Competencia clínica del personal de enfermería para el manejo de la hipotensión arterial intradialítica en el servicio de hemodiálisis del Centro Médico Naval

Clinical competence of nursing staff for the management of intradialytic hypotension in the hemodialysis service of the Naval Medical Center

Ángel Citalán Morales   ID   Isidora Gallardo García   ID   Jesús López Rivera   ID

Resumen

Introducción: el correcto manejo de la hipotensión arterial durante la hemodiálisis es fundamental en la formación y trabajo del personal de enfermería nefrológica del Centro Médico Naval. El personal debe tener conocimientos suficientes sobre la hipotensión y sus factores asociados que le ayuden a predecirla y actuar de manera preventiva, así como con habilidades instrumentales para llevar a cabo medidas en la práctica.

Objetivo: analizar la competencia clínica del personal de enfermería en el servicio de hemodiálisis del Centro Médico Naval con respecto a su formación académica y experiencia profesional en el manejo de la hipotensión arterial intradialítica.

Metodología: estudio prospectivo, descriptivo y observacional. Se emplearon dos instrumentos: una adaptación del Cuestionario de conocimientos para el manejo de hemodiálisis de Miller y la Guía de observación de habilidades instrumentales en el personal de enfermería de Murillo.

Resultados: se contó con una muestra de doce enfermeros pertenecientes al servicio de hemodiálisis. El 33.3% mostró un nivel regular de competencia clínica y 66.7% un nivel bueno. En promedio, la competencia clínica se ubicó en 78%.

Correpondence: Ángel Citalán Morales
Email: angel210890@hotmail.com
Naval Medical Center (CEMENAV)
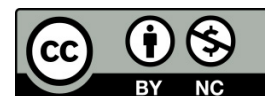
Discusión: los resultados obtenidos difieren de los reportados en otras investigaciones, tanto por el año de aplicación como de los sujetos evaluados.

Limitaciones: se contó con una muestra baja debido a que el personal del servicio no es numeroso.

Conclusiones: es necesario reforzar los conocimientos del personal sobre el tema. Sin embargo, se observó que las habilidades instrumentales fueron excelentes en todos los casos. No se observa relación con el nivel de estudios o la experiencia profesional.

Palabras clave: hipotensión; hemodiálisis; competencia clínica

Abstract

Introduction: the correct management of arterial hypotension during hemodialysis is fundamental in the training and work of the nephrological nursing staff at the Naval Medical Center. The staff must have sufficient knowledge about hypotension and its associated factors to help them predict it and act preventively, as well as instrumental skills to carry out measures in practice.

Objective: to analyze the clinical competence of the nursing staff in the hemodialysis service of the Naval Medical Center concerning their academic training and professional experience in the management of intradialytic arterial hypotension.

Methodology: a prospective, descriptive, and observational study. Two instruments were used: an adaptation of Miller's Hemodialysis Management Knowledge Questionnaire and Murillo's Guide to Observation of Instrumental Skills in Nursing Personnel.

Results: There was a sample of twelve nurses belonging to the hemodialysis service. 33.3% percent showed a fair level of clinical competence and 66.7% a good level. On average, clinical competence was 78%. Discussion: the results obtained differ from those reported in other studies, in terms of both the year of application and the subjects evaluated.

Limitations: there was a low sample size due to the small number of service personnel.

Conclusions: it is necessary to reinforce the knowledge of the personnel on the subject. However, it was observed that instrumental skills were excellent in all cases. No relationship was observed with the level of studies or professional experience.

Keywords: hypotension; hemodialysis; clinical competence.

Introduction

In hemodialysis treatment, arterial hypotension is one of the most frequently occurring complications.[1] It arises as a cardiovascular response to a significant reduction in plasma volume, i.e., it usually originates when a large amount of plasma fluid is removed in a short period and the remaining substance moves from the interstitial space to the intravascular space. [1] Kidney Disease Improving Global Outcomes (KDIGO) defines this condition as a decrease of more than 20 mmHg in systolic blood pressure (SBP) or more than 10 mmHg in mean arterial pressure (MAP) associated with symptoms.[2,3]

Arterial hypotension is considered of special concern because it produces discomfort in the patient during the extracorporeal dialysis process and generates obstacles to guarantee the success of the treatment. In the most extreme cases, it can generate a risk of death.[4] It is estimated that between 10% and 30% of hemodialytic treatments have shown hypotension at some point. Its management is even more complicated if we take into account that it has a multifactorial origin attributable to a set of variables, such as various comorbidities (for example, a reduced blood reserve in the heart due to coronary disease, the consequences of antihypertensive effects or autonomic dysfunction), and to factors inherent to the dialysis process, among which the management by the nursing staff stands out.[1,5]

As mentioned, during hemodialysis, patient morbidity and mortality and the risk of suffering a hypotension event are significantly increased. To deal effectively with this procedure, the nursing team must train continuously to achieve better technical-scientific skills and develop critical thinking to increase the quality of the service, through efficient performance and better decision-making when hemodialysis emergencies occur. This type of action not only has benefits for the patient but also helps to reduce the implications, complications, and costs that the procedure represents at the institutional level.[6,7]

Hemodynamically, an inadequate response may negatively influence the patient's adaptation and tolerance to hemodialysis treatment, and, therefore, its efficacy will be reduced. This highlights the importance of preventing the emergence of episodes of hypotension in the patient who has undergone this process. In addition, constant episodes of intradialytic hypotension can lead to permanent cardiac alterations, such as left ventricular hypertrophy and reduced arterial distensibility. Among patients constantly undergoing hemodialysis, volume overload, and heart failure are causes of acute myocardial infarction, cerebrovascular events, syncope, and reduced effectiveness of hemodialysis treatment.[7,8]

Nursing interventions in hemodialysis sessions are framed within the actions of integral patient management, from their admission to the dialysis unit until their discharge. Therefore, this process includes the patient's reception, the verification of monitors and facilities, the assembly and priming of the hemodialysis circuit, the previous evaluation of the patient's state of health, the connection of the patient to the monitor through the puncture of vascular accesses, as well as the programming of therapy and nursing care

during the sessions.[1,9] However, the main function of the nursing staff is to continuously monitor the patient to avoid complications. Such monitoring includes control of monitor parameters (conductivity, flow, temperature) and vital signs. Similarly, it is the responsibility of the staff to communicate to the patient the need to report any changes in his / her general condition.[9,10]

There are already some studies that have evaluated the clinical competencies of nursing staff in the management of arterial hypotension during hemodialysis, and some experiences recorded in recent years stand out. In 2017, Lazcano et al.[11] investigated to determine the nursing staff's competencies in the hemodialysis patient. They had a sample of 13 nurses to whom they applied two instruments: one that measured knowledge about hemodialysis with 14 items and another to measure work variables, with 10 dimensions. Among the results, more than half of the sample (77%) knew what to do during an episode of hypotension, which indicates a good level of knowledge on the subject; likewise, the sample was predominantly made up of graduates in nursing. The authors did not perform contrasts between variables.[11]

In 2015, Quirós and Parrales[8] developed a research study to assess the level of knowledge of the nursing staff of a public clinic in Guayaquil, Ecuador. The experimental design was mixed and a knowledge test was applied, that is, an observation guide to determine the nursing staff's scientific-technical knowledge, capacity to apply it, and instrumental skills. Among the findings, the fact that only 15% of those surveyed were aware that

intradialytic hypotension manifests itself episodically stands out; it is also noteworthy that 60% did demonstrate adequate management of hypotensive crises during hemodialysis sessions. Thus, it was concluded that the nursing team was well trained in the application of their instrumental skills; however, there were areas of opportunity in their level of technical-scientific knowledge. It was also concluded that the staff must improve their skills in detecting risk situations when monitoring hypotensive crises, and emphasis was placed on the need to transmit adequate instructions to the patient on the prevention of such crises.[8]

The hemodialysis service of the Naval Medical Center (in Spanich abbreviated CEMENAV) is an area where hemodialysis treatment is performed continuously and its staff is constantly trained in the correct application of the techniques and procedures involved. In the population attended at this health center, arterial hypotension is a frequent complication most of the time that extracorporeal dialysis treatment is provided, and the occurrence of crises is high. Therefore, it is necessary for the nursing staff assigned to the hemodialysis service at CEMENAV TO have better technical-scientific skills on this subject and to develop more critical thinking, since, to the extent that they improve their skills in dealing with frequent complications, they will be able to prevent their occurrence more efficiently or attenuate the effects on the general health of patients treated under this procedure.

It should be ensured that healthcare personnel have adequate training in the assessment and monitoring of the signs and symptoms of hypotension in patients

during hemodialysis. To achieve this, it is necessary to apply instruments that evaluate the competence of nursing personnel in the management of intradialytic hypotension. Therefore, the general objective of the present study was to analyze the clinical competence of nursing staff concerning academic training and professional experience in the care of intradialytic arterial hypotension in the hemodialysis service of the CEMENAV.

Material and Methods

An observational, descriptive, and prospective study was carried out. The research was carried out in the hemodialysis service of the CEMENAV between January and June 2022. Nursing personnel of the aforementioned service, working in the morning and evening shifts, with a minimum seniority of one month and who voluntarily agreed to participate in the study, were selected.

The notion of *"clinical competence"* is complex, multifaceted, and multifunctional. It can be defined as the set of knowledge, skills, and aptitudes of health professionals for the organization, retention, and use of processes and techniques in their academic and work practice. According to various studies,[12,13] the study of clinical competence should be divided into two dimensions: knowledge and instrumental skills of the personnel. Due to this, the variables to be considered in the research were the level of scientific-technical knowledge, level of instrumental skills, academic training, professional experience, and sex.

The variable *"knowledge"* is broken down into two indicators: the technical-scientific knowledge possessed by the nursing staff to carry out their functions, as well as the

integration of knowledge, which refers to their ability to make an adequate diagnosis and design an optimal care plan. Both were evaluated using an instrument adapted from the *"Questionnaire of Knowledge in the Management of Intradialytic Arterial Hypotension"* by Miller[13] and Murillo.[12] The instrument is made up of ten items. The cut-off points considered were: deficient level (equal to or less than 50%, equivalent to 5 or fewer correct answers); regular (level of knowledge between 60 and 80%, equivalent to 6 or 8 correct answers), and excellent (level of knowledge between 90 and 100%, equivalent to 9 or 10 correct questions). As with the instrument, these cut-off points were determined based on an adaptation of the instrument used by Miller[13] and Murillo.[12] The adaptation was made based on expert criteria regarding sufficiency concerning the topic; these are institutionalized cut-off points, determined by the health center where the test is usually administered.

On the other hand, the skill variable is intended to assess the habitual practice of the nursing staff, using the instrument *"Guide for the observation of instrumental skills in nursing staff"* by Murillo.[12] This variable is broken down into seven indicators, each containing a certain number of items to be evaluated. The indicators and the number of items in parentheses are mentioned below: hemodialysis preparation (7), initial patient assessment (8), vascular access preparation (17), vascular access approach (10), connection to the monitor (8), follow-up of the session and resolution of complications (13), and conclusion of the session (12). Because this is an observational guide, time

was required to review how participants performed the hemodialysis procedures. The following cut-off points were used: Excellent (91 - 100%); Good (75 - 90%); Fair (65 - 74%) and Poor (0 - 64%). These were established in Murillo's research12 and taken up again for the present study.

Once the results of both variables (level of knowledge and level of application of instrumental skills) were available, the level of clinical competence would be determined through the averaged integration of the scores obtained in both instruments. For clinical competence, the cut-off points proposed in Murillo's research were used:12 Excellent (91 - 100%); Good (75 - 90%); Fair (65 - 74%) and Poor (0 - 64%).

Initially, nursing personnel were invited to participate in the study. Those who accepted and met the inclusion criteria were 12 persons. All were asked to sign the informed consent form and to answer the printed questionnaire. Additionally, two eight-hour days were used for the observation of each participant for the completion of the application and skills guide. Once this was done, a database was integrated with the information obtained through both instruments.

Descriptive statistics were used to characterize the sample and describe the level of scientific-technical knowledge and instrumental skills that make up the clinical competence of the nursing staff. A contrast was made between the variables of professional experience and level of studies with the level of scientific-technical knowledge and application of instrumental skills, using tables and graphs that reported the frequencies and percentages of the distribution of the sample. Two statistical tests were used: a Spearman correlation to determine the association between level of knowledge and years of work experience, and a Chi-square for the correlation between level of knowledge and level of studies. The data obtained were recorded through a Microsoft Excel spreadsheet and subsequently imported into the specialized software Statistics Package for the Social Sciences (SPSS), version 26.0 for Windows.

Results

Of the 12 participants who made up the study sample, 33.3% were men and 66.7% were women. Regarding the age of the participants, 41.7% were older than 35 years of age, 33.3% were between 31 and 35 years of age, and the remaining 25.0% said they were between 26 and 30 years of age. The minimum age of the participants was 27, the maximum was 49, and the average age was 35.67, with a deviation of ±6.315.

It was observed that 50% of the nurses interviewed had more than 10 years of work experience, 33.3% had 6 to 10 years, and the remaining 16.7% had 1 to 5 years. The minimum time of work experience was 2 years, the maximum was 27 years, and the average was 12.75 years. Regarding seniority in the hemodialysis service, 41.7% of the study participants had more than 10 years of seniority, 8.3% had 6 to 10 years, 25.0% had 1 to 5 years, and the remaining 25.0% had less than one year in the service. The mean length of service was 7.57 years.

Regarding the level of education: 58.3% of the participants have completed a bachelor's degree in nursing and a postgraduate degree in

nephrology nursing, 25.0% have completed a bachelor's degree and a postgraduate degree in urologic nursing, and 16.7% are professional nursing technicians with a postgraduate degree in urologic nursing. It is observed that about 66.7% of the participants did not attend any type of training in the last two years.

Fifty percent of the nurses showed a deficient level of knowledge, which is equivalent to only obtaining 50% or fewer correct answers, the remaining 50% had a regular level, which means that they answered between 6 and 8 questions correctly. It should be noted that none showed an excellent level of knowledge (9-10 correct questions). The data described above are represented graphically in Figure 1, and in scalar terms, the data are broken down in Table 1.

Figure 1. Level of scientific-technical knowledge of nursing staff

■ Deficient (0-5)
■ Regular (6-8)
■ Excellent (9-10)
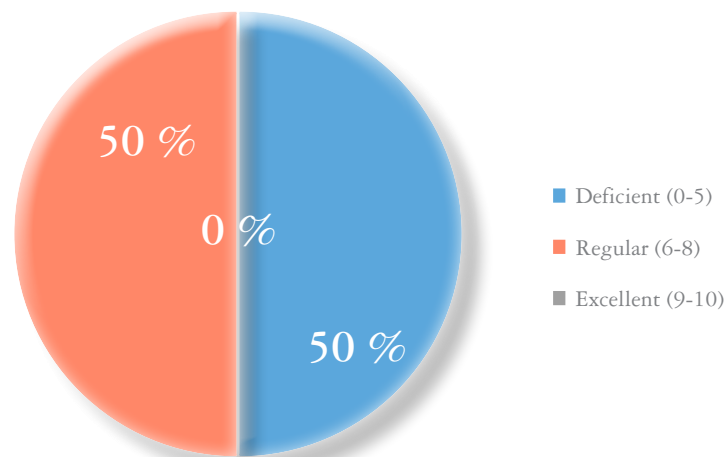
Source: own elaboration.

Table 1. Level of scientific-technical knowledge of nursing staff (scalar).

Knowledge level	Frequency	Percentage	Calificación
30% (3 correct answers)	1	8,3	Deficient
40% (4 correct answers)	4	33,3	Deficient
50% (5 correct answers)	1	8,3	Deficient
60% (6 correct answers)	2	16,7	Regular
70% (7 correct answers)	2	16,7	Regular
80% (8 correct answers)	2	16,7	Regular
Total	12	100,0	

Source: own elaboration.

Subsequently, the level of knowledge was contrasted with the work experience of the nursing staff. As can be seen in Figure 2, those with a deficient level are concentrated in the group with more than 10 years of experience (41.7%). Only one nurse with 6 to 10 years of experience showed a poor level. The nurses who obtained a fair level of knowledge were distributed in the three groups of years of experience: 16.7% had between 1 and 5 years of experience, 25% had between 6 and 10 years, and 8.3% had more than 10 years. A Spearman correlation test was performed; however, since the p-value was 0.065, which is greater than the 0.05 reference value, it is concluded that there is no significant association between the two variables.

Figure 2. Level of knowledge related to work experience
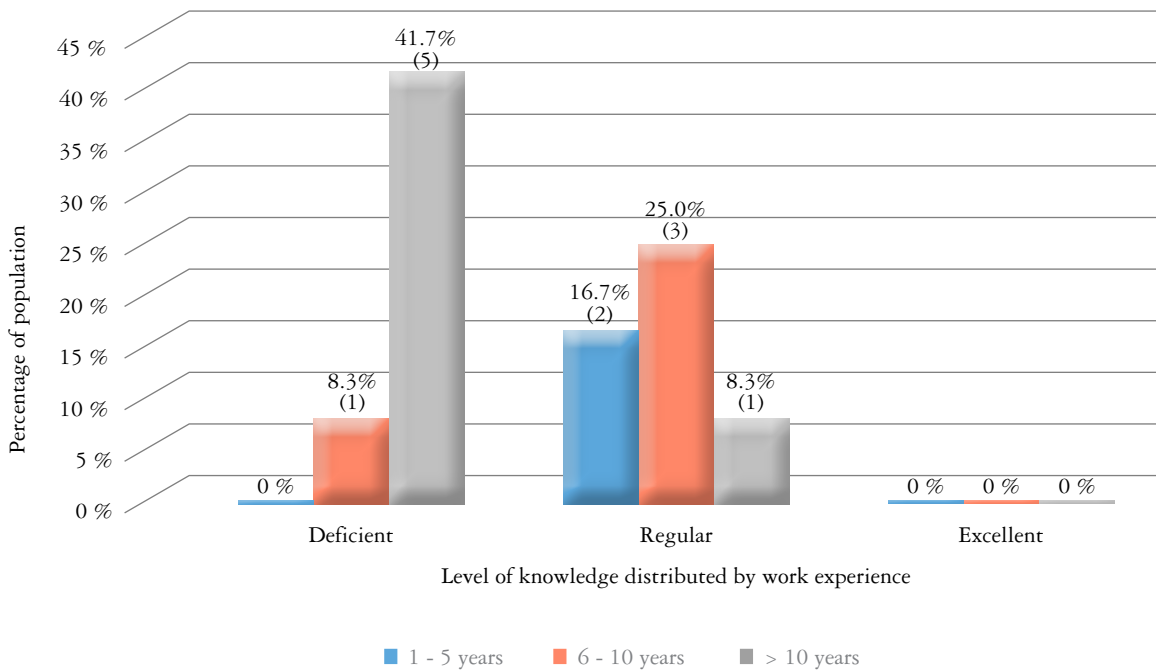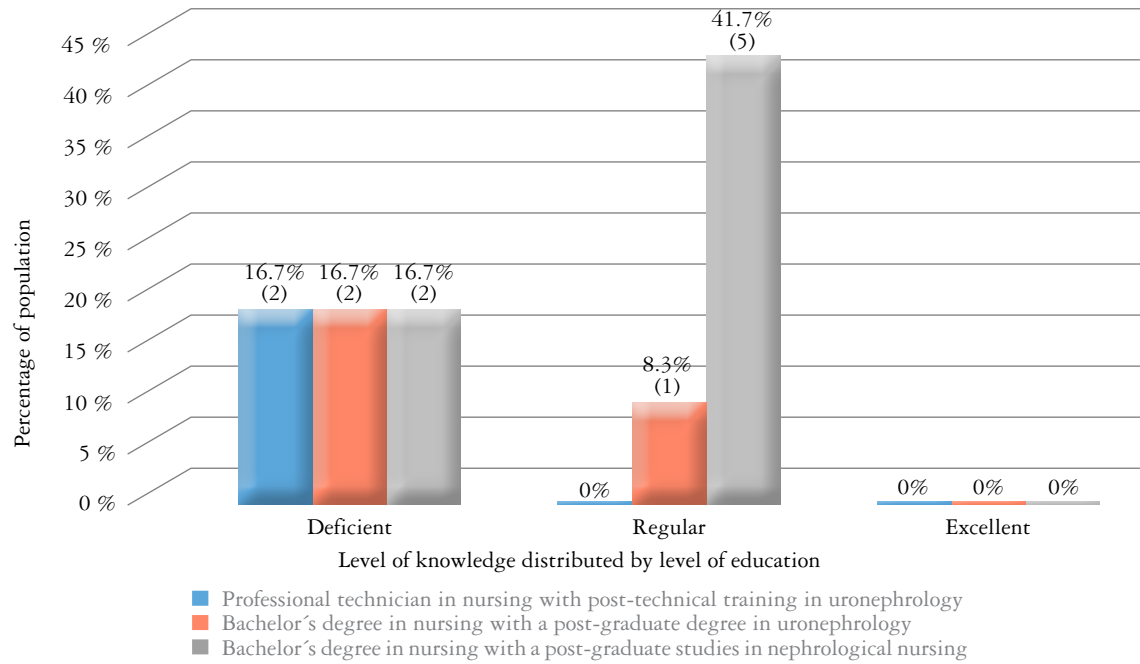

Source: Own elaboration.

Regarding the level of studies, Figure 3 shows that two technical nurses with a post-technical degree in uronephrology (16.7%), two graduates with a post-technical degree in this same area (16.7%) and two graduates with a post-graduate degree in nephrology showed a deficient level of knowledge. On the other hand, one nurse with a bachelor's degree and a postgraduate degree in uronephrology (8.3%) and five with a postgraduate degree in nephrology (41.7%) had a fair level of knowledge. The Chi-square test yielded a p-value of 0.164, so there was no significant association between the variables.

Figure 3. Level of knowledge related to the level of studies

Level of knowledge distributed by level of education

■ Professional technician in nursing with post-technical training in uronephrology
■ Bachelor´s degree in nursing with a post-graduate degree in uronephrology
■ Bachelor´s degree in nursing with a post-graduate studies in nephrological nursing

Source: own elaboration.

Regarding the level of instrumental skills, the results obtained during the two observations were grouped into four categories: excellent (when compliance ranges from 91 to 100%), good (from 75 to 90%), fair (from 65 to 74%) and poor (from 0 to 64%). 100% of the nurses showed an excellent level in the application of instrumental skills in both observations (Figure 4).

Figure 4. Level of skill application distributed by observation period

Level of skill application distributed by observation period

■ First observation   ■ Second observation
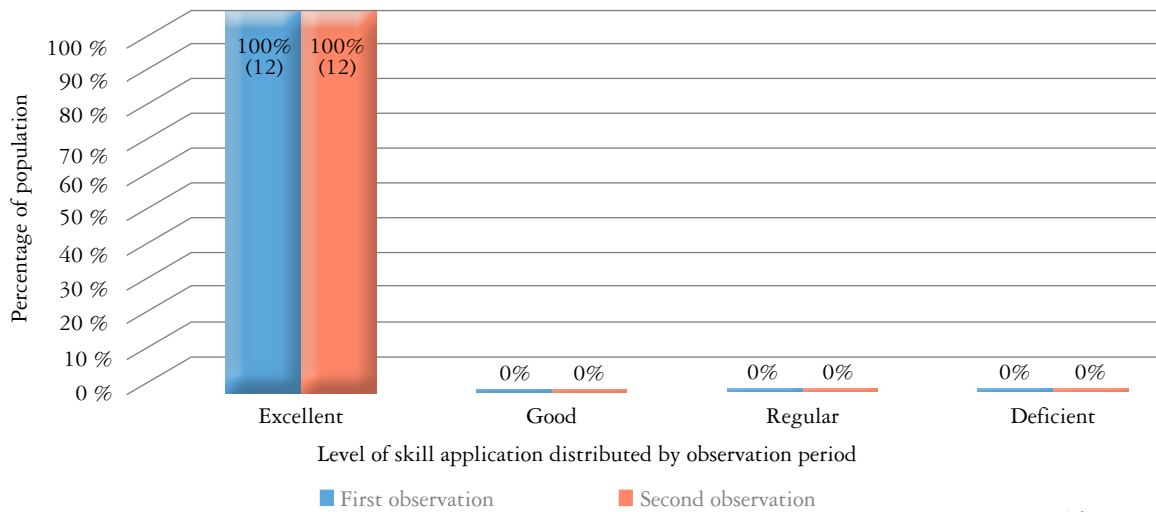
Source: own elaboration.

However, these results do not allow us to identify those evaluated concepts in which these skills need to be reinforced. Therefore, Table 2 presents the percentages obtained in the application of these concepts. As mentioned, each group of skills was made up of a certain number of items, so the table shows the number of criteria fulfilled.

Table 2. Percentage of application of the evaluated concepts

Group of skills evaluated	1st observation				2nd observation			
	Yes		No		Yes		No	
	Frequency	Porcentaje	Frecuencia	Porcentaje	Frecuencia	Porcentaje	Frecuencia	Porcentaje
1. Hemodialysis preparation	82	97.61%	2	2.3%	83	98.089%	1	1.19%
2. Initial patient assessment	87	90.65%	9	9.37%	87	90.65%	9	9.37
3. Vascular access preparation	204	100%	0	0%	204	100%	0	0%
4. Vascular access approach	111	92.5%	1	7.5%	111	92.5%	1	7.5%
5. Connecting the patient to the monitor	96	100%	0	0%	96	100%	0	0%
6. Follow-up of the hemodialysis session and resolution of complications	152	97.43%	4	2.56%	153	98.07%	3	1.92%
7. End of the session	144	100%	0	0%	144	100%	0	0%

Source: own elaboration.

During the first observation, it was found that 97.61% of the nurses performed hemodialysis preparation, while the remaining 2.3% did not; 90.65% performed the initial patient assessment and 100% performed vascular access preparation; 92.5% performed vascular access approach, while 7.5% did not. 100% of the nurses connected the patient to a monitor. Regarding hemodialysis session follow-up and complication resolution, 97.43% did, but the remaining 2.56% did not. And finally, 100% of the participants completed the session.

During the second observation, 98.08% of the nurses performed hemodialysis preparation and 1.19% did not, an improvement over the first observation. On the other hand, 90.65% performed the initial patient assessment, but 9.37% did not, so no variation in the percentage was found. Regarding vascular access preparation, 100% performed it, 92.5% made the approach and 7.5% did not. All the nurses connected the patient to a monitor; 98.07% followed up on the hemodialysis session and the resolution of complications, while 1.92% did not do so. The end of the session was carried out by 100% of those evaluated.

In this sense, once the percentages of both the level of knowledge and the application of instrumental skills were obtained, the level of clinical competence of the participants was determined. For this purpose, the results obtained from both instruments were averaged. The level of instrumental skills was determined by averaging the results obtained in the first and second observations. It was observed that the

lowest level of clinical competence was 65% and the highest was 88%, with an average of 76% (Table 3). According to the established cut-off points, six participants obtained a fair level and the remaining six obtained a good level of competence. It is worth mentioning that none reached an excellent or deficient level of competence.

Table 3. Level of clinical competence

Case	Knowledge level	Skill level	Level of clinical competence	Rating
1	30%	100%	65%	Regular
2	40%	100%	70%	Regular
3	40%	96.5%	68%	Regular
4	40%	96.5%	68%	Regular
5	40%	96.5%	68%	Regular
6	50%	96.5%	73%	Regular
7	60%	96.5%	78%	Good
8	60%	92%	76%	Good
9	70%	98%	84%	Good
10	70%	94.5%	82%	Good
11	80%	94%	87%	Good
12	80%	96.5%	88%	Good

Source: own elaboration.

Discussion

Very few studies have evaluated the clinical competence of nursing staff in the management of arterial hypotension during extracorporeal dialysis treatment, especially those using instruments such as those used here. For this reason, the results found in this study will almost always be evaluated indirectly.

In this study, it was observed that 50% of the nursing personnel showed a deficient level of scientific-technical knowledge, and the other 50% had a regular level. The study conducted by Lazcano et al.[11] used the same questionnaire developed by Murillo. Their sample was composed of 13 health professionals (62% with a bachelor's degree in nursing and 38% with a technical career in nursing). Their results showed that 77% of the respondents knew what intervention to perform during an episode of hypotension (modification of the sodium profile). This result contrasts with that shown by item 2 in this study, where only 44.7% of the nurses correctly identified the therapeutic measures to be performed in the event of this type of complication during hemodialysis.

It is difficult to find an explanation for this difference, especially because the personnel in the Lazcano et al. sample showed a lower level of academic preparation and fewer years of work experience. However, if we take into account that the proportion of people who have not received training in the management of hemodialysis complications in the last

year (66%, n=8) is similar to the proportion of people who failed to answer the question related to emergency therapeutic measures for dialytic arterial hypotension (58.3%, n=7), we can infer that the lack of specific preparation in the management of hemodialysis may be a factor that explains this result.

On the other hand, in the study by Quirós and Yance8 the Murillo knowledge test was also applied to a sample of 20 people (65% had a degree in nursing and 35% were nursing assistants), in addition to an observation guide to evaluate the skills and theoretical knowledge necessary for the management of interdialytic hypotensive crises in patients in a hospital in Ecuador. The results showed that 60% of the personnel evaluated placed the patient in the Trendelenburg position during an episode of hypotension. This percentage is lower than that obtained in this study, where in the questionnaire 100% of the nurses stated that this is the recommended position during such episodes. In addition, the data from Quirós and Yance revealed that 60% of the personnel interviewed had received training courses on the management of complications during hemodialysis; in contrast, the CEMENAV nursing personnel only received this type of course in 33% of the cases, which highlights the need for them to acquire training on the management of acute complications in hemodialysis.

Regarding instrumental skills, all the personnel showed an excellent level of application (91 to 100%). In the study by Quirós and Yance8, lower levels of performance were found in the correct management of hypotension at 60%, as reported by the observation guides applied by both researchers. This difference could be explained by the academic level and the experience of more than 10 years accumulated by most of the CEMENAV personnel.

Conclusions

The clinical competence of the nursing staff in the care of intradialytic arterial hypotension in the hemodialysis service of the CEMENAV is mostly good, with an average of 78%. However, this high percentage is generally due to the instrumental skills of the staff, which were rated as excellent in all cases. It is important to reinforce knowledge on the subject since in this aspect the sample tended towards a poor-regular level. In particular, instrumental skills were not found to be dependent on levels of study or years of professional experience.

The present study contributes to the opening of a clinical-therapeutic research field practically unexplored in our country since only literature based on reviews is available, but not on the application of instruments that directly evaluate the performance of the nursing staff in the prevention and control of episodes of arterial hypotension during hemodialysis treatment. Therefore, it is recommended that more studies of this type be conducted, especially focused on the evaluation of nurses' knowledge and instrumental skills.

Considering that one of the limitations of this study was the small sample size (justified by the spatial location of the study), it is suggested to extend the boundaries of the research by considering a larger population of nurses from other health institutions. In this way, a broader picture of their clinical performance can be obtained. A study of this magnitude may also help to identify

important deficiencies or omissions that these health professionals may be committing, and their early detection could contribute to reducing adverse events caused by arterial hypotension.

It is also recommended that other types of studies be designed based on the results and conclusions of this study. For example, among CEMENAV's nursing staff, it was identified that less than half of them are trained, so their training may favor their level of clinical competence. To test this hypothesis, studies could be designed to determine the impact of training programs on the nursing staff and their relationship with the prevalence of complications due to arterial hypotension in hemodialysis. Finally, based on the above, it is recommended to propose a mechanism for continuing education in the area of clinical nursing based on the training of personnel in techniques and methods that improve their performance; for example, in the management of intradialytic arterial hypotension in the hemodialysis service.

Referencias

1. **McIntyre D, Havas K, Bonner A.** Monitoring for intradialytic hypotension: an audit of nursing practice. J Ren Care. 2021;47(1):27-33.

2. **Flythe JE, Chang TI, Gallagher MP, Lindley E, Madero M, Sarafidis PA, et al**. Blood pressure and volume management in dialysis: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference. Kidney Int. 2020;97(5):861-76.

3. **Flythe JE, Brunelli SM.** The risks of high ultrafiltration rate in chronic hemodialysis: implications for patient care: ultrafiltration rate in hemodialysis. Semin Dial. 2011;24(3):259-65.

4. **Sars B, van der Sande FM, Kooman JP.** Intradialytic hypotension: mechanisms and outcome. Blood Purif. 2020;49(1-2):158-67.

5. **Cuba de la Cruz Y, Dieguez Y.** Hipotensión arterial en hemodiálisis. Nefrología. 2007;27(3):387-8.

6. **Fortin PM, Bassett K, Musini VM.** Human albumin for intradialytic hypotension in haemodialysis patients. Cochrane Database Syst Rev. 2010;11:CD006758. doi: 10.1002/14651858.CD006758.pub2

7. **Choquehuanca Suca A.** Cuidados enfermeros en la prevención de hipotensión en pacientes adultos con tratamientos de hemodiálisis [academic paper on the Internet]. Arequipa: Universidad Católica de Santa María; 2018. Available at: https://cutt.ly/lwk9pz5l

8. **Quiros Rumbea K, Yance Parrales LI.** Cuidados de enfermería en el manejo de hipotensión durante la hemodiálisis en pacientes con insuficiencia renal crónica de la Unidad Renal Sur – Pasal of the city of Guayaquil during the period from October to February 2015 [research project]. Guayaquil: Universidad Católica de Santiago de Guayaquil; 2015.

9. **Pérez Jaramillo A.** Abordaje de las complicaciones agudas en la unidad de diálisis para enfermería. NPunto. 2018;1(7):55-79.

10. **Nephrology News & Issues.** Strategies to reduce intradialytic hypotension in hemodialysis patients [Internet]. Thorofare: Healio News; 2015 [cited 28 may 2021]. Available at: https://cutt.ly/Jwk9pJb2

11. **Lazcano Ortiz M, Barrera García E, Cedeño Campos DC, Hernández Nicolás QA, Segovia Reyes A, Jiménez Sánchez RC.** Competencias del personal de enfermería

en el paciente con hemodiálisis. Educación y Salud Boletín Científico Instituto de Ciencias de la Salud Universidad Autónoma del Estado de Hidalgo. 2017;6(11).

12. **Murillo Gómez MV.** Nivel de competencia clínica de enfermería en pacientes con hemodiálisis [tesis en internet]. San Luis Potosí: Universidad Autónoma de San Luis Potosí; 2009. Available at: https://cutt.ly/lwk9aqwC

13. **Miller GE.** The assessment of clinical skills/competence/performance. Acad Med. 1990;65(9 Suppl):S63-7.