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Clinical Focus Article

The Use of Vasopressors by Nurses and Physicians in Nigeria

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ABSTRACT

Background: The use of vasopressors to support hemodynamics in critically ill patients is a common practice. It is crucial for clinicians to administer these agents safely and appropriately. However, the current literature lacks data on the awareness, use, selection, and implications of vasopressor use in Nigerian hospitals. This research aims to fill this gap and provide valuable insights.

Aim: Our aim is threefold: (1) To assess clinician knowledge and attitudes toward vasopressor use, (2) to examine the demographic characteristics of nurses and physicians using vasopressors in Nigerian hospitals, and (3) to identify barriers to early vasopressor use in the treatment of sepsis and septic shock in support of the Surviving Sepsis Campaign-2 guidelines.

Methods: This research was a collaborative effort involving participants from an online social media group of nurses and physicians practicing in critical care settings in Nigeria. The survey methodology was used, and responses were collected via Google Forms, highlighting the collective nature of this research.

Results/Findings: A total of 88 participants responded to the survey. The findings revealed that most respondents recognized the indications for vasopressors and the desired outcomes from their use. However, it was concerning to note that most institutions lack vasopressor guidelines. On a positive note, half of the responses agreed that vasopressor use should be reduced once desired outcomes are achieved. These findings have significant implications for patient care and clinical practice in Nigerian hospitals.

Conclusions: Survey findings suggest that nurses and physicians practicing in Nigerian hospital settings possess moderate knowledge of vasopressor use in treating sepsis and septic shock. Moderate knowledge of vasopressor indications and clinical outcomes does not align with current vasopressor administration practices in critical care settings.

Keywords: vasopressors, sepsis, survey, Nigeria

INTRODUCTION

This survey aimed to assess nurse and physician knowledge and attitudes while examining healthcare worker characteristics and practices around vasopressor use in Nigerian hospitals. The objectives of this survey were to identify barriers affecting the use of vasopressors and to set the groundwork for encouraging early vasopressor use in the management of sepsis and septic shock.

FRAMEWORK

In this study, we applied Benner's Novice to Expert theory (Benner, 1984) which outlines the different stages of professional growth in nursing: the novice as a beginner lacking experience; the advanced beginner possessing some acceptable performance in nursing situations; the competent nurse, who lack the speed and flexibility of proficient nurses, but they have some mastery and can rely on advance planning and organizational skills; the proficient nurse with three or more years of experience, who possesses an intimate understanding of long-term patient care goals and an intuitive grasp of clinical situations; and the expert nurse who can recognize demands and resources in situations and attain their goals, focusing on the most relevant problems. Critical care is a fast-paced environment where labile patients require and hopefully receive continuous care and monitoring (Scheeren et al, 2019). The nurse's skill level and experience will significantly influence their knowledge of using vasopressors (Elscous et al, 2017; Grigsby, 2021; Lewis et al, 2019). Benner's model has been applied to disciplines beyond clinical nursing and highlights that expertise in any field, including medicine, is a process learned over time.

METHODS

Survey instrument

The survey questions were developed by authors based on the literature, primarily the Surviving Sepsis Campaign-2 guidelines (Evans et al, 2021), and evaluated by other experts using face validity. The questions targeted the following three content areas.

1. What are the demographic characteristics of nurses and physicians who responded to the survey on vasopressor use in Nigeria?
2. Do nurses and physicians possess adequate knowledge for safe vasopressor use?
3. What are the most commonly available vasopressors in Nigerian hospitals?

Sample Selection

Survey respondents were recruited using convenience sampling from two social media groups on Telegram, which included healthcare workers living and practicing in Nigeria. One group consisted of critical care nurses (CCNs), and the other of anesthesia residents. Weekly reminders containing a link to the survey were sent to each respective group for four weeks. These groups were selected due to their strong national prevalence, including a substantial representation of resident physicians in Nigeria and all presumed CCNs practicing in the country.

There were 717 members in the Telegram social media group who received the invitation. This consisted of 463 CCNs and 254 residents. All group members

were considered for inclusion, including anesthesia residents, anesthesia consultants, physicians, and CCNs practicing in Nigeria. Survey participants were asked to self-identify their profession. Some physicians identified as "resident physicians or doctors", while others preferred to be identified as "physicians or doctors". Anesthesia consultants preferred not to use the term "physician or doctor"; these participants are identified as "other". Physicians and nurses working in non-critical care areas were excluded. Responses were collected online using Google Forms.

Statistical Analysis

We used descriptive statistics, including proportions, percentages, ranges, and standard deviations. We analysed the data using Microsoft Excel 2016.

RESULTS

Responses are reported by question.

Survey Question 1:

What are the demographic characteristics of nurses and physicians associated with the knowledge and practices related to vasopressor use in Nigeria?

A total of 106 participants responded to the survey (Figure 1). After excluding those who did not fully complete the survey, 88 responses remained for analysis, as shown in Table 1, for a total response rate of 12% (88/717). Most respondents (86%) were nurses with an average work experience of 14 years (SD 7.46). Physician respondents constituted 11% of the sample with an average work experience of 8 years (SD 4.72). The majority of nurses held a bachelor's degree (47%), followed by diploma-prepared nurses (26%). Bachelor-prepared physicians (MBBS) constituted 6%, and masters-prepared physicians represented 5% of the respondents. The MBBS degree is equivalent to the medical doctor (M.D.) or doctor of osteopathy (D.O.) in other countries.

Figure 1

Participant Demographic Flowchart

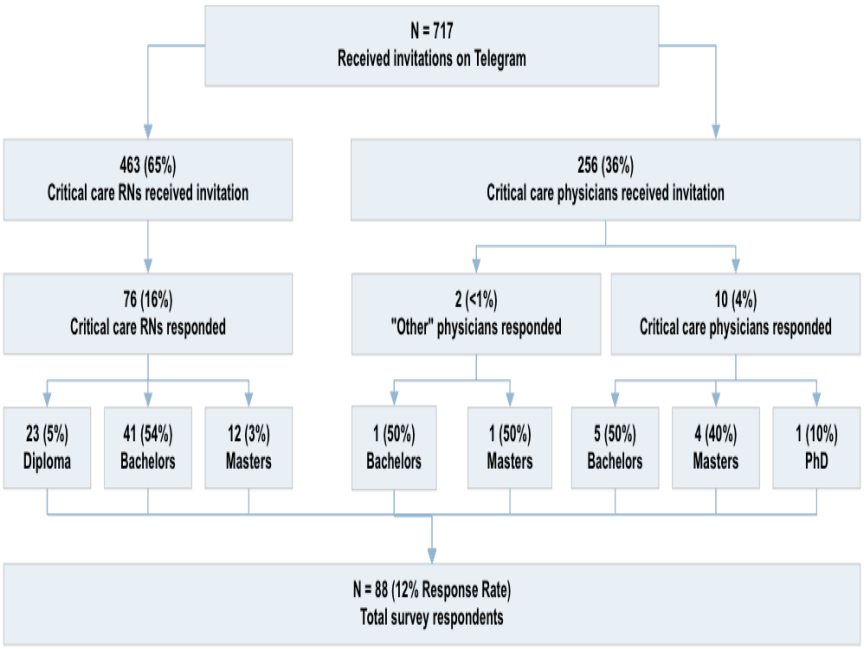

Table 1

Respondent Education

Profession Level of Education	Respondents (n;%)	Years of Experience (average; STD)
Nursing	76 (86%)	14 (7.5)
Bachelor	41(47%)	13 (7.3)
Diploma	23(26%)	12 (4.2)
Masters	12 (14%)	21(9.0)
Physician	10 (11%)	8 (4.7)
Bachelor	5 (6%)	7 (.8)
Masters	4 (5%)	8 (7.0)
PhD	1(1%)	12 (0)
Other	2(2%)	14 (2)
Bachelor	1 (1%)	16 (0)
Masters	1 (1%)	11 (0)
Grand Total	88 (100%)	13 (7.4)

Survey Question 2: Do nurses and physicians have an adequate knowledge base on vasopressor use? Survey participants were asked to select indications for vasopressor administration, as shown in Table 2. Respondents could choose multiple options. The most common response was "increase mean arterial blood pressure (MAP)" (76.13%), followed by "increase systolic blood pressure (SBP)" (45.45%), then "increase diastolic blood pressure (DBP)" (38.63%), and finally, "end-diastolic filling pressure (EDFP)" (20.45%). The selection of these end results does not significantly vary (SD = 1.18) between professional groups across institutions.

Common selections for vasopressor administration indications (Table 2) were fluid unresponsive shock patients (100%), low MAP < 60mmHg, organ support in heart failure (43.18%), and unstable hemodynamic states (35.22%). The selection of indications does not differ statistically (SD = 1.09) between professional groups.

Table 2

Clinical Outcomes of Vasopressor Use by Profession

Desired Outcomes of Vasopressor Administration - Multiple Choice Response	Nursing	Other	Physician	Resident Physician	Grand Total
Increase CVP	6	1			7
Increase CVP; increase DBP; increase end diastolic filling pressure	1				1
Increase CVP; increase DBP; increase MAP	1				1
Increase CVP; increase end diastolic filling	1				1

pressure					
Increase CVP; increase MAP	5		1		6
Increase CVP; increase MAP; increase end diastolic filling pressure	3	1			4
Increase CVP; increase SBP	1		1		2
Increase CVP; increase SBP; increase DBP	1				1
Increase CVP; increase SBP; increase DBP; increase end diastolic filling pressure	1				1
Increase CVP; increase SBP; increase DBP; increase MAP	3		1	1	5
Increase CVP; increase SBP; increase DBP; increase MAP; increase end diastolic filling pressure	1				1
Increase CVP; increase SBP; increase end diastolic filling pressure	1				1
Increase CVP; increase SBP; increase MAP	1				1
Increase CVP; increase SBP; increase MAP; increase end diastolic filling pressure	1				1
Increase DBP	1				1
Increase end diastolic filling pressure	1				1
Increase MAP	18		6		24
Increase MAP; increase end diastolic filling pressure	2		1		3
Increase SBP	6				6
Increase SBP; increase DBP; increase end diastolic filling pressure	1				1
Increase SBP; increase DBP; increase MAP	9		1		10
Increase SBP; increase DBP; increase MAP; increase end diastolic filling pressure	1		1		2
Increase SBP; increase end diastolic filling pressure	1				1

Increase SBP; increase MAP	2			1	3
Grand Total	**69**	**2**	**12**	**2**	**85**
Vasopressor Indications - Multiple Choice Response	**Nursing**	**Other**	**Physician**	**Resident Doctor**	**Grand Total**
Fluid unresponsive shock patient	10		1		11
Fluid unresponsive shock patient; organ support in heart failure	2		1		3
Fluid unresponsive shock patient; unstable hemodynamic state	2		1		3
Fluid unresponsive shock patient; unstable hemodynamic state; organ support in heart failure	1		1		2
Low mean arterial blood pressure below 60 mmHg	17		1	1	19
Low mean arterial blood pressure below 60 mmHg; fluid unresponsive shock patient	4				4
Low mean arterial blood pressure below 60 mmHg; fluid unresponsive shock patient; organ support in heart failure	7	1		1	9
Low mean arterial blood pressure below 60 mmHg; fluid unresponsive shock patient; unstable hemodynamic state	7		1		8
Low mean arterial blood pressure below 60 mmHg; fluid unresponsive shock patient; unstable hemodynamic state; organ support in heart failure	5		6		11
Low mean arterial blood pressure below 60 mmHg; organ support in heart failure	2				2
Low mean arterial blood pressure below 60 mmHg; unstable hemodynamic state	4				4
Low mean arterial blood pressure below 60 mmHg; unstable hemodynamic state; organ support in heart failure	2				2
Organ support in heart failure	2	1			3
Unstable hemodynamic state	2				2

Unstable hemodynamic state; organ support in heart failure	2				2
Grand Total	**69**	**2**	**12**	**2**	**85**

In response to a question on common adverse side effects of vasopressor agents most respondents (60%) indicated arrhythmias, while 13.6% selected arrhythmias, extravasation, and ischemia. The remaining 11.4% selected extravasation and ischemia only.

Regarding the monitoring of patients on vasopressors, 37.5% of the respondents indicated the monitoring of urine output, blood pressure, electrocardiogram, and mean arterial pressure. Just 4.5% indicated only blood pressure and urine output should be monitored, whereas 10.2% selected blood pressure monitoring alone. Another 8.0% believed both blood pressure and electrocardiogram monitoring were indicated. Lastly, 13.6% of respondents indicated that only mean arterial pressure required monitoring.

Table 3 shows nurses' actions before commencing vasopressors. Before starting vasopressors, 48% of respondents indicated they would contact a physician only, and 22.4% indicated they would contact a senior nurse only. Another 9.2% would initiate administration of a vasopressor before obtaining physician orders, and 9.2% would contact both a senior nurse and a physician before commencing vasopressors. A further 5.3% of respondents would contact a senior nurse and commence a vasopressor before obtaining physician orders, and just 2.6% would contact a physician and commence a vasopressor. Most physicians indicated they sometimes consider nurse recommendations for commencing vasopressors (90%), while just 10% indicated they always consider nurse recommendations.

Table 3
Nurse Actions Prior to Commencing Vasopressors

RN Action	Responses (n;%)
Contact physician	37 (48%)
Contact senior nurse	17 (22%)
Start vasopressor	7 (9%)
Contact physician AND senior nurse	7 (9%)
Contact physician AND senior nurse AND start a vasopressor	4 (5%)
Contact senior nurse AND start a vasopressor	2 (3%)
Contact physician AND start a vasopressor	2 (3%)
Grand Total	**76 (100%)**

Most institutions (53.4%) lack standard vasopressor administration guidelines, with only 46.6% of the respondents indicating that their institution has a standard protocol for vasopressor administration. However, most respondents indicated an understanding that vasopressors should be reduced gradually when the desired parameters have been

met. Over half the survey participants (56.8%) agreed, with 19.3% indicating they strongly agreed. Other respondents (18.2%) were undecided, and the remaining 5.7% did not agree.

Survey Question 3: What are the most common vasopressor agents available in Nigerian hospitals?

The most commonly available vasopressors were dopamine (88.63%), epinephrine (85.27%), norepinephrine (50.0%), dobutamine (34.09%), and lastly, vasopressin (29.54%).

Availability of vasopressor agents varied between institutions. Primary and general health centers indicated having one agent, specialist hospitals indicated having two agents, while respondents from teaching hospitals indicated they had access to 3 agents all the time. The first agent of choice for general use was epinephrine 28.41%, followed by dopamine 26.14%, norepinephrine 17.05%, vasopressin 7.95%, epinephrine 5.68% and dobutamine 3.41%. The septic shock agents selected were epinephrine (49%), norepinephrine (27%), vasopressin (15%), dopamine (8%), and dobutamine (1%).

DISCUSSION

Knowledge of vasopressor administration and titration in critical care settings is the cornerstone for safe and effective treatment and positive patient care outcomes. The International Surviving Sepsis Campaign (2021) guidelines recommend vasopressor support in patients with a low MAP <60mmHg and who are fluid unresponsive (Evans et al, 2021). Results from this survey revealed low understanding amongst CCNs in Nigeria, resulting in lower rates of early vasopressor initiation in shock patients. For sepsis patients in low to moderate-income countries, Lewis et al. (2019) identified both a lack of resources and delays in care initiation as contributors to high morbidity and mortality rates.

While this survey found that physicians possess greater understanding and stronger knowledge regarding vasopressor use, this may be attributed to the role of physicians in the prescription of medications and does not correlate with increased rates of early vasopressor initiation. Survey results show that physicians do not often consider nurse recommendations to commence vasopressors with just one physician indicating they consider vasopressor initiation recommendations from nurses. This often results in care delays, coupled with a lack of established standard protocols.

Although critical care nurses demonstrated familiarity with best professional practice, the majority (48%) indicated they would contact a physician before commencing vasopressors, and 22.4% would contact a senior nurse first. Just 9.2% felt confident commencing vasopressors before informing a physician of their

action. These findings suggest that nurses do not feel empowered to initiate vasopressors, even when early initiation is indicated and they possess the knowledge base to do so.

In contrast with Benner's novice-to-expert theory, surveyed CC PNs had an average of 14 years of experience. There was no evidence of increased early vasopressor administration with greater years of experience.

Limitations

This study has several limitations. As is typical of online convenience surveys, only 12% of invited clinicians responded. The small sample size and low response rate limit the applicability of the findings. This survey's findings should be used cautiously and may not be generalised to other populations.

CONCLUSION

This study revealed that nurses and physicians practicing in critical care settings in Nigeria demonstrate moderate knowledge of vasopressor use for the treatment of sepsis and septic shock Although familiarity with vasopressor indications and clinical outcomes varies between nurses and physicians, the collective knowledge level does not align with vasopressor administration practices in critical care settings. Future studies should be conducted with a larger sample size. Quality improvement projects using pre- and post-implementation models should be considered.

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