



**BARRIER'S AND ENABLERS FOR THE IMPLEMENTATION OF
STANDARDIZING BLOOD CULTURE SPECIMEN COLLECTION IN
CHILDREN, TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS
ABABA, ETHIOPIA: PROSPECTIVE CROSS SECTIONAL STUDY.**

BY: ELIAS ASSEFA (PEDIATRICS & CHILD HEALTH RESIDENT YEAR III)

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APPROVAL SHEET

**ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF
MEDICINE DEPARTMENT OF PEDIATRICS AND CHILD HEALTH**

I, the undersigned Pediatrics and child health resident declare that I have submitted my original proposal on the title barrier's and enablers for the implementation of standardized blood culture specimen collection in hospitalized children, TikurAnbessa Specialized Hospital, Addis Ababa, Ethiopia 2023 in partial fulfillment of the specialty program.

Submitted by:

Name of resident

Signature

Date

Dr. Elias Assefa

This proposed work has been submitted with my approval as an advisor,

Approved by:

Signature

Date

Professor Workeabeba Abebe

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Acronym and abbreviations

AOR: Adjusted Odds Ratio

BC: Blood culture

BSI: Blood stream infection.

CHD: Congenital heart disease

CI= Confidence Interval

COR=Crude Odds Ratio

GC: Gregorian calendar.

HCP: Health care personnel.

HIC: High income country

ICU: Intensive care unit.

LMICs: Low and middle income country.

MD: Medical Doctor.

SD: Standard Deviation

SPSS: Statistical package for social sciences.

TASH: TikurAnbessa Specialized Hospital.

TDF: Theoretical domain frame work.

Abstract

Background: Clinical culture specimen collection plays a vital role in diagnosing and managing infectious disease in hospitalized children. Obtaining accurate and reliable culture specimens is crucial for guiding appropriate antimicrobial therapy and preventing the spread of infections. However, there is often a lack of standardization in clinical culture specimen collection practices, leading to potential barriers and challenges in obtaining high quality samples.

Objectives: To identify the practice standardizing blood culture specimen collection and associated factors in hospitalized children at TikurAnbessa Specialized Hospital, Addis Ababa Ethiopia.

Methods: This study was conducted using a hospital- based prospective cross-sectional study design from July 2023 – October 2023 GC. Descriptive statistics was presented with frequency tables and charts. Binary logistic regression model was used to assess the association between the independent variable and treatment outcomes. All statistical tests were significant at P-value less than 0.05.

Result: In this study a total of 400 nurses were participated. More than half of them 233 (58.3%) were in the age group of 30-39 years with the minimum age of 26 and the highest age 44 years. The mean age of the study participants was 31.64 years with a standard deviation of 4.09. Only 104 (26%) with (95%CI, 21.8-30.3) blood collection specimen technique among the study participants was according to the standard.

Those who had good understanding about the enablers and scored above the mean (AOR=1.68, 95%CI, 1.01-2.81) and those who had good understanding about the barriers and scored above the mean (AOR=95% CI, 1.75(1.04-2.95) were significantly associated with standardizing blood culture specimen collection practice.

Conclusion and recommendation: According to the findings, several enablers and barriers negatively influenced blood collection practice according to the standard. To achieve successful increased awareness and efforts by the individual professional are necessary. However, facilities must facilitate for its achievement by providing adequate resources, clear task statements and follow up.

Keywords: Blood culture, nursing, Barriers, Enablers

1. INTRODUCTION

1.1. Background of the study

In today's rapidly evolving healthcare landscape, ensuring the delivery of high-quality and evidence-based care is of utmost importance, especially for vulnerable populations such as hospitalized children. Clinical culture specimen collection plays a crucial role in diagnosing and treating infections, enabling healthcare professionals to identify the causative pathogens and select appropriate antimicrobial therapy. However, the lack of standardization in specimen collection practices often poses significant challenges in accurately identifying and managing infections in hospitalized children (1).

Despite the potential benefits, the implementation of standardized clinical culture specimen collection in pediatric settings is not without its challenges. Various barriers can hinder the adoption and integration of these standardized practices into routine clinical workflows. These barriers may arise from factors such as lack of awareness or knowledge among healthcare professionals, resource constraints, organizational culture, and resistance to change. Understanding and addressing these barriers is essential to promote the successful implementation of standardized practices in pediatric healthcare settings (2).

Simultaneously, numerous enablers can facilitate the adoption and implementation of standardized clinical culture specimen collection practices. These enablers encompass factors such as leadership support, education and training programs, availability of necessary resources, interdisciplinary collaboration, and the use of technology and automation. By identifying and leveraging these enablers, health care organizations can overcome barriers and create an environment conducive to the adoption of standardized practices, ultimately leading to improved patient outcomes and better overall healthcare delivery for hospitalized children (3).

This research proposal aims to explore the barriers and enablers that impact the implementation of standardized clinical culture specimen collection in hospitalized children. By analyzing data from healthcare professionals, and engaging relevant stakeholders, this study seeks to generate valuable insights and recommendations to facilitate the successful integration of standardized practices into pediatric healthcare settings (4).

Through this research, we hope to enhance our understanding of the challenges healthcare organizations face in implementing standardized clinical culture specimen collection and identify the key enablers that can drive successful adoption. The findings of this study will contribute to the body of knowledge surrounding pediatric healthcare practices and provide practice recommendations for healthcare leaders and policymakers seeking to improve the quality and safety of care for hospitalized children. Ultimately, our research aims to create a positive impact on clinical outcomes and promote a culture of evidence-based practice in pediatric healthcare settings (5).

1.2. Statement of the problem

In pediatric healthcare setting, accurate and timely identification of infectious disease is crucial for appropriate patient management and treatment. One essential aspect of this process is the collection of clinical culture specimens from hospitalized children. However, the lack of standardized protocols for specimen collection can lead to variations in quality and consistency, potentially compromising diagnostic accuracy and patient outcomes (6-8).

This research proposal aims to investigate the barriers and enablers that affect the implementation of standardizing clinical culture specimen collection in hospitalized children. By identifying and addressing these factors, healthcare institutions can improve the reliability and efficiency of diagnostic processes, leading to enhanced patient care and better infection control practices.

In TikurAnbessa Specialized Hospital (TASH), which is the biggest hospital and last resort in referral chain of hospital in Ethiopia. As far as the authors are aware, there are no research published on barriers and enabler of implementation of standardizing blood culture specimen collection in pediatrics patients in Ethiopia.

1.3. Significance of the study

The proposed study on barriers and enablers for implementing sample collection in hospitalized children holds significant importance for various stakeholders in pediatric healthcare. The study's findings will contribute to improving patient care, diagnostic accuracy, and infection control practices in several ways.

Enhanced patient safety and care: Standardizing clinical culture specimen collection practices ensures accurate and reliable test results, leading to improved patient safety and care. By identifying and addressing barriers to standardization, healthcare professionals can minimize errors, reduced the risk of misdiagnosis, and facilitate timely and appropriate treatment decisions. This study will provide insights into effective strategies to overcome barriers, resulting in enhanced patient outcomes.

Improved Diagnostic Accuracy: Standardization specimen collection practices is crucial for obtaining reliable and consistent diagnostic result. By identifying barriers that hinder adherence to standardized protocols, healthcare institutions can implement targeted interventions and training programs to improve healthcare professionals' knowledge and skills. Ensuring accurate specimen collection techniques will contribute to higher diagnostic accuracy, enabling early detection and appropriate management of infectious disease in hospitalized children.

Efficient Resource Utilization: Standardized specimen collection practices help optimize resource utilization in pediatric healthcare settings. By reducing variations and errors in collection techniques, unnecessary repeat tests and investigations can be avoided, leading to cost savings. Additionally, standardization enables efficient use of laboratory resources, such as

reagents and equipment, by minimizing specimen rejection due to inadequate samples or contamination. This study will provide insights into enablers that facilitate resource optimization and efficiency.

Infection Control and Prevention: Standardized clinical culture specimen collection practices are critical for effective infection control and prevention in pediatric healthcare settings. Inconsistent collection techniques and practices can lead to inaccurate identification of infectious agents, compromising appropriate infection control measures. By addressing barriers to standardization, healthcare institution can improve adherence to protocols, minimize contamination risks, and enhance overall infection control efforts. The study's findings will inform strategies and reduce the spread of infections in hospitalized children.

Policy and Guideline Development: The research findings can serve as a foundation for developing evidence-based policies, guidelines, and best practices related to clinical culture specimen collection in pediatric healthcare settings. The identification of barriers and enablers will guide policymakers and healthcare organizations in formulating standardized protocols, educational initiatives, and organizational cultural changes. These policies and guidelines can be implemented at various levels, from local institutions to national healthcare systems, ensuring consistent and high-quality specimen collection practices.

Overall, this study's significance lies in its potential to improve patient care, diagnostic accuracy, infection control measures, resource utilization, and policy development in pediatric healthcare settings. By addressing the barriers and leveraging the enablers, healthcare institution can enhance the quality of care provided to hospitalized children, leading to improved health outcomes and better overall healthcare system performance.

2. Literature Review

2.1. Standardized Protocols:

Prospective observational study was undertaken at St. Theresa Hospital, Hyderabad, India, during January 2020-June 2020. The contamination rate was calculated by dividing the total number of contaminated blood cultures by the total number of cultures multiplied by 100 (ref).

Blood culture contamination rate was 2.4 %, which is within the limit as per the standard guideline.()

The research concluded with contamination occurred mainly due to improper disinfection of the skin and environmental contamination ().

2.2. Awareness and Training:

Healthcare professionals' lack of awareness and inadequate training on standardized specimen collection techniques contribute to suboptimal practices. Such problem is common in low and middle-income countries like Ethiopia. One study conducted in three government run hospitals in Ethiopia reported that just 64.2% of HCP received training on how to collect blood samples in college; while only 9.2% received on –the-job training ()

2.3. Time Constraints and Workload pressures:

Time constraints and high workload demands faced by healthcare professionals in pediatric settings can pose significant barriers to implementing standardized specimen collection protocols. A study done in tertiary care academic medical center showed that over 33 months, 2,083 out of 88,322 total blood cultures collected were contaminated, with an overall contamination rate of 2.4%. A moderate positive correlation was found between the monthly total number of cultures and monthly contamination rate. A positive correlation was present between the number of hospital beds per unit and unit contamination rates ($r= 0.429$ $p< .01$) ().

2.4. Supportive Organizational Culture:

The presence of a supportive organizational culture that values patient safety and quality improvement is crucial for overcoming barriers and implementing standardized specimen collection practices. Leadership support, regular audits, and feedback mechanisms are enablers that promote adherence to protocols. A systematic review and theoretical domains framework survey in Indonesia, Thailand and Vietnam. Studies were conducted in 37 high-income countries(HICs) and 41 low- and middle-income countries(LMICs). From 14 TDF domains, 8 TDF domains were considered key in influencing BC sampling, including 'no awareness of guideline, low priority of BC, no intention to follow guidelines, level of doctors who can order or initiate an order for BC, no norms of BC sampling, perceived cost-effectiveness of BC, regulation on cost reimbursement and consequences that discourage BC sampling. The study identified individual, socio-cultural and environmental barriers/enablers to BC sampling across different countries, which represent potential targets for interventions. Context-specific multifaceted interventions at both hospital and policy levels are required to improve diagnostic stewardship practices ().

In Ethiopia, different research where conducted on the bacterial profile and antimicrobial susceptibility pattern. A cross sectional study involved about 201 pediatrics patient was conducted from October 2011 to February 2012 at pediatric units of TikurAnbessa Specialized

Hospital and Yekatit 12 Hospital. Majority 147 (73.1%) of them were neonates (<28 days). Out of the 201 tested blood samples, blood cultures were positive in 56 (27.9%). However, Gram negative and Gram positive bacteria constituted 29(51.8%) and 26(46.4%) respectively. From which contaminant result was 19.6% ().

A cross-sectional study was conducted between September 2018 and March 2019. Blood collected twice from each septicemia suspected patient were processed following standard bacteriological procedures. The prevalence of BSI was 28.06% and a higher proportion of pathogen detected were gram-negative bacteria (54.5%) and gram-positive bacteria (45.43%). Contaminant result was 15.2%. The final conclusion of the research was pediatric patients and ICU patients are more affected by BSI, and drug-resistant bacteria are a major problem. Therefore, appropriate intervention approaches need to be implemented ().

A cross-sectional study was carried out among children with CHD and sepsis at TASH between May 2017 and July 2020. The study aimed to describe the pattern and outcome of bacterial sepsis among children with CHD in TikurAnbessa Specialized Hospital. This study included 384 CHD children with sepsis. Proportion of culture proven bacterial sepsis was 17.1% (66) from which 27% of culture result was contaminant ().

This shows that it is universal in failure to adhere on standardize clinical culture specimen collection but there is huge difference in contaminant culture result in developed and developing country ().

2.5. Conceptual framework

3. Objective

3.1. General objective

- To identify the practice standardizing blood culture specimen collection and associated factors in hospitalized children at Tikur Anbessa Specialized Hospital, Addis Ababa Ethiopia.

3.2. Specific objectives

- To determine the current practice of blood culture specimen collection.
- To identify facilitators for promoting scandalized blood culture specimen collection.
- To identify contributor towards limitations of standardizing blood culture specimen collection.
- To identify factors affecting the standardizing blood culture specimen collection

4. Materials and Methods

4.1. Study Setting

The study was conducted at TikurAnbessa specialized hospital at pediatrics ward Addis Ababa, Ethiopia. TikurAnbessa specialized hospital, established in 1974 GC, is the largest tertiary hospital in the country. The hospital is administered by Addis Ababa University and is the largest and oldest teaching hospital among all in Ethiopia providing teaching for about 300 medical students and 350 residents each year. TASH provides diagnosis and treatment for approximately 400,000 patients each year. The pediatrics department has 4 ward, pediatrics ICU and Causality ward. In each ward 5 – 6 interns, 3-4 year 1, 3-4 year 2, 2-3 year 3 resident and 3 seniors assigned in every months.

4.2. Study Design and period

An institutional based prospective cross sectional study was conducted from July to October, 2023 (GC).

4.3. Source Population

All health care professionals who collect blood sample for culture at hospital level.

4.4. Study Population

All health care professionals who collect blood sample for culture at TASH.

4.5. Sampling Frame

Systematic random sampling technique was applied on those who work at pediatrics inpatient and causality ward and draw blood sample for culture.

4.6. Sample Size

Sample size is determination by using a single population formula.

$N =$ Total sample size

$Z = 1.96$

$P = 50\%$ (0.5) was taken because there was no similar studies conducted so far found in the same age group.

$q = 1 - p$

$d =$ Margie of error 5% (0.05)

$N = \frac{Z^2 pq}{d^2} = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = \frac{0.9604}{0.0025} = 384$

$d^2 = 0.05^2 = 0.0025$

The final sample size calculated using the above formula and adding non response rate of 10%

Become 422.

4.7. Inclusion and Exclusion criteria

➤ Inclusion criteria

- Health care providers who draw blood sample for culture and sensitivity.

➤ Exclusion criteria

- Health care provider who were absent during the data collection due to personal problem or annual leave were excluded from the study.

4.8. Operational definitions

- **Barriers for implementation** - who scored greater than to the mean score of the barrier questions was categorized as having good perception, whereas those who scored less than or equal the mean score was categorized as having poor understanding.
- **Enablers for implementation:-** who scored greater than to the mean score of the enabler questions was categorized as having good perception, whereas those who scored less than or equal the mean score was categorized as having poor understanding.

4.9. Data collection and measurement

The data was collected by interviewing health care professional who draw blood specimen for culture with structured questionnaire. The questionnaire was piloted and if any revision was needed and modified on the result of the pilot study.

The questioner was divided in to 5 sections.

- Section one: About the socio demographic characteristics like educational status and experience of the participants.
- Section two to five: Assessing the barrier and enablers of implementing standardizing blood culture specimen collection.

4.10. Data Handling

The data cleanness and completeness was checked by the principal investigator daily. The hard copies were converted into soft copies, stored on a hard drive, and backup copies were stored on a separate drive.

4.11. Study Variables

4.11.1. Independent Variable;

- Socio-demographic data: Age, Sex, work experience, educational back ground

- Other factors: lack of standardized protocols, limited awareness & training, work load, supportive organizational culture and staff perception and satisfaction.

4.11.2. Dependent Variable

Standardizing blood culture specimen collection

4.12. Data Quality Assurance

The collected data was coded and checked for its completeness and converted in to soft copy. The converted soft copy was again cross-checked with the hard copy for neatness, completeness, and consistency before carrying out any statistical analysis.

4.13. Data Analysis

After a thorough cleaning and checking for its completeness data was entered into the statistical package for Social Science ver.25 (SPSS) for subsequent descriptive analysis such as mean frequencies and percentages as appropriate. Multiple variable binary logistic regression analysis was used to analyze the association between variables where applicable. Statistical significance was taken for p-value of < 0.05 for all statistical tests.

4.14. Ethical Consideration

Ethical clearance to conduct this study was obtained from the pediatrics and child health Departments of Research and Publications committee of the school of Medicine, College of Health Sciences, Addis Ababa University. Confidentiality was fully maintained during Data Collection and further analysis and dissemination of results.

4.15. Dissemination of findings

The output of this study will be displayed both in tabular and graphical presentations. The finding of the study will be presented on the research defense day and a formal report will be submitted to the Department of Pediatrics and Child Health with both soft and hard copy. The research output will also be published on local or international scientific journals.

5. Result

5.1. Socio demographic characteristics

In this study a total of 400 nurses with response rate of 98.5% had participated in TikurAnbessa Specialized Hospital during the study period. The mean age of the study participants was 31.64 years with a standard deviation of 4.09. As shown in Table-1 below more than half 233 (58.3%) were in the age group of 30-39 years with the minimum age of 26 and the highest age 44 years. Three hundred sixty eight (92%) were BSc educational back ground. Majority of the study participants 288 (72%) had work experience of less than five years.

Table 1: Socio demographic characteristics of nurses who participated in the study

Variables	Number (n)	Percentage (%)
Sex		
Female	280	70
Male	120	30
Age		
<=30	151	37.8
30-39	233	58.3
>=40	16	4.0
Level of Education		
Bachelor's degree	368	92
Master's degree or higher	32	8.0
Work experience		
<5 years	288	72
>=5 years	112	28

5.2. Knowledge level and awareness

All study participants had familiar with the concept of standardizing clinical culture specimen. However, the collection technique according to the standard among the study participants was only 104 (26%) with (95%CI, 21.8-30.3). Majority of the study participants had moderately knowledgeable 304 (76%), while only 23(5.8%) were very knowledgeable about the standardizing clinical culture specimen collection. Table 2

Table 2: The participants' Knowledge level and awareness regarding the standardization of blood culture specimen

State of knowledge regarding blood culture	frequency (n)	Percentage
Familiar with the concept of standardizing clinical culture specimen		
Yes	400	100
No	0	0
Knowledge level		
Slightly knowledgeable	73	18.3
Moderately knowledgeable	304	76
Very knowledgeable	23	5.8
Training on standardizing clinical culture specimen collection		
Yes	0	0
No	400	100
Collection technique according to the standard		
Yes	104	26
No	296	74

5.3. Enablers for the implementation of standardizing blood culture specimen collection

Among the study participants, 164 (41%) agreed that availability of clear guidelines and protocols for standardized collection and 159(39.8%) agreed that comprehensive training programs and education materials for healthcare staff would keep them standardized clinical culture specimen collection. One hundred fifty two (38%) agreed that collaborative communication between healthcare staff, patients, and families regarding the importance of standardized collection. The mean (SD) score on enablers was 3.44 ± 0.46 . Of these, 239 (59.8%) had a good understanding towards enablers for implementation of standardized clinical culture specimen collection (table 3).

Table3: Enablers for implementation of standardized clinical culture specimen collection in hospitalized children.

Enabler related questions	Category	Frequency (%)
Comprehensive training programs and education materials for healthcare staff.	Strongly disagree	9(2.3)
	Disagree	24(6)
	Neutral	96(24)
	Agree	159(39.8)
	Strongly agree	112(28)
Adequate availability of necessary resources (equipment, supplies) to support standardized collection practice.	Strongly disagree	25(6.3)
	Disagree	56(14)
	Neutral	99(24.8)
	Agree	119(29.8)
	Strongly agree	101(25.3)
Leadership support and commitment to implementing standardized collection techniques.	Strongly disagree	22(5.5)
	Disagree	155(38.8)
	Neutral	117(29.3)
	Agree	55(13.8)
	Strongly agree	51(12.8)
Clear guidelines and protocols for standardized collection.	Strongly disagree	12(3)
	Disagree	24(6)
	Neutral	93(23.3)
	Agree	164(41)
	Strongly agree	107(26.8)
Collaborative communication between healthcare staff, patients, and families regarding the importance of standardized collection.	Strongly disagree	24(6)
	Disagree	56(14)
	Neutral	120(30)
	Agree	152(38)
	Strongly agree	48(12)
Incentives or rewards for healthcare staff to encourage adherence to standardized collection practices.	Strongly disagree	17(4.3)
	Disagree	127(31.8)
	Neutral	108(27)
	Agree	67(16.8)
	Strongly agree	81(20.3)

5.4. Barriers for the implementation of standardizing blood culture specimen collection

The mean (SD) score on barrier for implementation was 3.28 ± 0.44 . Of these, 226 (56.5%) had Good understanding towards the barriers of implementing technique. Of the study participants, 159 (39.8%) had agreed insufficient training and education regarding standardized collection techniques and 119(29.8%) agreed inadequate resources (e.g. equipment, supplies) to support standardized collection practices were barriers for the implementation. However, 144(36%) participants about the awareness about the importance of standardized clinical culture specimen collection and 168(42%) participants on the resistance to change from healthcare staff had neutral response (table 4).

Table4: barriers for implementing standardized clinical culture specimen collection in hospitalized children.

Barriers related questions	Category	Frequency (%)
Lack of awareness about the importance of standardized clinical culture specimen collection	Strongly disagree	16(4)
	Disagree	165(41.3)
	Neutral	144(36)
	Agree	48(12)
	Strongly agree	27(6.8)
Insufficient training and education regarding standardized collection techniques.	Strongly disagree	9(2.3)
	Disagree	24(6)
	Neutral	96(24)
	Agree	159(39.8)
	Strongly agree	112(28)
Inadequate resources (e.g., equipment, supplies) to support standardized collection practices.	Strongly disagree	25(6.3)
	Disagree	56(14)
	Neutral	99(24.8)
	Agree	119(29.8)
	Strongly agree	101(25.3)
Resistance to change from healthcare staff.	Strongly disagree	56(14)
	Disagree	132(33)
	Neutral	168(42)
	Agree	32(8)
	Strongly agree	13(3.3)
Lack of clear guidelines or protocols for standardized specimen collection.	Strongly disagree	13(3.3)
	Disagree	59(14.8)
	Neutral	112(28)
	Agree	160(40)
	Strongly agree	56(14)
Time constraints and workload pressure affecting the implementation of standardized collection practices.	Strongly disagree	13(3.3)
	Disagree	48(12)
	Neutral	131(32.8)
	Agree	152(38)
	Strongly agree	56(14)
Communication Barriers between healthcare staff and patients/families regarding the importance of standardized collection.	Strongly disagree	24(6)
	Disagree	56(14)
	Neutral	120(30)
	Agree	152(38)
	Strongly agree	48(12)

5.5. Factors influencing standardizing blood culture specimen collection

In this study the binary logistic regression model analysis showed sex, Knowledge level regarding the standardization, Enablers and barriers for implementation were statistically associated with p-value <0.05.

In order to avoid an excessive number of variables and unstable estimates, variables with P value <0.25 were taken to multi variable binary logistic regression analysis.

After adjusting for confounders in the multivariable binary logistic regression analysis, female were 7.27 times more likely statistically significant to implement standardizing blood culture specimen collection (AOR=7.27, 95% CI, 3.34 - 15.89), very knowledgeable study participants were 3.62 times to practice according to the standard than those slightly knowledgeable (AOR= 3.62, 95% CI, 1.34-9.08). Those who had good understanding about the enablers and scored above the mean (AOR=1.68, 95%CI, 1.01-2.81) and those who had good understanding about the barriers and scored above the mean (AOR=95% CI, 1.75(1.04-2.95) were significantly associated with standardizing blood culture specimen collection practice.

Table 5: Binary and multi variable logistic regression analysis of factors associated with standardizing blood culture specimen collection (n=400)

Variables	collection according to the standard		COR	P-value	AOR	P-value
	Yes	No				
Sex						
Female	96	184	7.3(3.42-15.6)	0.00	7.29(3.34-15.89)	0.000
Male	8	112	1.00		1.00	
Work experience						
<5 years	80	208	1.00		1.00	
>=5 years	24	88	1.41(0.84-2.37)	0.19	1.13(0.62-2.06)	0.68
Level of education						
BSc	96	272	1.00			
Masters and above	8	24	1.06(0.46-2.44)	0.89	1.46(0.57-3.72)	0.43
Knowledge level regarding the standardization						
Slightly knowledgeable	9	64	1.00			
Moderately knowledgeable	79	225	0.40(0.19-1.84)	0.32	0.26(0.12-1.57)	0.41
Very knowledgeable	16	7	6.51(2.58-16.41)	0.00	3.62(1.34-9.08)	0.01
Enablers for implementation						
Good perception	49	190	2.01(1.28-3.16)	0.002	1.68(1.01-2.81)	0.046
Poor perception	55	49	1.00			
Barriers to implementation						
Good perception	43	183	2.29(1.46-3.62)	0.000	1.75(1.04-2.95)	0.035
Poor perception	61	113				

1.00=reference, AOR= Adjusted Odds Ratio, COR=Crude Odds Ratio, CI= Confidence Interval

6. Discussion

We had seen different demographic and other factors such as gender, level of education, work experience, health care providers' knowledge about standardization and the enablers and barriers understanding level were among the parameters of the 400 study participants.

In the current study about 55.9% study participants agreed that leadership support and commitment to implementing standardized collection techniques. This is in line with the result of a systematic review done on the effectiveness of three practices for reducing blood culture contamination rates which disclosed involvement from multiple, relevant departments and leaders within an organization to support implementation likely be required (12).

In the current finding, female were more likely to implement standardizing blood culture specimen collection (AOR=7.27, 95% CI, 3.34 - 15.89). This might be due most of the time female are more care full and responsible at each of their activities.

About 67.8% nurses also agreed insufficient training and education regarding standardized collection techniques perceived as initial barriers. This finding agrees with previously conducted Meta analysis study which showed training costs as initial barriers (12).

Knowledge about cross contamination and antimicrobial resistant strains of hospital pathogens can be major challenge for the standardized blood culture specimen collection (13). The knowledge level of nurses about the standardization of clinical specimen collection in this study Very knowledgeable was 3.62 times to practice according to the standard compared to slightly knowledgeable. The findings were comparable with different studies carried out elsewhere in other developing countries such as Pakistan (14, 16). Failure to attempt in identification of potential anaerobic bacteria and fungi in this study might under estimate the exact hospital acquired postoperative infection rate in the study area.

According to this study good understanding about the enablers were significantly associated with standardizing blood culture specimen collection practice. A finding from another study which showed implementing collaborative communication and networks, having clear guide lines were identified as important enabler factors (7). This is supportive to our finding.

Those who had good understanding about the barriers were also significantly associated with standardizing blood culture specimen collection practice. This finding was in line with other

previous study conducted in Kirsehir, Turkey (8). Several barriers negatively influenced the practices and information exchange, which may place patients in a vulnerable and exposed condition. Those services should be facilitated by providing adequate resources, clear work statements, and understandable course of actions.

7. Strength and Limitations

The study was a prospective cross sectional study conducted at specialized hospital to identify the practice standardizing blood culture specimen collection. The data was collected by a pretested and interview based by trained and experienced data collectors.

As a limitation of our study, we stated that the survey was conducted only once which is not follow up type. That is the result reflects only for the time of data collection only. It was also conducted in hospital setting which may not be generalizable to other settings.

8. Conclusion and Recommendations

The clinical evaluation of culture results can be affected by multiple factors at almost all stages of the procedure, which include the time of blood collection, technique for drawing blood, volume, care providers who obtained the sample training condition and the materials and guide lines. Standardization of these factors with continual training will provide maximal benefit.

In Ethiopia context the research on barriers and facilitators of blood culture collection practice is very limited. To determine quality blood culture collection practice particularly in the children patient subgroups Extra research is needed focusing on the domains of enablers and barriers quality improvement practices not only hospital settings but also in other important care settings that needed to evaluate and improve quality gaps.

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Annex: Data collecting Questionnaire

Title: Barrier's and Enablers for the implementation of standardizing blood culture specimen collection in Hospitalized children, TikurAnbessa Specialized Hospital, Addis Ababa, Ethiopia

Code number _____ Date ____/____/____

Signature _____

Section I- Demographic Data

1. Age _____ years
- 2, Sex A, Male B, Female
- 3, Profession A, Senior B, Resident C, Nurses D, Intern

Section 2- Knowledge and Awareness

1, Are you familiar with the concept of standardizing clinical culture specimen collection?

- A, Yes
- B, No

2, If yes, how would you rate your knowledge level regarding the standardization of clinical specimen collection in hospitalized children?

- A, Very Knowledgeable
- B, Moderately Knowledgeable
- C, Slightly Knowledgeable
- D, Not Knowledgeable at all.

3, Have you received any training or education on standardized clinical culture specimen collection practice in hospitalized children?

- A, Yes
- B, No

4, If yes, please briefly describe the nature of the training or education you received.

Section 3: Barriers to implementation please indicate the extent to which you agree or disagree with the following statements related to barriers for implementing standardized

clinical culture specimen collection in hospitalized children. Use a scale of 1 to 5, where 1 represent “Strongly Disagree”, 2 represent Disagree, 3 represent Neutral, 4 represent Agree and 5 represent “Strongly Agree”.

S.N	Barriers to implementation of standardized clinical culture specimen collection in hospitalized children.	1	2	3	4	5
1	Lack of awareness about the importance of standardized clinical culture specimen collection					
2	Insufficient training and education regarding standardized collection techniques.					
3	Inadequate resources (e.g., equipment, supplies) to support standardized collection practices.					
4	Resistance to change from healthcare staff.					
5	Lack of clear guidelines or protocols for standardized specimen collection.					
6	Time constraints and workload pressure affecting the implementation of standardized collection practices.					
7	7, Communication Barriers between healthcare staff and patients/families regarding the importance of standardized collection.					

8, Other barriers (please specify)

Section 4: Enablers for implementation please indicate the extent to which you agree or disagree with the following statements related to enablers for implementing standardized clinical culture specimen collection in hospitalized children. Use a scale of 1 to 5, where 1 represent “Strongly Disagree”, 2 represent Disagree, 3 represent Neutral, 4 represent Agree and 5 represent “Strongly Agree”.

S.N	Enablers for implementation of standardized clinical culture specimen collection in hospitalized children.	1	2	3	4	5
1	Comprehensive training programs and education materials for healthcare staff.					
2	Adequate availability of necessary resources (e.g., equipment, supplies) to support standardized collection practice.					
3	Leadership support and commitment to implementing standardized collection techniques.					
4	Clear guidelines and protocols for standardized collection.					
5	Collaborative communication between healthcare staff, patients, and families regarding the importance of standardized collection.					
6	Incentives or rewards for healthcare staff to encourage adherence to standardized collection practices.					

7, Other Enablers (please specify)

Section 5: Additional Comments

Please provide any additional comments, insights, or suggestions related to the barriers and enablers for implementing standardized clinical culture specimen collection in hospitalized children.

Thank you for participating in this questionnaire. Your responses are greatly appreciated and will contribute to valuable in this field.