ISSN: 1343-4292
Volume 140, Issue 03, June, 2022

Nurses' Knowledge regarding Electrolyte Differences and Fluid for Haemodialysis Patients

Ali Hussein Ali Aldakheel[1]

Instructor, Adults Nursing Department College of Nursing, University Of Al Muthanna[1]

ABSTRACT— Fluid and electrolyte imbalances are the most prevalent dialysis complications. As a result, the completion of this research prepares the method via which dialysis nurses care for dialysis patients in accordance with the most recent advances in nursing interventions and enable them to provide a series of instructions to educate patients and allow them to improve their mental and physical abilities and provide them with knowledge of health procedures followed to reduce fluid and electrolyte imbalances and improve patients' ability to Live a normal life. The study aimed to assess nurses' knowledge of electrolyte imbalances and fluid, and to determine the effectiveness of an educational program on their knowledge of fluid and electrolyte differences. The study design is a quasi-experimental design by applying the two groups in the pretest and posttest periods. The study was conducted in Al-Hussein Teaching Hospital from (December 5 / 2019 to January 5 / 2022). The non-probability sample was selected and included (54) nurses working in the Haemodialysis center. Data were collected using a questionnaire regarding dialysis nurses' knowledge of electrolyte imbalance and fluid. The reliability of the questionnaire was selected using Cronbach's alpha which is (0.972) and Pearson's test (test and retest) which is (0.996). Data analysis was performed by applying descriptive statistics (frequency and percentage) and inferential statistics. The research's findings suggested that now the study group of dialysis nurses benefited from implementing the educational program and adequately improving and developing their knowledge. The level of knowledge of the nurses about electrolyte disturbance and fluid of the dialysis patients of the study group was poor in the pretest before the implementation of the educational program, while it increased to a high level once the instructional program has been implemented. The following suggestions were made by the researcher: Expanding nurses' knowledge and Skills by creating scientific videos on electrolyte and fluid abnormalities in dialysis patients and using these films at various levels of education. Conduct additional studies on the implementation of educational programs on nurses' knowledge and practice about dialysis complications. Skillfully train caregivers working in a specialized dialysis center or develop appropriate health education.

KEYWORDS: Effectiveness, Hemodialysis, electrolyte imbalance & fluid.

1. INTRODUCTION

The kidneys are in charge of keeping the body in balance. As a result, kidney failure (KF) frequently causes abnormalities in acid-base balance, electrolyte balance, and fluid balance. Furthermore, the purpose of KF The therapy is to address those imbalances. Renal disease is an illness categorised as whether short or prolonged, and this is the most appropriate manner to present the symptoms of diverse forms. Acute kidney disease (AKD), also known as acute kidney injury (AKI), and chronic kidney disease (CKD) can be minor to severe. Patients with AKI and CKD require hospitalization for best therapy, unless their fluid and electrolyte abnormalities can be handled out patiently. Although there are several forms of kidney illness, Regardless of the underlying cause, many of the essentials of fluid and electrolyte control are the same [1].

Water is the main component of bodily fluids, as are the majority of the chemicals. Water is essential in numerous physiological functions, including Nutrient digestion, absorption, use, and distribution, elimination of wastes, circulation, and hemodynamic support [2].

Fluids and electrolytes were balanced in complicated systems, and these systems assure appropriate operation. Similarly, pediatric patients' fast growth and development is related with From infancy through maturity, pharmacokinetics changed. All of these ongoing dynamic changes must be detected in order to keep fluid of the patient in the level, avoid ionic liquid and fluid imbalances, and enhance medication adherence. Total body water, for example, influences the effect of the state of hydrated on pharmaceutical pharmacokinetic via altering distribution volume. (TBW) [3].

2. METHODOLOGY

A quasi-experimental (Nonequivalent groups) design was used to determine the effectiveness of an educational program on nurses knowledge regarding electrolyte and fluid imbalance in patients on hemodialysis. The study group and control group were evaluated using a pretest and posttest approach. The study began from 5 the December 2019 to 5 January 2022. The study was conducted in Al Muthanna Governorate Al-Hussein Teaching Hospital for hemodialysis. A random a selection of 54 nurses was chosen based on the research criteria and after receiving their agreement. Data Gathering: The data were acquired utilizing a created questionnaire and a structured interview approach with respondents who were group interviewed in hemodialysis The Arabic version of the questionnaire is being used by expert centers. Each sample's interview length ranged from 25 to 45 minutes. The created questionnaire is utilized as a means of data collection as a result of an evaluation of related literature and research. It is divided into two primary sections. Part(I) is made up socio-demographics variables. Part(II) was divided into five of sections that discuss fluids and electrolytes disturbances in patients of hemodialysis.

3. RESULTS

Table (1): Distribution of the Study Samples According to the Demographic Characteristic.

Variables	Groups	Study		Control	
		Freq.	%	Freq.	%
Age	**21 – 27**	**19**	**70.4**	**20**	**74.1**
	28 – 34	2	7.4	1	3.7
	35 – 41	4	14.8	4	14.8
	42 – 48	2	7.4	1	3.7
	49 – 55	0	00.0	1	3.7
	Total	**27**	**100**	**27**	**100.0**
	Mean ± SD	**28.22 ± 7.143**		**28.93 ± 7.780**	
Gender	**Male**	12	44.4	7	25.9
	Female	**15**	**55.60**	**20**	**74.1**
	Total	**27**	**100**	**27**	**100.0**
Marital status	**Single**	9	33.30	6	22.2
	Married	**18**	**66.7**	**20**	**74.1**
	Divorce	0.0	0	1	3.7

ISSN: 1343-4292
Volume 140, Issue 03, June, 2022

	Total	**27**	**100**	**27**	**100.0**
Residence	**Urban**	**21**	**77.80**	**22**	**81.5**
	Suburban	2	7.40	2	7.4
	Rural	4	14.80	3	11.1
	Total	**27**	**100.0**	**27**	**100.0**
Education level	**Nursing Prep graduate**	5	18.5	5	18.50
	Nursing Institute graduate	9	33.3	8	29.6
	Nursing College graduate	**13**	**48.10**	**14**	**51.9**
	Total	**27**	**100**	**27**	**100.0**
Experience years	**1 – 6 Years**	**20**	**74.1**	**21**	**77.8**
	7 – 12 Years	3	11.1	3	11.1
	13 – 18 Years	2	7.4	2	7.4
	≥ 19 Years	2	7.4	1	3.7
	Total	**27**	**100.0**	**27**	**100.0**
Training courses	**No training**	**14**	**51.90**	**17**	**63.0**
	1	7	25.9	4	14.8
	2	4	14.8	2	7.4
	3	2	7.4	2	7.4
	≥ 4	0	0	2	7.4
	Total	**27**	**100.0**	**27**	**100.0**
Self-education	**Yes**	**24**	**88.9**	**25**	**92.6**
	No	3.0	11.10	2	7.4
	Total	**27.0**	**100**	**27**	**100.0**
Sources of self - education	**Non**	3.0	11.10	2	7.4
	Social medias	**14**	**51.90**	**9**	**33.3**
	Scientific sites	3	11.10	5	18.5
	Books & lectures	3.0	11.10	6	22.2
	Library	0.0	0	1	3.7
	S.M and S.S	0.0	0	1	3.7
	S.M, S.S and B.L	1.0	3.70	1	3.7
	S.S and B.L	1.0	3.70	1	3.7
	All	2.0	7.40	1	3.7
	Total	**27.0**	**100**	**27**	**100.0**

The majority of nurses in both groups were between the ages of 21and 27 (Mean SD 28.57 7.406), accounting for 70.40 percent of the study group and 74.1 percent of the control group. Regarding the majority of the gender were female, closed to 55.60 percent of the study team and 74.10 percent of the control team. Furthermore, both the research and control groups had a larger percentage of married nurses (66.7 percent and 74.1 percent, respectively). the majority of the samples (study and control groups) lived in cities (77.8 percent & 81.5 percent respectively). the larger percentage of the two samples (study and control groups) are (48.1 percent) and (51.9 percent) Nursing College graduates, respectively.

The great majority of nurses in both populations (study and control groups) (74.1 percent) (77.8 percent) had experience years within a 1 - 6 year gap. In training courses, the most of nurses, of the study group

(51.9 percent) and the control group (63 percent) had none. With self-educations, the most sample from the study group and the control group self-educate, with percentages of (88.9 percent) and (92.6 percent) respectively. Finally, in terms of self-educations sources, social-media received the most of responses in both the research and control groups, with percentages of 51.9 percent and 33.3 percent, respectively. In terms of effectiveness, there is no significants statistical differences between both of them.

Table (2): Nurses' knowledge of the major fields of nursing is assessed electrolyte imbalance and fluid during the pretest period for the study and control groups.

No	Domains regarding to Knowledge's of Nurses':	Studied Pre No=27			Control Pre No=27			t	Sig.	C. S
		M..S	R..II	A.s.s	M.S	RII	Ass.			
1.	Kidney disease and the dialysis procedure	1.530	0.504	M	1.714	0.565	M	5.586	.000	S
2.	Dialysis patients' fluid volume imbalances	1.161	0.383	M	1.197	0.395	M	1.840	.087	N.S
3.	Electrolytes and the right amounts for the patients	1.12	0.37	M	1.146	0.378	M	1.000	.334	N.S
4.	Disturbances in electrolytes	1.177	0.388	M	1.242	0.409	M	2.813	.020	S
5.	Electrolyte Disorders: Nursing Intervention	1.121	0.369	M	1.176	0.388	M	2.036	.056	N.S
Total mean		1.15		L.M.S	1.194		L.M.S	2.379	.025	S

Table (2) shows that at the pre-test, the mean score and Relative Importance index (rii Indexes of nurses' knowledge throughout all items for both the study and control groups were poor for the mean score and moderate for the Relative Important Indexes grades (low,moderate,high). Furthermore, this table shows that there are no significant differences between the study and control groups in the majority of categories linked to nurses' understanding of electrolytes imbalances at pretest.

Table (3): The effectiveness of an educational program on Hemodialysis nurses'knowledge of key domain of fluids and electrolytes imbalances in the studied group at pretest and posttests.:

No.	Domains regarding to Knowledge of Nurses':	Studied-Pre No=27			Study-Post No=27			t	Sig.	C.S
		M..S	R..II	A.s.s	M.S	R.II	Ass.			
1.	Kidney disease and the dialysis procedure	1.53	0.504	M	2.948	0.972	H	9.274	.000	S
2.	Hemodialysis patients' body fluid problems	1.161	0.383	M	2.85	0.940	H	32.528	.000	S

ISSN: 1343-4292
Volume 140, Issue 03, June, 2022

3.	**Electrolytes and the right amounts for the patients**	**1.126**	**0.371**	**M**	**2.889**	**0.953**	**H**	**42.831**	**.000**	**S**
4.	**Disturbances in electrolytes**	**1.177**	**0.388**	**M**	**2.821**	**0.930**	**H**	**30.433**	**.000**	**S**
5.	**Electrolyte Disorders: Nursing Intervention**	**1.121**	**0.369**	**M**	**2.868**	**0.946**	**H**	**52.453**	**.000**	**S**
Total mean		**1.15**		**L.M.S**	**2.87**		**H.M.S**	**41.900**	**.000**	**S**

Table (3) shows that the average score, as well as the Relative Important Index of Nurse Knowledge were greater in posttest than in the pretest for the study group on all items, as evidenced by the overall mean score and Relative Important Index grades (low, moderate, high). Furthermore, the chart shows that there are substantial variations in the study group's general understanding of between the pretest and posttest results, there is electrolyte and a fluid imbalances.

3.1 Discussing the Demographics of the Hemodialysis Unit Nursing Staff (Study and Control Groups)

The most of the studies group were ages of (21--27), according to the research findings in Table (1). They constitute 70.40% of the studies group and (74.10) percent members of the control group. This conclusion is in line with the findings of [4], observed that almost two third (62.50 percent) of nurses ages ranged of (20 to30), with a mean age of (25.776.320) years. Furthermore, this conclusion supports the findings of [5] who observed that the bulk of the research sample (40 percent) was made up of young people. This study contrasts with the findings of [6] the most of nursing staff (72percent) They were still under the ages of sixty three. These findings, according to the investigator, imply that that the age of nurses is crucial in relation to improving knowledge and behaviors. Nurses, that are younger had higher aspirations, put in more work.

The majority of nursing personnel at health clinics Females made up (55.60) percent of the study and (74.1percent) of the control groups, respectively. This is congruent with the findings of [7] revealed that around half of his samples 53.80% was female, with the balance being men. According to [6] the majority (82.50 percent) of hemodialysis nursing personnel are females (2017). While this data varies with [5] who discovered that 53.3 percent of hemodialysis nurses in a research done in Baghdad Teaching Hospitals were guys.

The bulk of the population is married, with 66.70% of the study team group and 74.10% of the comparison group married. The conclusions of this investigation confirmed the notion of [7] who reported the most of the samples (70 percent) was married. This study backs up the findings of [4], who reported that The majority of health workers (68.75 percent) were marriage. These, according to the study, statistics show that the ages groups is marrying, particularly following completing their studies and obtaining a career in the field of nursing. Where Iraqi youngsters choose to marry after graduating from school and the availability of professional options Single nurses, on the other hands, have no other interests they are just concerned with their job.

In term of clinical expertise yrs, the majority of the nurses had 1 to 6 years of experience, with a ratio of (74.10%) in the research groups and (77.80%) in the group of control. related to [7] 46.3percent of the

studied team had (1-5)years of clinical experience. Furthermore, that data confirms [5] finding that the most of the nursing staff (40 percent) had a year of hospital experiences. These data show, according to the researcher, that the fact that nurses cycle from one to other units insides the clinic may justify the year early of work experiences in dialysis unit. As nurse is younger, the results mentioned would has a higher preparedness grow their practices and knowledge when comparing to another nurse in the older team.

Per the findings, the bulk of the study population lacked training sessions., representing for (51.90percent) of the research team and (63percent) of the controlling samples. That conclusion is accepted with the findings of [7] who discovered that the more than half of the research population (66.3%) lacked access to hospital-based hemodialysis trainings. This study confirms the view of [11] found that a most of the nursing studied did not receive related courses. This might be due to the fact that their facility emphasizes infection control training above dialysis courses. According to the report, all dialysis nurses should participate in training program to enhance their awareness and competency throughout all areas of dialysis. This might be due to the fact that the hospital emphasizes infection prevention and control training above dialysis courses.

The most samples of study participating's in different forms of self, and this result was matched for (88.90 percent and 92.60 percent, respectively) for the research group and group of control. This conclusion is same with the resulting of a study catches by [13] which discovered which the bulk of nurses of dialysis selfe-educate. This conclusion is congruent with the findings of the study [10] which discovered that the most of nursing staff (40 percent) participate in onset educations.

In terms of personal, the most of the sample samples uses social-medias to educate oneself, representing for (51.90) percentage of the study group and 33.30 percent of the group of control. This conclusion is congruent with the findings of a study catches by [14] which discovered that the majority of dialysis nurses rely on social networking websites for self-education. This conclusion is congruent with the findings of a study holded by [15] which discovered that the majority of nurses of dialysis nurses on social-networking websites for self-educations.

3.2 Discussions of the Pre - test Phase Assessments of Nurse's Knowledge Related to the Domains of Fluid and Electrolytes Imbalances for the Group and Control Group

Table(2) revealed that previous to intervention, the examined nurses have an insufficient levels of knowledge the about education programs items, with the average rating and Relative Importance index Score of nurse' knowledge for all items both in study and control groups being moderate. According to the study's results, previous to the introduction of the education programme, nurses' knowledge of Kidney Damage and Hemodialysis, Electrolytes Disorder, and Adequate Quantities of Electrolytes for Patients was inadequate. There are no discernible distinctions between both the two groups. According to the study, caregivers do not have the knowledge to assist with renal dysfunction, hemodialysis, and electrolytes abnormalities. As according [10] before to treatment, (61.50) percent and 53.8 percent of the investigated nurses, respectively, showed a low level of knowledge connected to general science questions and (65.3 percent, 69.2 percent, and 76.9 percent) related to specific knowledge items.

3.3 Discussions of Effectiveness of an Educational Program on Hemodialysis Nurses' Knowledge for Study Group at Pretest and Posttest

The educational program was effective in the study group (table 3), as evidenced by a high percentage of hemodialysis nurses responding to questions about fluid and electrolyte imbalance in HD patients and the majority of nurses in the study group passing the post-program test compared to the control group. Tables (3) show that there is a high level of knowledge (2.87) for nurses in the study group after executing the

educational program, however there is no change in nurses' knowledge in the control group between pretest and posttest in terms of total mean scores.

The posttest is given to both groups immediately following the end of the educational session. The results of this test's data analysis show that there is a substantial difference between the study and control groups. This demonstrates that as a result of their exposure to the program, nurses' knowledge in all domains improved in the research groups. The impact of the educational program on Nurses' knowledge is evaluated using a scoring analysis of mean score. The results show that the study group's post-test knowledge scores are greater than the control group's.

These findings, according to the study, show that nurses who practice with HD have a limited understanding of renal failure and hemodialysis problems and treatment. As a result, hemodialysis nurses should take a refresher course on a regular basis to keep their expertise up to date.

This finding is supported by [9] who said that the most of nurses polled had satisfactory understanding of the concept of hemodialysis and that more than half had satisfactory knowledge of evaluating the patient's health before to dialysis.

This finding is supported by [16] who demonstrated that most nurses lacked appropriate understanding of the early identification of (AKI), implying that training courses for the prevention and detection of early AKI should be designed and implemented.

4. Conclusions

The following conclusions have been formed based on the current study findings and the discussion and interpretation of the data:

- According to the research, the most of dialysis nurses are females between both the ages of 21-27 who graduate from nursing schools. Have (1-6) year of healthcare experience and without having participated in any hemodialysis trainings produced or established by hospitals in Iraq or abroad. According to the study, the most of the nurses whom participating in the study were marriage, resided in cities, and utilized social networks for self-education.
- The research group's nurses' degree of expertise awareness of electrolytes and fluids disturbances in Patients on hemodialysis was low before the training program was implemented, but it increased to a high level after the program was implemented.
- The control group's nurses' awareness of fluid and electrolyte disturbances in hemodialysis patients was low in the pretest and remained low at the posttest.
- A substantial relationship this between nurses' knowledges of fluid and electrolyte abnormalities in hemodialysis patients and their age range, relationship status, level of learning, year of healthcare experience, and source of self-educations during the pretest period.
- There is a strong the connection between nurses' knowledge of electrolytes abnormalities and overall efficiency with dialysis patients, and also relationship status and level of education, in the posttest period.

Recommendations: Based on the study's results and conclusions, the researcher suggests the following:

- Establishing and developing the specialized Center with the required equipment to serve hemodialysis patients with full health care.
- A special and lengthy continuous education program involving electrolytes and fluid disturbances

in dialysis patients should be developed and put in place for nursing staff in hemodialysis facilities.

- Improving nurses' practices and knowledge through the creation of scientific videos about electrolytes and fluids abnormalities in dialysis patients and their use in various teaching settings.
- Creating a brochure on fluid and electrolyte abnormalities in hemodialysis patients to all staff nurses in hemodialysis units.
- The availability of research materials, as well as a focus on the need of inspiring nurses in the dialysis department to educate about dialysis problems.
- Extending study on the use of training programms that teaching nurses about dialysis complications.
- Developing trainings for dialysis professionals who operate in specialist health clinics, as well as teaching staff about hemodialysis health.

5. References

[1] Fehrman-Ekholm I, Kvarnström N, Söfteland JM, et al: Post-nephrectomy development of renal function in living kidney donors: a cross sectional retrospective study. Nephrol Dial Transplant 26(7):2377–2381, 2011.

[2] Goraya N, Wesson DE. Does correction of metabolic acidosis slow chronic kidney disease progression? Curr Opin Nephrol Hypertens. 2013;22(2):193-197.

[3] Zoccali C, Moissl U, Chazot C, Mallamaci F, Tripepi G, Arkos¬sy O, et al. Chronic Fluid Overload and Mortality in ESRD. J Am Soc Nephrol. 2017 Aug;28(8):2491-2497.

[4] Yousef YE, Elashir UM, Mahmoud SR. The effect of nursing educational program on knowledge and practice of nurses regarding infection control measures for children under hemodialysis. Egyptian Nursing Journal. 2019; 16(1–9).

[5] Bakey SJ. Evaluation of nurses' practices throughout hemodialysis treatment for patients in hemodialysis unit at Baghdad teaching hospitals. Kufa Journal for Nursing Sciences. 2014;2(2):1-16.

[6] Yousif KI, Abu-Aisha H, Abboud OI. The effect of an educational program for vascular access care on nurses' knowledge at Dialysis Centers in Khartoum State, Sudan. Saudi J Kidney Dis Transpl. 2017;28(5):1027-35.

[7] Mahmood, W.: Assessment of Nurses' Knowledge Toward Vascular Access for Patients with Hemodialysis at Baghdad Teaching Hospital. Thesis University of Baghdad, College of Nursing, 2016. p.13.14.53.

[8] Almashhadani, Haider Abdulkareem, et al. "Corrosion inhibition behavior of expired diclofenac Sodium drug for Al 6061 alloy in aqueous media: Electrochemical, morphological, and theoretical investigations." Journal of Molecular Liquids 343 (2021): 117656.

[9] Hassan SA, Sorour AS, Eldahshan KF, Elmoghazy GE.; Nurses Knowledge and Practice Regarding Intradialytic Complications for Hemodialysis Patient, Journal of American Science. 2013;9(11), 300-307 http://www.jofamericanscience.org.

[10] Soheir Tawfeek Ahamed, Salwa Abd El Gawad Sallam American Journal of Nursing Research.

2018, 6(5), 237-243 doi:10.12691/ajnr-6-5-4 https://www.researchgate.net/publication/326206818_The_Effect_of_Nursing_Instructions_on_Nurses'_Knowledge_Practice_and_Suggestions_Regarding_Adverse_Events_in_Hemodialysis.

[11] Sousa M., Camargo A., Bezerra A., Freitas J. and Miasso A. (2013). Adverse events in hemodialysis: reports of nursing professionals. Revista da Escola de Enfermagem da USP. Feb Vol. 47. No.1.

[12] Almashhadani HA, Alshujery MK, Khalil M, Kadhem MM, Khadom AA. Corrosion inhibition behavior of expired diclofenac Sodium drug for Al 6061 alloy in aqueous media: Electrochemical, morphological, and theoretical investigations. Journal of Molecular Liquids. 2021 Dec 1;343:117656.

[13] Dhiraj Narayan Manandhar, Pramod Kumar Chhetri, Prakash Poudel, Samir Keshari Baidya, Krishna Kumar Agrawaal(2017), Knowledge and Practice of Hemodialysis Amongst Dialysis Nurses, J Nepal Med Assoc 2017;56(207):346-51. file:///C:/Users/IT/Downloads/3244-01.ManuscriptArticleText-8494-1-10-20171012.pdf.

[14] Zamani-Alavijeh, F., Araban, M., Harandy, T.F. et al. Sources of Health care providers' Self-efficacy to deliver Health Education: a qualitative study. BMC Med Educ 19, 16 (2019). https://doi.org/10.1186/s12909-018-1448-z

[15] Mona Soliman, Yassin S. Ibrahim, Noha A. Osman, Hoda I. Rizk, And Salma A. Seddik, Assessment of Infection Control Knowledge and Practices among Hemodialysis Nursing Staff in Kasr Al-Ainy Hospitals, Med. J. Cairo Univ., Vol. 86, No. 3, June: 1649-1656, 2018.

[16] Nascimento RA, Assunção MS, Junior JM.; Nurses' knowledge to identify early acute kidney injury, Rev Esc Enferm USP. 2016;50(3):399-404. DOI: http://dx.doi.org/10.1590/S0080-623420160000400004.