JOURNAL OF NEPALESE SOCIETY OF CRITICAL CARE MEDICINE
AN OPEN ACCESS, PEER REVIEWED, OFFICIAL JOURNAL OF NSCCM

ORIGINAL ARTICLE

Knowledge, Awareness and Practice of Blood Culture Collection Among Clinical Staff in A Tertiary Hospital in the UK

Nnaemeka Nnamani, M.B.B.S., Dip Acute Medicine, M.Sc. Acute Medicine, Darshana Wickremasinghe, M.B.B.S., Dip in Med Micro, Professional Dip in Infectious Diseases, M.D., I.L.M.3.

Medway Foundation Trust, Gillingham Kent, United Kingdom

Corresponding author:
Dr. Nnaemeka Nnamani
MBBS, Dip Acute Medicine, MSc Acute Medicine Specialty Doctor Acute Medicine, SMART Virtual Ward, Medway Foundation Trust, Gillingham Kent, United Kingdom
Email: nnaemeka.nnamanni@nhs.net; nnaemekannamani@yahoo.com
Phone: 07919308928

ACCESS THIS ARTICLE ONLINE

View PDF

HOW TO CITE THIS ARTICLE IN VANCOUVER STYLE?

Nnamani N, Wickremasinghe D. Knowledge, Awareness and Practice of Blood Culture Collection Among Clinical Staff in A Tertiary Hospital in the UK. Journal of Nepalese Society of Critical Care Medicine. 2026 Jan;4(1):13-16.

Submitted	:	May 16, 2025
Accepted	:	December 21, 2025
Published Online	:	January 8, 2026
Declarations	:	None
Conflicts of Interest	:	None

ABSTRACT

Background and aims: Blood culture (BC) is an essential diagnostic tool for bloodstream infections. However, inappropriate collection technique continues to affect the quality of BC results due to contamination, potentially leading to improper use of antimicrobial therapy. Appropriate collection technique and adherence to standard protocols are key to minimize the rate of BC contamination. This study aims to evaluate the knowledge, awareness and practice regarding BC collection among clinical staff (CS) at a UK tertiary hospital.

Methods: A cross-sectional questionnaire-based study was conducted among CS of a UK hospital. Data were collected using a questionnaire and analysed through descriptive statistics.

Results: A total of 196 CS participated. Participants were mostly from the ward (55.61%) while the same day emergency had the fewest participants of less than 5%. Less than 50% had awareness of hospital BC policy, while more than 50% showed understanding. However, there was variable knowledge on principles guiding BC, such as the timeline required to transport a sample (12.76%), skin disinfection time (13.78%), and supervision requirements for competence (56.12%). Although the majority of CS (69.9%) showed knowledge on collecting BC before other blood samples to avoid contamination and accuracy, only a third (35.20%) had knowledge of blood culture in relation to antibiotics administration. Nearly 40% of staff had never been trained before undertaking this procedure, while only 15% had been trained for less than 6 months.

Conclusion: There were gaps in KAP of CS regarding BC which may explain the observed contamination rate of the centre. Educational support, supervision and regular audit would be helpful in improving quality of BC.

Keywords: *Awareness and practice, bacteraemia, blood culture collection, knowledge.*

INTRODUCTION

Blood culture (BC) remains a gold standard for diagnosis of bloodstream infection.[1] BC collection requires collecting and inoculating blood into a BC bottle with optimal environmental condition suitable for microbial organisms to grow.

Guidelines recommend aseptic technique, direct venepuncture, and inoculating the BC tubes in the right order and appropriate labelling.[2] This is fundamental in the era of increased diagnosis of sepsis in the UK. An analysis by the UK Sepsis Trust in hospitals revealed that about 200,000 patients were admitted to hospital in the year 2017/18 with bacterial sepsis.[3] A study in 2022 showed that sepsis was directly responsible for 3770 deaths in England and Wales, and influenced about 25,542 related deaths.[4] There have been increase in misdiagnosis of sepsis due to contaminations arising from BC collection, leading to false positive results, wrong diagnosis and antibiotics misuse, prolonged hospital admission and high cost of treatment. Overall, this will have an undesired effect and negatively impact the quality of patient care.[5]

Currently, from the hospital's medical records data, BC contamination rate is 8.4% which is higher than the global acceptable standard rate of 2-3%.[6] As a part of clinical audit and quality improvement project, the study aimed to elicit the knowledge, awareness and practice (KAP) of BC collection in NHS local Trust Hospital compare them with the standard best practice.

METHODS

We conducted a questionnaire-based quantitative study among 196 clinical staff (CS), involved in routine collection of BC in a local UK hospital. The conduction of this study was approved by the hospital's Quality Assurance and Compliance Team (Ref: 2025.025). This study was exempted from ethical approval because data collection was anonymous, did not interfere with confidentiality, and was deemed to be associated with negligible risk from ethical stand point. Inclusion criteria were CS comprising of doctors and nurses working in medical and surgical areas. Exclusion criteria were 1. consultants, 2. phlebotomists because they are not routinely involved in BC collection, 3. CS from paediatric areas because their BC collection procedure, volume requirement and governance differ significantly from adults.

We designed a pre-tested electronic questionnaire with 21 questions for data collection, based on the BC collection policy in the hospital. This was reviewed by clinical expert and vetted by the hospital audit department. Nurses and doctors working on the hospital wards, emergency departments, ambulatory care and other clinical areas were recruited to participate voluntarily. They were reached out through direct communication and through QR codes posted in strategic ward areas, using simple random sampling. Responses were collected using an electronic data collection system (https://www.gthr.co.uk) which is the hospital's official means of data collection for audit. Information about the duration of employment and BC training since the time of employment in the hospital was also gathered, to help assess how these factors influenced BC results and contamination rates. Data were analysed using descriptive statistics to summarise respondents and inferential statistical tests to determine the relationship between demographic variables and outcome on knowledge, awareness and practice.

RESULTS

A total of 196 personnel participated in the survey. These included 106 doctors and 90 registered nurses. Table 1 shows the distribution of the respondents in terms of their job description, areas of work, work experience and duration of training since the training on BC.

Table 1. Demographics of respondents

S. No.	Characteristics	Number (%)
1	**Job description**	
	• Doctors	106 (54)
	• Nurses	90 (46)
2	**Areas of work**	
	• Wards	
	• Emergency	109 (55.61)
	• Same day Emergency care	53 (27.04)
	(clinics)	9 (4.59)
	• Other areas	25 (12.76)
3	**Length of employment**	
	• Less than 6 months	22 (11.22)
	• 6-12 months	39 (19.90)
	• More than 12 months	135 (68.88)
4	**Duration since training**	
	• Within the last 6 months	31 (15.81)
	• Within the last 6-12 months	28 (14.29)
	• Within the last 12 months	59 (30.10)
	• Never received any training	78 (39.80)

Regarding the level of staff knowledge and awareness in BC, in terms of policy awareness as depicted in figure 1, 50% of clinical staff were not aware of the BC collection policy in the hospital, and 48% were not aware of the standard guidelines regarding indications of BC.

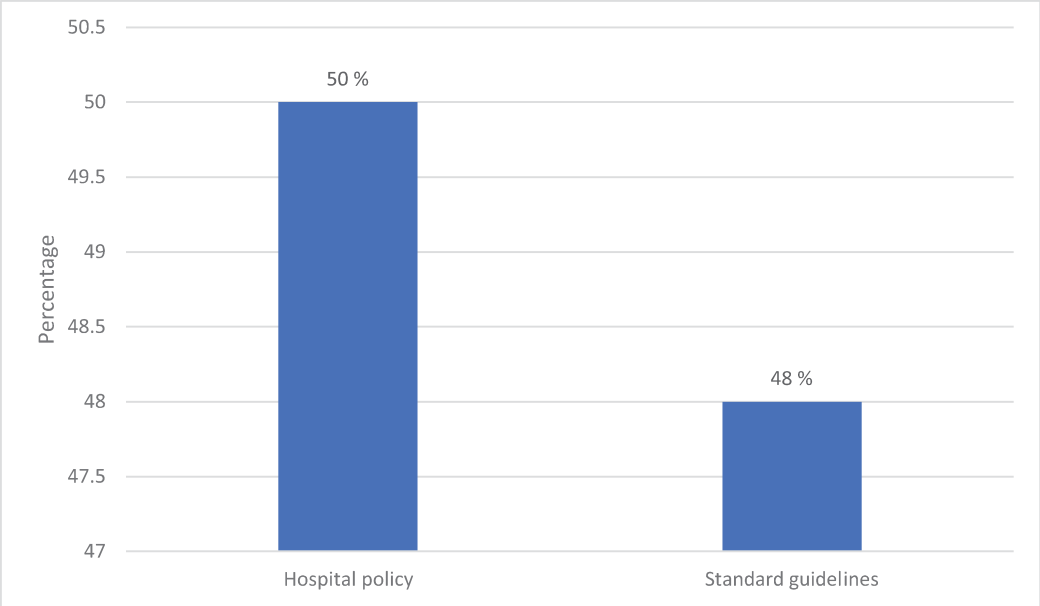

Figure 1: The chart shows the proportion of respondents who were aware of the government policies and standard guidelines.

With regards to knowledge, only 12.7% of the total respondents, had knowledge of the timeline required to send the BC samples to the laboratory, and 13.78% knew the skin disinfection time during collection as shown in figure 2. Nearly 70% knew that they had to take BC samples before taking other blood samples. Over 50% knew the importance of competence before independently taking BC. In addition, 65.31% recognised the need to take BC before initiating antibiotic therapy.

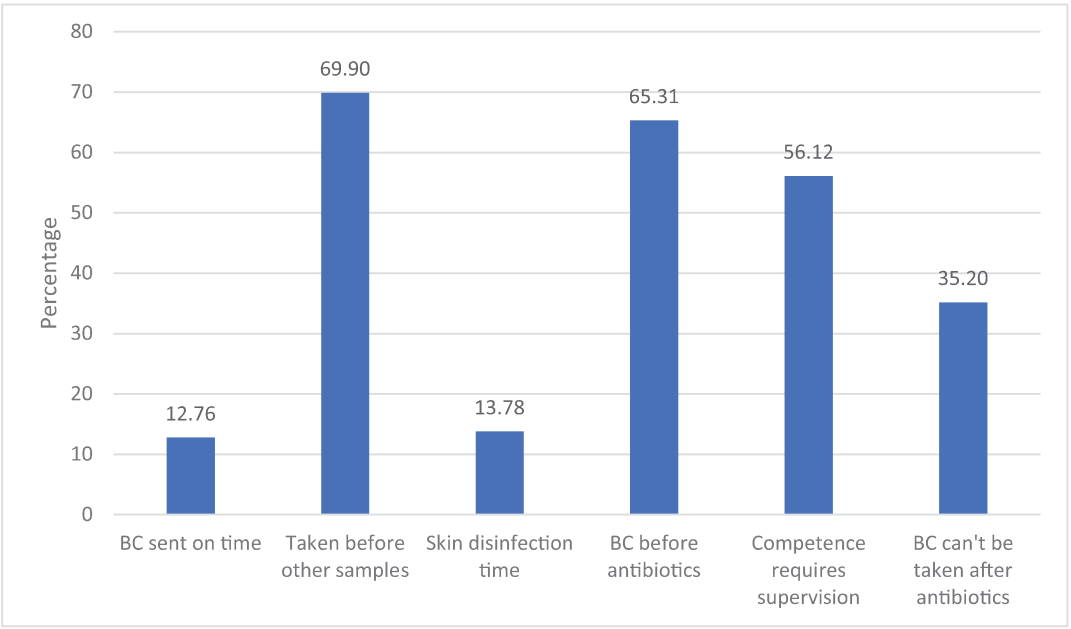

Figure 2: Shows the various knowledge aspects of the respondents.

DISCUSSION

This study assessed the knowledge, awareness and practice related to BC among doctors and nurses in a UK based hospital. The key findings indicated that awareness regarding BC collection and understanding appropriate indications were present in 51% and 52% of respondents respectively. In addition, a substantial proportion of participants reported limited or no recent formal training in BC collection practices. These findings highlight gaps in knowledge and training related to BC collection within the study population. When compared with similar studies in a public tertiary hospital, the observed gaps are consistent. A study conducted in Brazil public hospital involving 112 nurses reported that 49.1% did not receive training on site and 81.4% were unaware

of their hospital's BC policy and contamination rate.[7] These findings suggest that inadequate training and dissemination of standard protocols are common factors across different healthcare system.

Evidences from retrospective studies further support the need for structured quality improvement and training. A retrospective study from Kingdom of Saudi Arabia analysing 27,544 blood culture samples reported initially, a high contamination rate. There was a slow decline following the implementation of quality improvement initiatives. The rate of contamination decreased to 6.3% in 2018, and further to 4.25% and 3.74% in 2022 and 2023, respectively. These improvements were attributed to quality improvements initiatives such as stricter adherence to aseptic BC collection techniques, increased staff training and awareness programs.[8]

In this study, more than 39 % of respondents reported obtaining blood culture without formal training. Another 29.6% were trained within the last 12 months while only 13.8% had received formal training within the past 6 months. Although this study cannot establish a direct relationship, such training gaps may affect adherence to recommended practice for BC collection. Previous literature as above mentioned has demonstrated that protracted intervals without refresher training can influence clinical practice and accuracy of procedures, thereby increasing the risk of contamination. This has implications in the diagnosis of sepsis.

Favourable BC collection techniques with minimal contamination requires adequate knowledge, frequent training and strict adherence to standard technique. Although complete elimination of contamination may not be practical, evidence suggests that continuous education, quality improvement strategies can minimize the rate of contamination near an accepted benchmark of below 3%.[6]

The findings of this study emphasize the need for lasting evaluation of training and organisational policies to improve BC collection technique and thus safety of patients. The strength of this study includes its focus on real world clinical practice and the inclusion of CS directly involved in BC collection. By incorporating participants' training and experience level, it provides reasonable insight into current practice within the hospital setting. However, there are few limitations. The busy schedule and shift patterns in clinical areas affected the sample size which, may affect variations in clinical staff experience and training level. Sampling could have also been affected by the non-involvement of the phlebotomist in BC collection, despite being heavily involved in day-to-day blood sample collections in the hospital. Another limitation to consider is that information provided by respondents on questionnaire data may not actually reflect real clinical practice. As this survey had voluntary participation, staff who were more interested in the topic may have likely participated more.

CONCLUSION

The study identified important gap in knowledge, awareness, and formal training related to BC collection among doctors and nurses in a tertiary hospital. Despite moderate awareness of indications and collection techniques, a considerable number of healthcare workers revealed performing BC collection without formal training. These findings are consistent with similar reports from other healthcare settings and draws a need for structured training and standardized organisational protocol. Frequent education, regular training and strict adherence to hospital BC techniques are important in reducing contamination, improving diagnostic accuracy and patient safety.

ACKNOWLEDGEMENT

We express our profound gratitude to the audit team/department, clinical staff of doctors and nurses of Medway Maritime Hospital NHS Foundation Trust, for their immense contribution through their voluntary and random participation in getting the data required for this study. We also thank microbiologist Dr Vasile Laza-Stanca and the clinical Audit and QI facilitator, Mr Andrew Foote.

REFERENCES

1. Nair A, Elliott SP, Al Mohajer M. (2017). Knowledge, attitude, and practice of blood culture contamination: A multicenter study. Am J Infect Control. 2017;45(5):547–8. [PubMed | Google Scholar | DOI]
2. Bool M, Barton MJ, Zimmerman PA. Blood culture contamination in the emergency department: An integrative review of strategies to prevent blood culture contamination. Australas Emerg Care. 2020;23(3):157-65. [PubMed | Google Scholar | DOI]
3. The UK Sepsis Trust (2024). Sepsis Trust. [online] Sepsis Trust. Available at: https://www.sepsistrust.org/.
4. ONS (2024). Office for National Statistics. [online] Ons.gov.uk. Available at: https://www.ons.gov.uk/ - Home - Office for National Statistics
5. Palavecino EL, Campodónico VL, She RC. Laboratory approaches to determining blood culture contamination rates: an ASM Laboratory Practices Subcommittee report. J Clin Microbiol. 2024;62(2):e0102823. [PubMed | Google Scholar | DOI]
6. Aldiba MA, Dighriri A, Al-Modeer HG, et al. Improving awareness of blood culture indication, procedure and resource Utilization at Armed Forces Hospital Jizan, Saudi Arabia. BMJ Open Qual. 2023;12(1):e002150. [PubMed | Google Scholar | DOI]
7. Ruiz JS, Frota OP, Antonio M. Knowledge, Attitudes, and Practices of nurses regarding blood culture collection. Rev Bras Enferm. 2025;77(6):e20230424. [PubMed | Google Scholar | DOI]
8. Alhazmi AH, Dighriri AM, Dhayhi NS, et al. Multiyear experience with blood culture results from a tertiary care hospital in Saudi Arabia: a retrospective study. BMC Infect Dis. 2025;25(1):1500. [PubMed | Google Scholar | DOI]