.0	23	100.0	35	100.0
10. Guidelines, protocols, standards and pathways.	20	100.0	23	100.0	35	100.0
11. Design of hemodialysis unit	20	100.0	23	100.0	35	100.0
12. Patient's room	20	100.0	23	100.0	35	100.0
13. Facilities, supplies and equipment	20	100.0	23	100.0	35	100.0
14. Communication channels	20	100.0	23	100.0	35	100.0

Table (4): Expert group's opinions related to the outcome standards, competency criteria for patients undergoing hemodialysis.

Outcome standards Criteria:	Nursing educators opinions (n=20)		Physician's opinions (n=23)		Nurses opinions (n=35)	
	Agree		Agree		Agree	
	No	%	No	%	No	%
Maintain the stability of the blood pressure, pulse, temperature and blood sugar.	20	100.0	23	100.0	35	100.0
Maintain vascular access site without any complications.	20	100.0	23	100.0	35	100.0
Accumulate waste products removed.	20	100.0	23	100.0	35	100.0
BUN and creatinine restored to baseline levels.	20	100.0	23	100.0	35	100.0
Electrolytes restored to baseline levels.	20	100.0	23	100.0	35	100.0
Accumulated fluid removed; dry weight restored.	20	100.0	23	100.0	35	100.0
Acid – base balance restored.	20	100.0	23	100.0	35	100.0
Ensure gradual performance of physical activity.	20	100.0	23	100.0	35	100.0
Provide nursing instruction for patients and their families	20	100.0	23	100.0	35	100.0

Table (5): Test- retest, Spearman-Brown Coefficients reliability testing of basic nursing competencies for patients undergoing hemodialysis.

Basic nursing competencies	No. of items	Spearman-Brown Coefficients
Ensures that all staff follows ethics and a patient's right in the hemodialysis unit.	5	1.0
Ensures that all staff follows professionalism.	17	1.0
Ensures that the hemodialysis unit environment is ready to receive the patient.	37	0.99
Ensures that the hemodialysis unit environment is safe to receive the patient.	21	0. 94
Ensures that all infection control measures are properly followed in all procedures.	65	1. 0
Ensures that all persons are properly attired for hemodialysis.	8	1.0
Assemble and setup hemodialysis machine.	31	1.0
Ensures that all required health in for are given to new patient on hemodialysis.	28	0. 95
Perform pre-evaluation for the patient undergoing the hemodialysis procedure.	60	1.0
Evaluate and prepare the vascular access.	28	0. 95
Initiate hemodialysis treatment process.	29	1.0
Monitor hemodialysis treatment.	20	1.0
Respond to emergency crisis during hemodialysis.	108	1.0
Terminate hemodialysis set.	36	1.0
Disassemble hemodialysis machine.	13	1. 0

Table (6): Test- retest, Spearman-Brown Coefficients reliability testing of the hemodialysis unit structure standard items for patients undergoing hemodialysis.

Hemodialysis unit structure	No. of items	Spearman-Brown Coefficients
1. Mission.	1	1.0
2. Philosophy and objectives.	7	1.0
3. Organization.	6	1.0
4. Unit policies and procedures.	19	1.0
5. Performance appraisal system.	3	1.0
6. Job description.	14	1.0
7. Hemodialysis unit staffing.	11	1.0
8. Dialysis technician.	5	1.0
9. Documentation system.	23	1.0
10. Guidelines, protocols, standards and pathways.	9	1.0
11. Communication channels	4	1.0
12. Design of hemodialysis unit	21	1.0
13. Patient's room	18	1.0
14. Facilities, supplies and equipment	59	1.0

Table (7): Test- retest, Spearman-Brown Coefficients reliability testing of hemodialysis outcome standards of competency criteria for patients undergoing hemodialysis.

Hemodialysis outcome	No. of items	Spearman-Brown Coefficients
1. Maintain the stability of the blood pressure, pulse, temperature and blood sugar.	3	1.0
2. Maintain the stability of the all body system conditions.	1	1.0
3. Maintain vascular access site without any complications.	2	1.0
4.Accumulated waste products removed and accumulated fluid removed; dry weight restored.	8	1.0
5. Electrolytes restored to baseline levels, Acid – base balance restored, BUN and creatinine restored to baseline levels.	6	1.0
6. Ensure gradual performance of physical activity.	4	1.0
7. Provide nursing instruction for patients and their families	2	1.0

DISCUSSION

Standards are a formal mechanism designed to ensure that nursing practices are consistent with the delivery of effective critical care services. They are also useful in the designing of critical care units as well as in the development and evaluation of orientation, continuing education and quality improvement programs. Additionally, the standards of care informed the professional nurses, other health professionals and consumers of the expectations for critical care nursing practice. However, the board of directors of the **Canadian Association of Critical Care Nurses** (CACCN) views the development of standards as an important means of demonstrating professional accountability. ***(Patricia, 2006).***

In **2004; Parsly** added that developing standards of pre, during and post hemodialysis nursing interventions will enable nurses to identify deficiencies in the provision of care, and compare their performance with required performance established in the standards. Furthermore, if the standards of pre, during and post hemodialysis nursing interventions are set clearly, this demonstrates what nurses need to do to provide an acceptable level of care through use performance checklists of the procedures most commonly applied to the hemodialysis unit derived from the standards.

According to **Donabedian's** structure-process-outcome model which is used as a framework for quality assessment, is illustrated the link between structure, process and outcome in the present study. "Before assessing quality of care, the nurse should be aware of quality definition and this depends on whether one assesses only the performance of practitioners or also the contributions of patients and health care system. Moreover, detailed information about the causal linkages among the structural attributes of the settings in which care occurs, so the processes of care, and the outcomes of care is needed" ***(Donabedian,1997; Parsly, 1994; Marquis & Huston, 2006).***

In relation to the process standards; this study showed the importance of the developed fifteen comprehensive basic nursing competencies namely; caring and competent nursing care are provided for each patient, ensure that all staff follows ethics and patient's right in the hemodialysis unit, ensure that all staff follows professionalism, ensure that the hemodialysis unit environment is ready to receive the patient, ensure that the hemodialysis unit environment is safe to receive the patient, ensure that all infection control measures are properly followed in all procedures, ensure that all personal are properly attired for hemodialysis, assemble and setup hemodialysis machine, ensure that all required health education is given to new patient on hemodialysis, perform pre-evaluation for patient undergoing hemodialysis procedure, evaluate and prepare the vascular access, initiate hemodialysis treatment process, monitor hemodialysis treatment, respond to emergency crisis, terminate hemodialysis set and disassemble hemodialysis machine. All the experts agreed upon the process standards.

This finding is in line with **Mahmoud (2011)** who reported that the process related to nursing care for hemodialysis patients should be based on the national guidelines of care for hemodialysis nurses in Egypt and the Canadian Association of Nephrology

Nurses and Technologists (CANNT) standards of practice. Accordingly, the processes of nursing care are divided into 6 main sections; direct nursing care for patients undergoing hemodialysis, care of intradialytic problems, infection control, health education to the patient and family, collaboration with other health care members, and facilitation of quality assurance in the unit.

Moreover, ensures that all staff follow ethics and patient's right in the hemodialysis unit was agreed upon by all experts. This result is in line with **Fariched (2009)** and the American nurses association (A.N.A) code of ethics for nurses who stated that the professional nursing responsibility consists of the following elements; the professional nurse's obligation to protect the patient's right to safety, the professional nurse's role as the patient advocate, protection of the patient from incompetent, unethical, or illegal action practice and professional nurse's obligation to maintain the highest level of competency in nursing practice through continuing education activities.

Also in the present study, all experts agreed with divided hemodialysis care into the three phases; including the pre, during and post hemodialysis care. This finding is in line with **Mahmoud (2011)** who reported that contribute to direct patient care is subdivided into three phases (the pre dialysis phase, during phase and the post phase

Furthermore, the results of this study revealed that all experts agreed upon all process competencies related to pre hemodialysis nursing care including; assemble and setup hemodialysis machine, ensure that competent nursing evaluation is provided for each patient before undergoing hemodialysis procedure, ensure that all nurses evaluate and prepare the vascular access and ensure that all nurses initiate hemodialysis treatment process. This finding is in line with **Walsh (2002); Hogan & Madayag (2004)** and who emphasized that in the pre dialysis phase, the hemodialysis nurses are responsible for carrying out comprehensive pre dialysis assessments. This assessment includes: assessing the patient for vital signs, body weight, vascular access condition, skin color and integrity, baseline fluid status, mental status, complications, changes in status since the most recent treatment, and current laboratory results. They also prepare the equipment, the patient, and the machine to initiate the hemodialysis session. This is supported by **Thomas & Macdonald (2008)** who stated that the priming and rinsing of the extracorporeal circuit is a critical process in the preparation of the dialysis machine to remove air from the bloodlines and the dialyzer membranes.

Moreover the results of the present study are congruent with the **American University of Beirut Medical Center (2006)** which reported that the hemodialysis nurses have an essential role in ensuring conformity to the hemodialysis standards and providing effective and safe patient care. Throughout the treatment process, before dialysis, the nurse assists patients and their families in meeting the challenges they face, encouraging them to feel strong, able, and ready to live a normal productive life. Also, hemodialysis nurses play a vital role in providing efficient, coordinated, and focused patient care.

Although all experts agreed upon all process competencies related to nursing care during the hemodialysis nursing care, including; ensure that all infection control

measures are properly followed in all procedures, ensure that all nurses monitor the patient during hemodialysis treatment and ensure that all nurses respond to emergencies crisis during hemodialysis. This results are in line with **Smith et al. (2004); Timby & Smith (2010)** who stated that in the during phase nurses are responsible for applying infection control measures during needle insertion into the fistula or graft, taping intravenous (IV) tubing securely to the patient extremity, obtaining blood for laboratory analysis, priming the extracorporeal circuit with blood, taping connections securely, giving the correct dose of heparin, noting time of dialysis, checking the patient's vital signs once dialysis has been initiated and then every 30 min. Also, nurses are responsible for observing the rate of flow, composition and temperature of the dialysate and the clotting time, assessing the general condition of the patient and the presence of any complications during hemodialysis, giving medications, responding to all alarms immediately and documenting all observations and interventions.

This result is supported by **Potter & Perry (2001)** who stated that good health depends, in part, on a safe environment practices or techniques that control or prevent transmission of infections, and protect the patient and health care workers from disease and **Taylor et al. (2001)** stated that the effectiveness of infection control practice depends on the nurse's conscientiousness and consistency in using an effective aseptic technique and implementing infection control practices. Nurses can intervene in and positively affect a patient's outcome by assessing the person at risk, selecting appropriate nursing diagnosis, planning, and intervening to maintain a safe environment

Furthermore, the results of this study revealed that all experts agreed upon process competencies related to post hemodialysis nursing care, including ensure that all nurses terminate hemodialysis set, ensure that all nurses disassemble the hemodialysis machine. Similar results were found by **Black & Hawks (2005); Morton et al. (2005)** who emphasized that in the post hemodialysis care phase, nurses are responsible for terminating the session by clamping the arterial line and returning the blood in the dialyzing circuit line to the patient as much as possible, applying sterile dressing to the needle sites and observing the area for bleeding. In addition to checking and recording vital signs and weight, and recording patient responses to the session, initiating interventions related to abnormal blood pressure or inadequate fluid removal and documenting all administered medications, they provide or supervise the cleaning of the dialysis machine. Also, this result is supported by **Thomas & Smith (2006)** who stated that throughout each dialysis session, nurses participate in emergency interventions as needed and provide physical and emotional support for patients and their families.

In this respect, **Marquis & Huston (2003); Othman (2007)** stated that the process standards deal with methods of providing services. Process standards and their criteria set out the level of performance expected from each nurse. This reflects the most important process for creating clinical tools such as guidelines, standard steps for all nursing procedures, care maps and clinical pathways.

Furthermore, **Aiken et al. (2002) and, Thomas and Macdonald, (2008)** stated that the Nursing Organization and Outcomes Model "registered nurse [RN] staffing levels influence the ability of RNs to care for patients, therefore affecting surveillance and process of care. Process of care, in turn, directly affects patient outcomes. Consequently, higher levels of RN staffing are proposed to result in better patient outcomes and fewer adverse patient events". Moreover the **American Nurses Association (ANA) (2004)** has adopted standards of clinical nursing practice outcome, which include standards that focus on nursing care, practice, and professional performance.

Moreover, **Kongstvedt (2003) and Peabody et al. (2006)** reported that the process means the interaction of events and interventions that take place during the delivery of care to the patient. For example, process can be measured during the patient stay in the hospital. However, measuring process is very difficult, especially in the developing countries. This may be related to lack of measurement criteria or the absence of reliable and valid measurement tools.

Regarding the outcome standard competencies in the present study, all the experts agreed upon nine comprehensive competencies regarding the nursing evaluation for the following conditions; maintain stability of the blood pressure, pulse, temperature and blood sugar, maintain vascular access site without any complications, accumulated waste products removed and fluid and electrolytes removed, restored to baseline levels the acid base balance and restored BUN and creatinine to baseline levels, restored dry weight, ensure gradual performance of physical activity and provide nursing instruction for patients and their families.

This result is inconsistent with **Kallenbach et al. (2005)** who emphasized that standards of clinical practice for nephrology nursing specify a desired patient outcome including, identify the nursing management aspects of care including assessment parameters (e.g., assess vascular access for patency and evidence of complications) and assess nurses interventions including, use of aseptic technique in handling vascular access, and implement patient teaching about maintain the sterile pressure bandage for at least 2 hours after the removal of the dialysis needle. In addition, **Ahmad (2009) and Linton (2012)** reported that the positive patient outcomes for hemodialysis are highly dependent on complication-free vascular access.

This finding is supported by **Rybak & Bush (2000) and Linton (2012)** who stated that the outcome standard concerned with the final results of care delivered as a result of established structure and process standards. It measures changes in the patient health status as a result of nursing care, medical care or other services offered to the patient. **Moorhead et al. (2008)** stated that the patient outcomes had been used to evaluate the quality of nursing care. These outcomes included the changes in the behavioral and physical characteristics of the patients.

Also, our findings are supported by **Moorhead et al. (2008)** who stated that the outcomes focus on nursing care and include indicators for measuring success with the nursing interventions. This was and explained by **Moorhead et al. (2004)** who emphasize that measuring the outcomes and changes in the patient's health status over

time provides feedback, so nurses can modify interventions as needed to improve the quality of patient care and organizational performance.

Moreover the results of the present study are in line with **Ead (2007); Mahmoud (2011) and Abed Mowla (2012)** according to Spearman-Brown reliability test the developed standards of care for patients undergoing maintenance hemodialysis had high reliability. This finding is supported by **Keser et al. (2013)** who stated that Spearman-Brown is an equation for making a correlation to a reliability estimate that was calculated by the split – hall method, which is a method estimating the interval consistency (reliability) of an instrument. It was as well explained by **Tantawy (2004) and Mahmoud (2011)** who stated that quality of practice should be conforming to standards of care, which are considered as a starting point for better practice because hemodialysis patients are vulnerable to complications before, during and after treatment. So, nursing interventions have a great impact on reducing risk for complications and potential to promote health in the presence of end stage renal disease (ESRD).

As regards structure standards, the results of the present study revealed that all experts agreed upon all developed fourteen comprehensive competencies related to the unit mission for care, philosophy and objectives, plan of the organization, policies and procedures manual, performance appraisal system, job description for the nursing staff, sufficient number of well trained personal (multidisciplinary), established system for administrative records and reports, guidelines, protocols, standards and pathways for quality of hemodialysis patients care, communication channels, unit design(condition of physical environment) and appropriate supplies and equipment to deliver competent hemodialysis patients care. This finding was in line with **Gallin & Lothschuetz (2000); Kurtzman et al. (2008),** who stated that structural standards establish guidelines for organizational patterns and supports for providing health care. These standards include the mission, philosophy, goals, policies, objectives, and job description of the organization/department. Structural standards also include the physical, financial, and organizational resources required for delivering care to the patient, the number of personnel and their educational backgrounds, and assigned responsibilities.

Moreover, the result of the present study was explained by **Kallenbach et al. (2005),** who reported that in the United States, each dialysis facility has written policies and procedures that guide staff members in clinical practice and patient care, and that monitor established standards of care, quality assurance, equipment and maintenance standards, reuse, and any pertinent medication or treatment protocols. These policies are written by the dialysis team and approved by the facility and nursing administrator, as required by the Joint Commission on Accreditation of health care Organization (JCAHO) for a special care unit. Also **El-Malah, (2010)** stated that those standards have been structured to be inclusive of all levels of nursing care providers in all varieties of settings. **Ellis & Hartley (2008)** added that each standard is accompanied by a set of specific criteria that can be used for evaluating whether

that standard has been met. Also, this result was supported by **The Egyptian Ministry of Health and Population, (1998),** report that in Egypt, that there are national guidelines for nursing care that guide nurses' performance in special care units as hemodialysis, critical care and operating rooms. This guideline contains some of the structural requirements in each unit. For example, in a hemodialysis unit there should be a separate area for staff to eat and drink and also a separate bathroom for patients and staff.

Moreover, **Finkelman (2012)** reported that the standards of professional performance, describe a competent level of nursing behavior in the professional role, including activities related to quality of care, performance appraisal, education, collegiality, use of theory and ethics, collaboration, research, and resource utilization. Thus, regardless of specialty, nursing standards are designed to provide information that can be used to guide and measure nursing actions.

Moreover, in the present study structure comprehensive standards emphasized the importance of having a hemodialysis unit job description for a sufficient number of well trained personnel (multidisciplinary team). This is supported by **Senicar (2000)** who stated that nurse staffing is a key driver in delivering safe, quality care at every practical level and in all health care settings. Heath organizations continue to strive to design a staff mix to optimize patient, staff, and organizational outcomes. Also, this is supported by **American Nurses Association** last study **(2012)** which found a growing body of evidence which demonstrates clearly that nurses make the critical, cost-effective difference in providing safe, high-quality patient care.

Furthermore, the structure comprehensive standards in the present study showed the importance of communication channels. This was explained by **Moorhead et al. (2008)** who mentioned that poor communication and collaboration among the health care providers as well as the differing priorities of patient care among them leads to deficits in patient safety and quality of care. **Taylor, (2006)** stated that collaboration between nurses and the other healthcare team increases patient and staff satisfaction, and improves patient outcomes. In the same lien, **Dougherty & Larson (2010); Ignatavicius & Workman (2010)** mentioned that adequate communication between nurses and physicians as well as collaboration between the health care team has been recommended for continuity of care, to reduce medical errors and increase patient safety.

In the present study the structure comprehensive standards stated criteria of hemodialysis unit design, this criteria was in the same line with **Pontoriero et al. (2001); Kallenbach et al. (2005); El-Malah, (2010),** who reported that the environmental structure in hemodialysis units should include room(s) for hemodialysis; each room is equipped with dialysis beds or dialysis chairs and the dialysis machines. Each bed has a minimum space of seven feet linear separation from the other bed to allow access for privacy, adequate supplies for emergency care and routine treatment, easy cleaning of the dialysis machines and clean tidy medicine areas. Also, hand washing facilities, adequate lighting, good ventilation and adjustable temperature should be available in each room. In addition to adequate numbers of cleaning bedside tables and bed side chairs, wheel chairs, adequate supply of linen

and emergency lighting source(battery operated) and appropriate supplies and equipment to deliver competent hemodialysis patients care. Separate room(s) for patients with Hepatitis B or -HIV positive patients. Also one consulting room should be equipped with an examination table and a kit for minor operations and office space for dietitian and social workers who are available on or accessible to the dialysis unit should be available. A waiting room with two toilet areas and a public telephone for pre-and post-dialysis patients, equipped with lounge chairs and at least two small beds should be available. A lounge room for nursing staff, a reception room, and a secretary office should be available. In addition, suitable storage places for sanitary and disposable products should be available as well as storage places for clean, disposable material and biological waste material. Also, an area should be designed to the technical maintenance for the extracorporeal dialysis equipment. Final delivery of treated water, electrical system and drainage should be made available for the dialysis beds.

The present findings are also explained by **Marquis & Huston (2009); Eaton-Spiva et al. (2010)** who emphasized that nurses must work in an environment that encourages empowerment, giving them the opportunity to make most of their talents, creativity, and exploration. Added empowerment occurs when nurses are involved in planning and implementing changes. Similarly, **Laschinger et al. (2009)** mentioned that engagement results from access to job resources in the workplace, such as supportive supervision and development opportunities, and serves as a motivational factor for employee performance. Also, **Draper et al. (2008)** stated that inadequate engagement of staff nurses reduces their support and diminishes the importance of quality improvement. Thus, low scores on collaborative performance may help explain low scores on quality improvement activities.

CONCLUSION:

Based on study findings, it can be concluded that:

1. All of the experts agreed upon the comprehensive competencies of hemodialysis standards structure, process and outcome.

2. The developed hemodialysis standard is highly reliable according to Spearman-Brown confection test.

RECOMMENDATIONS:

1. The developed standards of nursing care for management of patients undergoing hemodialysis should be available in Arabic and English language in all hemodialysis unit and should be revised and updated annually.

2. The appropriate equipment and supplies necessary for safe practice must be accessible for all nurses at all hemodialysis rooms at all time.

3. Job description must be available for all nursing personnel and for workers in the hemodialysis unit for better utilization of nursing capabilities.

4. The distribution of nurses on hemodialysis unit should be done according to the number of patients and dependency needs.

5. The developed standards of hemodialysis nursing interventions for management of patients undergoing hemodialysis should be included in the medical surgical course in the renal disorder unit.

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إعداد معيار للرعاية التمريضية لمرضى الأستصفاء الدموي في مدينة بورسعيد

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الخلاصة

أصبحت المراحل الأخيرة للفشل الكلوي مصدر قلق للصحة العامة في جميع أنحاء العالم كذلك إن الفشل الكلوي بمراحله الأخيرة يتطلب العلاج المتزايد بشكل كبير، في مصر، هناك أيضا زيادة في انتشار وحدوث أمراض الكلي بمراحلها الأخيرة ويشكل ذلك عبئا كبيرا على نظام الرعاية الصحية في مصر. وعلاوة على ذلك لا يوجد معلومات كافية لدى الممرضات عن نوعية الرعاية التمريضية لمرضى الأستصفاء الدموي. وتهدف الدراسة إلى إعداد معيار للرعاية التمريضية لمرضى الأستصفاء الدموي في مستشفى بورسعيد العام و بورفؤاد العام والمبرة . وأجريت الدراسة في وحدات الأستصفاء الدموي ببورسعيد. وقد اشتملت عينة البحث على (الخبراء) تشتمل جميع ممرضات وأطباء وأعضاء هيئة تدريس ذوات خبرة أكثر من 3 سنوات فى الاستصفاء الدموى "العدد الكلى (78) واستخدمت استمارتان في جمع المعلومات ، استمارة الأولى: استمارة استطلاع للرأي (للخبراء) عن المعايير الأساسية للعناية التمريضية الخاصة بمريض الإستصفاء الدموى، الاستمارة الثانية هى استمارة ملاحظة التصميم الهيكلي لوحدة الأستصفاء الدموي.أشارت نتائج هذه الدراسة أن جميع الخبراء (100%) يتفقون على معايير العناية التمريضية لمرضى الأستصفاء الدموي. ، وكذلك وجد أن ومعظم العناصر الخاصة بهيكلية وحدة الاستصفاء الدموى غير متوفرة في المستشفيات، وكذلك كان معامل سبرمان- بروان لقياس محتوى استطلاع الرأي بشان تطوير معايير الأستصفاء الدموي للرعاية التمريضية كانت قيمته عاليه (1.0) . و قد أوصت هذه الدراسة بضرورة وضع معايير للعناية التمريضية لمرضى الأستصفاء الدموي ويجب أن تكون متوفرة بعدد كافي بوحدة الأستصفاء الدموي باللغة العربية والانجليزية وتكون محدثه سنويا

الكلمات الإسترشادية : إعداد معيار- للرعاية التمريضية- لمرضى الأستصفاء الدموي