ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF PEDIATRICS AND CHILD HEALTH

PEDIATRIC RESIDENT KNOWLEDGE OF TRANSFUSION MEDICINE IN TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA

BY: DR. ELIAS TADESSE (MD, PEDIATRICS AND CHILD HEALTH RESIDENT)

THESIS SUBMITTED TO ADDIS-ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES SCHOOL OF MEDICINE DEPARTMENT OF PEDIATRICS AND CHILD HEALTH AS A PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE SPECIALTY CERTIFICATE IN PEDIATRICS AND CHILD HEALTH.

MARCH 2024

ADDIS ABABA, ETHIOPIA

Pediatric Resident Knowledge of Transfusion Medicine in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia

Advisor: - Abdulkadir Gidey, MD, Assistant professor of Pediatrics and Pediatric Hemato-Oncology

Addis Ababa, Ethiopia

March 2024

THESIS SUBMISSION FORM

Name of the investigator	Dr. Elias Tadesse
Name of advisors	Abdulkadir Gidey, MD, Assistant professor of Pediatrics and Pediatric Hemato-Oncology
Full title of the research project	Pediatric Resident Knowledge of Transfusion Medicine in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia,2024
Duration of the project	3 months
Study area	Tikur Anbessa, Ethiopia.
Total cost of the project	25,050 ETB
Address of investigator	Name: Dr Elias Phone: +251927731442 Email : elijahtad56@gmail.com

Declaration

Assurance of principal investigator, I agree to accept responsibility for the scientific, ethical and technical conduct of the research project & for provision of required progress report as per terms and condition of the college of health sciences in effect at the time of grant is forwarded as the result of this application.

Name of principal investigator	Signature	Date
Dr Elias Tadesse	_____	_____

Approval

This thesis proposal has been submitted with the approval of the university advisors

Name of the advisors	Signature	Date
Dr. Abdulkadir Gidey	_____	_____

Acknowledgements

First, I would like to say thank almighty God for helping me all the way, Next, my special respect goes to my Advisor Dr. Abdulkadir Gidey for his unreserved help, positive guidance, constrictive comments, and continuous efforts. Furthermore, my heartfelt gratitude to Addis Ababa University College of Health Science, School of medicine, Department of Pediatrics and Child Health for providing this great opportunity. Finally, I would like to thank all my friends and colleagues.

Table of contents

List of acronyms

AA- Addis Ababa

AAU- Addis Ababa University

ANOVA - One-Way analysis of variance

E.C- Ethiopian Calendar

ETB- Ethiopian Birr

FFP- Fresh Frozen Plasma

FMOH- Federal ministry of Health

G.C- Gregorian Calendar

HCW- health care workers

HDI- Human Development Index

NICU- Neonatal Intensive care unit

PI- Principal Investigator

PIDs- Post-Intern Doctors

PGY- Postgraduate Year

REC- Research Ethical Committee

SPSS- Statistical Package for the Social Sciences

TASH- Tikur Anbessa Specialized Hospital

TM- Transfusion Medicine

TRALI- Transfusion Related Lung Injury

TTIs- Transfusion Transmitted Infections

UK- United Kingdom

List of figures

List of tables

Abstract

Background: One of the most often performed hospital treatments worldwide is blood transfusion. Approximately 5% of pediatric patients require transfusions at least once while they are hospitalized. Clinician's knowledge about blood products and their preparation, storage, demands, doses and administration, may have profound impact on patient care and transfusion outcomes. Despite the frequent use of transfusion therapy in almost every medical field and potential risk, there is very little educational time in medical school and residency spent on transfusion medicine topics.

Objective: - This study amid to assess Pediatric Resident Knowledge of Transfusion Medicine in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia, 2024.

Methods: Hospital based cross-sectional study was conducted among 107 conveniently selected residents at study Hospitals from 16/10/2015 -16/01/2016 E.C. Knowledge of residents were assessed by a structured questionnaire adapted from different literature. Then the data was analyzed using SPSS version 25 software package. Descriptive summary statistics, One-Way analysis of variance (ANOVA) was performed to determine if there were any statistically significant differences between the mean scores for different subgroups and fisher exact test was computed, to check if there was statistically significant association between the knowledge level and explanatory variable. Statistical significance was considered at level of significance of 5% (p value <0.05). finally, the results were presented using text, table, and charts.

Result: 107 pediatric residents in TASH participated in this study. Majority of the residents (80.4%) had good knowledge on diagnosing/treating acute hemolytic transfusion reactions. The average score was 34.7% with no statistically significant difference in year of residency.

Conclusion: this study examined, using a validated, pediatric-focused assessment tool, transfusion medicine knowledge in a large sample of pediatric residents of TASH. The results demonstrated that many pediatric residents do not have adequate transfusion medicine education and knowledge.

Key words: Knowledge, Pediatric resident, Transfusion medicine, TASH, Ethiopia

1 Introduction

1.1. Background

Blood transfusion is a highly effective and potentially lifesaving treatment, and an essential component of modern health care(1). Blood transfusion is one of the most common hospital procedures performed in the world(2). Transfusions are a common intervention within pediatrics and require unique considerations to optimize patient care(3). Transfusion can result in significant medical complications that require prompt assessment and intervention(4).

Transfusions are often necessary for pediatric patients, such as those with hematologic malignancies or disorders, severely unwell children in intensive care units, and premature babies. (3). Approximately 5 % of pediatric patients in high-risk intensive care units need transfusions at least once during their stay.(5). The growth and development of children differs greatly from that of adults, and their needs must be taken into account when choosing the sort of product to use, how to modify it, how much to use at a time, how quickly to provide it, and whether transfusions could cause complications.

The time spent on transfusion medicine subjects in medical school and residency, despite the fact that transfusion therapy is used often in almost every medical specialty and carries some risk.(2,6). As a result, several studies have demonstrated a significant knowledge gap among physicians(2,7–10). This lack of understanding of evidence-based transfusion medicine has been demonstrated to negatively impact patient care, specifically resulting in inappropriate and overuse of blood products(3,11).

1.2 Statement of the problem

Transfusion medicine (TM) has been recognized as a basic specialty, and post graduate courses are being conducted at various teaching hospitals in the developed world. However, in the undergraduate and postgraduate curriculum, not much emphasis is given on the training in TM (1). A number of studies have shown a high rate of inappropriate blood product use. These findings are likely in part due to inadequate knowledge of transfusion medicine(12,13)

Thus, the purpose of this descriptive cross-sectional study was to examine this issue specifically among pediatric residents at Tikur Anbessa Specialized Hospital. As a starting point, this study sought to describe Pediatric residents' knowledge of transfusion medicine at TASH. And by identifying the gaps, it is reasonable to address those gaps to help the residents and serve pediatric patients appropriately.

1.3 Significance of the study

Transfusion of blood and blood products is one of the most frequently practiced procedures at our hospital. Although residents are not directly involved in the procedure, they are responsible for following patients during and after the transfusion. They are also required to have adequate knowledge on transfusion reactions and related complications. Data regarding knowledge, attitude and/practice of pediatric residents on transfusion medicine, not only in our country but worldwide, is scarce. In this study I tried to assess pediatrics knowledge of transfusion medicine at TASH. The results of this study can be used as an input for the policy makers/FMOH to assess and address the gaps identified. Also, the findings of the study will help as baseline data for further research in the future.

2. Literature Review

Although blood transfusions are the most common treatment performed on hospitalized patients, transfusion medicine (TM) is not given much consideration in medical school curricula worldwide. Because of this, doctors' understanding of TM is still insufficient, which has an adverse effect on clinical practice and the appropriate selection of blood components.(13,14).

There are only few global researches done on pediatric residents' knowledge of transfusion medicine. There is only one large survey that was done on the topic across 19 sites in 6 countries (UK, Brazil, Singapore, Canada, Netherlands and US). The overall mean score on the exam was 37.1% (range 9.5% – 71.4%). The mean scores at the different participating sites ranged from 30.7% - 42.1%, which was found to be poor(3).

A survey to assess and quantify the knowledge of TM among PIDs was done in specialized hospital in Sri Lanka. In this survey a total of 56% of participants correctly answered basic knowledge questions (surgery, 52%; internal medicine, 66%; anesthesia, 49%; pediatrics, 43%; obstetrics/ gynecology, 43%; and general medicine, 55%)(15). In a descriptive cross-sectional survey using a self-administered questionnaire conducted in a tertiary care in western India, pediatric residents scored 59.5 % which is below the minimum score for satisfactory response indicating mandatory basic minimum knowledge which was 60 %(1).

A cross-sectional study was done in Iran in 2007 G.C to assess physicians' knowledge on transfusion medicine. The results of this research showed that physicians' knowledge in transfusion medicine is one-third of the expected level(16). Another study done across 9 countries (Australia, Canada, England, Ireland, Italy, Germany, The Netherlands, Spain and United States) demonstrated the poor state of internal medicine residents' knowledge of transfusion medicine(2).

3. Objective

3.1. General objective

- To assess Pediatric Resident Knowledge of Transfusion Medicine in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia, 2024

3.2. Specific objectives

- To assess the level of knowledge Pediatric residents towards transfusion medicine
- To describe the perceived knowledge and attitudes of pediatrics residents
- To determine factor affecting knowledge level of Pediatric residnets to wards transfusion medicine

4. Method and Materials

4.1. Study area

The study was conducted at Tikur Anbessa Specialized Hospital. Addis Ababa is the capital city of Ethiopia. Tikur Anbesa Specialized Hospital (TASH) is the country's largest tertiary hospital. TASH is situated at the heart of the capital city on Churchill Avenue. The hospital is also the largest teaching hospital in the country providing undergraduate as well as postgraduate teaching service in addition to other two pillars of teaching hospital such as clinical service for patients from all corners of the country and problem-solving researches on thematic areas. It has more than 900 beds and offers diagnosis and treatment for approximately 500,000 patients a year. There are a total of 112 pediatric residents, year I to year III, which is the highest number in the country.

4.2. Study design and period

- An institution based cross-sectional study was conducted from 16/10/2015 -16/01/2016 E.C

4.3. Population

4.3.1. Source population.

- All pediatric residents in TASH,

4.3.2. Study population.

- Pediatric residents in TASH, who were working pediatric unit during the study period and willing to participate in the study.

4.4. Inclusion and exclusion criteria

4.4.1 Inclusion criteria

- All Pediatric residents who are working in Tikur Anbessa Specialized Hospital, who were willing to participate.

4.4.2 Exclusion criteria

- Pediatrics residents
    - who were unwilling to participate.

4.5 Sample size and procedure

There was a total of 112 pediatrics residents, excluding the principal investigator, from year 1 to year 3 who are actively involved in their specialty program. 107 pediatric residents practicing TASH during the study were included in the study.

4.7 Data collection methods and producer

Google form-based survey questionnaire and exam was used to collect data from pediatrics residents of TASH.

The data was obtained from residents by using structured questionnaire after getting informed consent. The standardized questionnaire was adapted from BEST-TEST3 International Education Needs Assessment with some modification. it consisted of four parts. The first part contained basic demographic information. The second part it assesses background information of pediatric residents. The third it assesses pediatric residents' ability. The fourth part included 20 multiple choice questions to assess the participants' knowledge. All the questions were in English, and it was be distributed to residents and they were doing it on spot by using their phones or tablets. The face and content validity of the questionnaire were established by experts' approval from previously done different literatures.

4.8. Data processing and analysis

After data collection, it was entered using Google sheet, each completed form was checked for completeness and exported to SPSS version 25 for analysis. The result was present using descriptive summary statistics such as frequencies, proportions, the mean, median and standard deviation. One-Way analysis of variance (ANOVA) was performed to determine if there were any statistically significant differences between the mean scores for different subgroups A fisher exact test was computed to check if there was statistically significant difference between knowledge level and explanatory variables Statistical significance was considered at level of significance of 5% (p value <0.05).

4.9. Study Variables

4.9.1. Outcome variable

- Knowledge, of transfusion medicine

4.9.2. Explanatory variables

- Age
- Sex
- Year of residency
- Training about transfusion medicine
- Ability
- Work experience.

4.10. Operational Definition

Level of knowledge of pediatric residents:

- was categorized based on the mean value; those who score below the mean were classified less knowledgeable and those who score above the mean were classified knowledgeable.

4.11. Ethical consideration

An ethical clearance and official letter were obtained from the Department of Research and Publication Committee of Addis Ababa university, Department of pediatric and child health. After getting permission from the hospitals to participate in the study, verbal consent was obtained from each resident. The data collection was anonymous which do not include names of individual participant and any other personal identifiers and confidentiality was maintained at all levels of the study, and the collected information was kept in a secured place.

4.12 Dissemination of the result

The results of the study were presented and submitted to Addis Ababa University, College of medicine and Health Sciences department of pediatrics and child health. The findings were also shared with the staff, authorities, and officials of TASH in order to enhance appropriate interventions. The study might be presented in associations like Ethiopian Pediatrics Society (EPS) and the result of the study will be attempted to be published in medical journals.

5. Results

5.1 Sociodemographic characteristics of pediatrics resident at TASH

The study was conducted in Tikur Anbessa specialized hospital (TASH). A total of 107 respondents participated, making a response rate 95.5%.

Of the total Pediatrics Residents, 63 (58.9%) were male and 44 (41.1%) were female, resulting in a male to female ratio of 1.4:1. Nearly two-thirds 62(57.9%) of them were between the ages of 28 to 30 years. Of residents, about 43 (40.2 %) were year III residents. Nearly three fourth 76(71.0%) of pediatrics residents had one-to-three-year work experience. The socio-demographic characteristic of the study population is shown in table 1.

Table 1 sociodemographic characteristics of pediatric resident at TASH from 16/10/2015 - 16/01/2016 E.C

SD Variable		**Frequency**	**Percent**
Age in year	25 – 27	10	9.3
	28 – 30	62	57.9
	31 – 33	28	26.2
	Above 33	7	6.5
	Total	**107**	**100.0**
Sex	Female	44	41.1
	Male	63	58.9
	Total	**107**	**100.0**
Year of residency	R1	29	27.1
	R2	35	32.7
	R3	43	40.2
	Total	**107**	**100.0**
Work Experience	1 year - 3 years	76	71.0
	Less than 1 year	13	12.1
	more than 3 years	18	16.8
	Total	**107**	**100.0**

5.2 Previous Trainings and perceived knowledge of pediatrist residents

Nearly half 51(47.7%) of pediatric residents took transfusion medicine training in medical school for 1 hr. and about 47(43.9%) took transfusion medicine training in residency for 1 hr. More than a quarter 29(27.1%) of Pediatrics residents who took transfusion medicine in medical school and nearly one third 34(31.8%) of Pediatrics residents who took transfusion medicine training in residency consider the training was Very helpful.

Only 14(13.1%) of pediatrics residents reported that the presence of transfusion guideline in the hospital, while 47(43.9%) knew how to contact the blood bank. More than half 63(58.9%) of residents had obtained informed consent to provide blood products to a patient. The majority 79(73.8%) rated their knowledge of transfusion medicine as "intermediate" and almost all 79(73.8%) felt that additional training in transfusion medicine would be Very helpful to their education and care of patients with 21(19.6%) indicating it would be extremely helpful. Subject survey responses are described in Table 2.

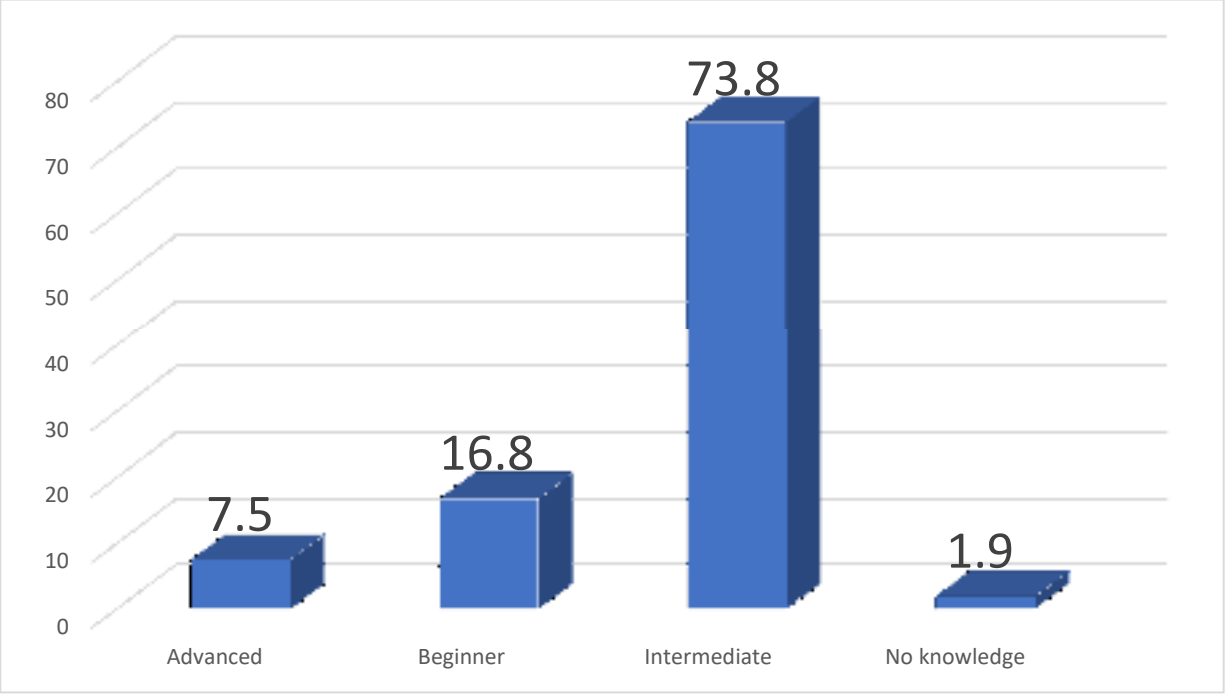

Fig 1 perceived knowledge of pediatrist residents at TASH from 16/10/2015 -16/01/2016 E.C

Table 2 Previous Trainings and perceived knowledge of pediatrist residents at TASH from 16/10/2015 -16/01/2016 E.C

Variables		Frequency	Percent
Amount of Training in Medical School	1 hour	51	47.7
	2 hours	25	23.4
	3hours	10	9.3
	4+ hours	6	5.6
	None	15	14.0
Was Medical School Education Helpful	Extremely helpful	4	3.7
	Moderately helpful	31	29.0
	Not at all helpful	13	12.1
	Slightly Helpful	30	28.0
	Very helpful	29	27.1
Amount of Training in Residency	1 hour	47	43.9
	2 hours	22	20.6
	3 hours	10	9.3
	4+ hours	2	1.9
	None	26	24.3
	Total	107	100.0
Was Residency Education Helpful	Extremely helpful	5	4.7
	Moderately helpful	28	26.2
	Not at all helpful	23	21.5
	Slightly Helpful	17	15.9
	Very helpful	34	31.8
Presence of transfusion guidelines	Don't Know	51	47.7
	No	42	39.3
	Yes	14	13.1
know how to contact the blood bank	No	60	56.1
	Yes	47	43.9
obtained informed consent	No	44	41.1
	Yes	63	58.9
my knowledge of transfusion medicine	Advanced	8	7.5
	Beginner	18	16.8
	Intermediate	79	73.8
	No knowledge	2	1.9
additional training importance	Extremely helpful	21	19.6
	Moderately helpful	4	3.7
	Not at all helpful	2	1.9
	Slightly Helpful	1	0.9
	Very helpful	79	73.8
Total		**107**	**100.0**

5.3 Perceived ability related to pediatric transfusion medicine.

Eight specific questions were asked assessing Pediatrics resident perceived ability (scale 1–5) to complete transfusion medicine associated activities. The mean ± SD perceive ability score of the total residents was 26.5 ±4.8. Regarding Average perceived knowledge score by year of residency, Year three residents had highest mean score 26.8 ± 5.04 followed by Year two 26.7 ±5.47 and years one 25.6 ± 3.79.

Nearly half 50(46.7%) of pediatrics resident consider themselves as "very good" in assessing need for RBC whereas as more than one third 40(37.4%) consider themselves as "good" in assessing need for Plasma transfusion, more than half 54(50.5%) of them consider them themselves "very good" in assessing need for platelet transfusion and more than one third consider themselves as "poor" in assessing need for cryoprecipitate or fibrinogen.

About 46(43.0%) of pediatrics residents consider themselves as "good" in assessing and treating patients' fever during a transfusion whereas about 43(40.2%) of them consider themselves as "good" in assessing and treating patients with dyspnea during a transfusion. More than a quarter31(29%) of pediatrics residents consider themselves as "good" in Obtaining consent from a patent. Almost half 79(73.8%) of them felt that knowledge of transfusion medicine would be Very important to provide appropriate care to patients. perceived ability of Pediatrics resident about transfusion medicine are described in Table 3

Table 3 perceived ability of Pediatrics resident about transfusion medicine at TASH from 16/10/2015 -16/01/2016 E.C

		Frequency	Percent
1 Assessing need for RBC	Fair	7	6.5
	Good	29	27.1
	Very Good	50	46.7
	Excellent	21	19.6
2 Assessing need for plasma transfusion	Poor	2	1.9
	Fair	17	15.9
	Good	40	37.4
	Very Good	31	29.0
	Excellent	17	15.9
3 Assessing need for platelet transfusion	Poor	2	1.9
	Fair	2	1.9
	Good	25	23.4
	Very Good	54	50.5
	Excellent	24	22.4
4 Assessing need for cryoprecipitate or fibrinogen	Poor	37	34.6
	Fair	31	29.0
	Good	26	24.3
	Very Good	13	12.1
5 Assessing and treating fever during a transfusion	Poor	2	1.9
	Fair	17	mo15.9
	Good	46	43.0
	Very Good	37	34.6
	Excellent	5	4.7
6 Assessing and treating a patient with dyspnea during a transfusion	Poor	1	0.9
	Fair	26	24.3
	Good	43	40.2
	Very Good	32	29.9
	Excellent	5	4.7
7 Obtaining consent	Poor	25	23.4
	Fair	24	22.4
	Good	31	29.0
	Very Good	20	18.7
	Excellent	7	6.5
8 Importance of transfusion medicine	Slightly important	3	2.8
	Moderately important	8	7.5
	Very important	53	49.5
	Extremely important	43	40.2
Total		**107**	**100.0**

5.4 Knowledge of residents towards transfusion medicine

Knowledge of transfusion medicine was measured Using a published transfusion medicine knowledge exam with 20 questions the cumulative score of 100. the mean ± SD knowledge score of the total pediatrics resident residents were 34.67 ±12.25. Regarding Average knowledge score by year of residency, Year one residents had highest mean score 35.0 ± 11.41 followed by Year two 34.5 ±11.0 and years three 34.53± 13.92. There was no statical significant difference in mean score between residents R1, R3 and R3 (p=0.986)

Table 4 Knowledge score of Residents transfusion medicine, in Tikur Anbessa specialized hospital from 16/10/2015 -16/01/2016 E.

Population	**M**	**SD**	**V**	**R**	**Min**	**Max**	95% CI	P value ANOVA	**Percentiles**		
									25	50	75
R1	**35.0**	**11.4**	**130.4**	**45**	**15**	**60**	**30.6 - 39.34**	**0.986**	**25.0**	**35.0**	**40.0**
R2	**34.6**	**11.0**	**121.1**	**40**	**15**	**55**	**30.7 - 38.3**		**25.0**	**35.0**	**45.0**
R3	**34.5**	**13.9**	**193.8**	**60**	**10**	**70**	**30.2- 38.8**		**25.0**	**35.0**	**40.0**
Total pediatrics residents	**34.7**	**12.3**	**150.1**	**60**	**10**	**70**			**25.0**	**35.0**	**40.0**

Mean(M), Standard deviation (SD), Variance(V), R(range) Minimum(min), Maximum(Mas), Confidence interval (CI) analysis of variance (ANOVA)

Nealy half 47(4.9%) of residents had poor overall knowledge about transfusion medicine, whereas 34(31.8%) had very poor knowledge. Only24(22.4%) and 2(1.9%) had good and very good knowledge respectively fig 1.

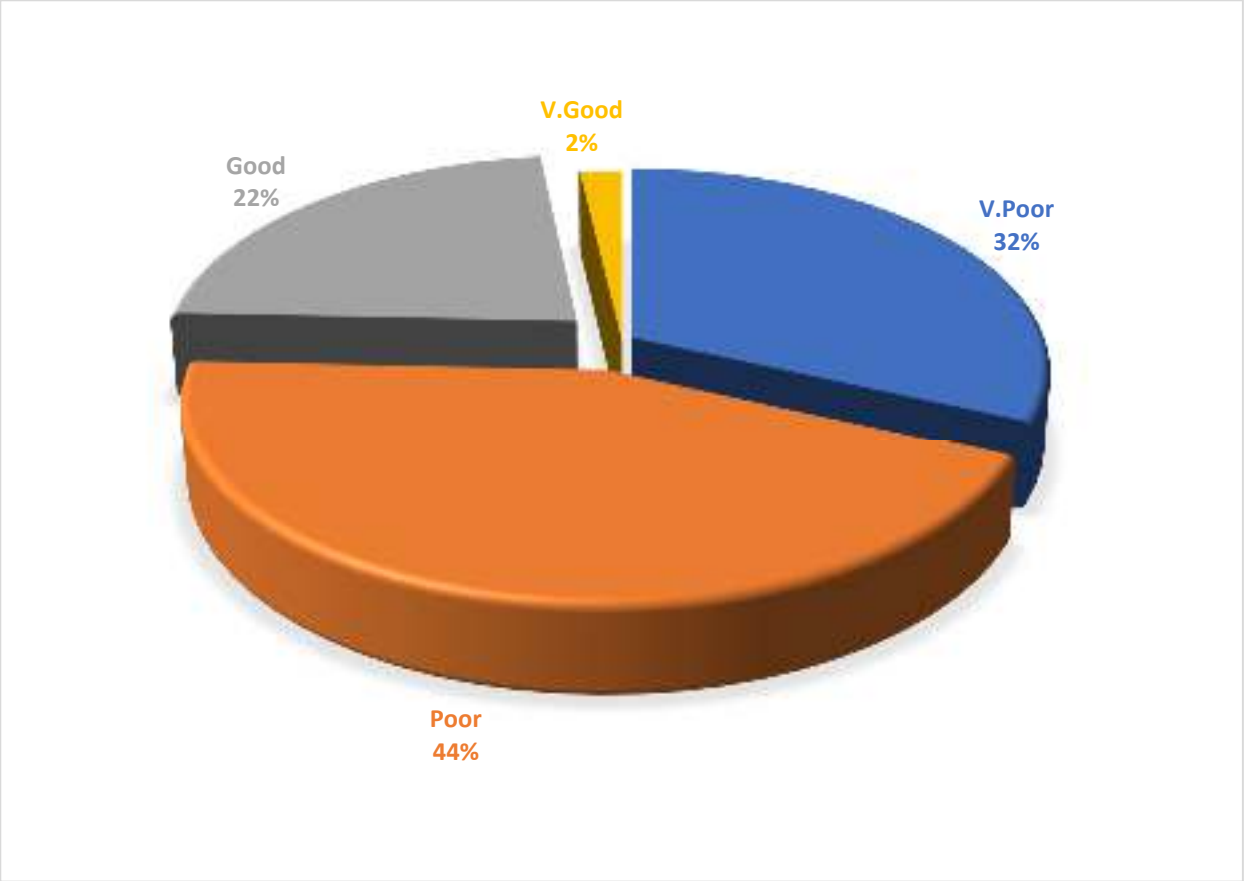

Fig 2 knowledge level of pediatrics Residents towards transfusion medicine, in Tikur Anbessa specialized hospital from 16/10/2015 -16/01/2016 E.

Regarding knowledge level by year of residency, more than half 15(51.7%) of year one residents had poor knowledge whereas more than a quarter 8(27.6%) had very poor knowledge and only 6(20.7%) had good knowledge. About 13(37.1%) and 12(34.3%) of year two residents had poor and very poor knowledge about transfusion medicine. Nealy half 19(44.2%) and nearly one third 14(32.6%) of year three resident had poor and very poor knowledge about transfusion medicine whereas about 8(18.6%) and 2(4.7) had Good and Very Good knowledge about transfusion medicine.

Table 5 Knowledge level by year of residency towards transfusion medicine, in Tikur Anbessa specialized hospital from 16/10/2015 -16/01/2016 E.

Population	**Knowledge level about transfusion medicine**				**P value**
	V. Poor	Poor	Good	V. Good	

Year of residency	R1	8(27.6%)	15(51.7%)	6(20.7%)	0(0%)	0.72
	R2	12(34.3%)	13(37.1%)	10(28.6%)	0(0%)	
	R3	14(32.6%)	19(44.2%)	8(18.6%)	2(4.7%)	
Total pediatrics resident		34(31.8%)	47(43.9%)	24(22.4%)	2(1.9%)	

Regarding specific knowledge about transfusion medicine question, 6 of the 20 questions scoring below 25% (Table 5). Less than 50% of the residents responded correctly to questions regarding the threshold for RBC transfusion. Only less than 20% of residents responded correctly to questions related to TRALI and/or TACO.

Table 6 Exam responses (%correct answers by pediatrics residents at TASH from 16/10/2015 - 16/01/2016 E.

Question	Variables	Frequency	correct %
Q1	RBC transfusion thresholds in acute anemia	49	45.8
Q2	Dyspnea, TRALI, TACO	16	15.0
Q3	Indications for irradiated blood	64	59.8
Q4	Platelet transfusion thresholds for invasive procedures	58	54.2
Q5	Dyspnea, TRALI, TACO	8	7.5
Q6	Diagnosis / management of acute hemolytic transfusion reactions	86	80.4
Q7	RBC transfusion for non-bleeding, hospitalized patients without cardiac concerns	40	37.4
Q8	Diagnosis / management of allergic transfusion reactions	28	26.2
Q9	Management of fever during transfusion	30	28.0
Q10	Transfusion and infectious disease	49	45.8
Q11	HDFN	18	16.8
Q12	Transfusion thresholds for invasive procedures	**38**	**35.5**
Q13	TRALI	19	17.8
Q14	RBC transfusion thresholds in acute anemia	53	49.5
Q15	Management of fever during transfusion	34	31.8
Q16	Massive transfusion	19	17.8

Q17	Platelet transfusion thresholds for prophylaxis	13	12.1
Q18	Reversal of coumadin	18	16.8
Q19	Correct samples, recipient ID	49	45.8
Q20	maximum storage time for red blood cells before they must be transfused	34	31.8

There was statical significant difference in mean score between perceived advanced knowledge and no knowledge (ANOVA, P=0.0019); Perceived advanced knowledge and Beginner (ANOVA, P=0.041).

Table 7 Exam scores based on training and perceived transfusion medicine knowledge.

Variables		Number	Mean	SD	95% CI	P-value
Year of residency	R1	29	35.00	11.42	30.6 - 39.34	0.986
	R2	35	34.57	11.01	30.7 - 38.3	
	R3	43	34.53	13.92	30.2- 38.8	
Knowledge	No knowledge	2	15.00	7.07	-48.53-78.53	**0.00457**
	Beginner	18	29.17	12.40	23-35.3	
	Intermediate	79	35.63	11.47	33.0-38.20	
	Advanced	8	42.50	12.54	32.0-52.98	
Amount of Training in Medical School	None	15	33.33	9.76	27.9-38.73	0.900262
	1 hour	51	34.31	14.32	30.28-38.34	
	2 hours	25	34.40	8.82	30.76-38.03	
	3 hours	10	37.50	10.34	30.1-44.89	
	4+ hours	6	37.50	16.36	20.33-54.66	
Amount of Training in Residency	None	26	33.08	12.25	28.12-38.02	0.636673
	1 hour	47	36.28	12.70	32.54-40.0	
	2 hours	22	32.95	11.92	27.67-38.23	
	3 hours	10	36.50	12.26	27.73-45.26	
	4+ hours	2	27.50	3.54	-4.26 -59.26	
Was Medical School Education	Not at all helpful	13	35.38	8.77	30.08-40.68	0.119816
	Slightly Helpful	30	31.67	14.76	26.15-37.17	
	Moderately helpful	31	35.65	7.83	32.77-38.51	
	Very helpful	29	37.93	14.11	32.56-43.29	
	Extremely helpful	4	23.75	7.50	11.81-37.02	
Was	Not at all helpful	23	33.70	12.90	28.11-39.27	0.316915

Residency Education Helpful	Slightly Helpful	17	34.41	11.71	28.39-40.43	
	Moderately helpful	28	34.29	12.23	29.54-39.02	
	Very helpful	34	37.21	12.50	32.84-41.56	
	Extremely helpful	5	25.00	6.12	17.39-32.60	
Work Experience	Less than 1 year	13	36.54	16.12	26.79-46.28	0.281632
	1 year - 3 years	76	35.33	11.26	32.75-37.90	
	More than 3 years	18	30.56	13.05	32.04-37.04	

5.5 Factor affecting Knowledge of pediatrics resident.

Cross tabulation and Fisher exact test were done to check association between knowledge level and explanatory variables such as age, Sex, Year of residency, work experience, training in medical school, training in residency and presence of guideline. The Based on the p-value (< 0.05) result of fisher exact test there was no statistically significant association between age (P= 0.36), Sex(P=0.82), Year of residency(P=0.78), work experience(P=0.42), training in medical school(P=0.67), training in residency (P= 65)and presence of guideline (P=29).(Table 6)

Table 8 Fisher exact test analysis results of factors affecting knowledge in TASH, from 16/10/2015 -16/01/2016 E.

Explanatory variables		**Knowledge level**		**P value**
		Poor	Good	
Age in years	25 - 27 Year	6(60%)	4(40%)	0.36
	28 - 30 Year	46(74.2%)	16(25.8%)	
	31 - 33 Year	24(85.7%)	4(14.3%)	
	Above 33	5(71.4%)	2(28.6%)	
Sex	Male	47(74.6%)	16(25.4%)	0.82
	Female	34(77.3%)	10(22.7%)	
Year of residency	R1	23(79.3%)	6(20.7%)	0.78
	R2	25(71.4%)	10(28.6%)	
	R3	33(76.7%)	10(23.3%)	
Year/s of practice before joining residency	Less than 1 year	8(61.5%)	5(38.5%)	0.42
	1 year - 3 years	58(76.3%)	18(23.7%)	
	More than 3 years	15(83.3%)	3(16.7%)	

Amount of Training in Medical School	None	12(80%)	3(20%)	0.67
	1 hour	39(76.5%)	12(23.5%)	
	2 hours	19(76%)	6(24%)	
	3 hours	8(80%)	2(20%)	
	4+ hours	3(50%)	3(50%)	
Amount of Training in residency training	None	21(80%)	5(20%)	0.65
	1 hour	32(68.1%)	15(31.9%)	
	2 hours	18(81.8%)	4(18.2%)	
	3 hours	8(80%)	2(20%)	
	4+ hours	2(100%)	0(0%)	
Presence of guideline	Yes	13(92.9%)	1(7.1%)	0.29
	No	30(71.4%)	12(28.6%)	
	don't know	38(74.5%)	13(25.5%)	

6. Discussion

This study was a prospective hospital-based cross-sectional study, conducted in Tikur Anbessa specialized Hospital involving 107 pediatric residents 16/10/2015 -16/01/2016 E.C. The main finding of this study was the poor performance of pediatric residents using a structured, validated knowledge assessment, with an average score of 34.67 ±12.25. As the exam covers essential topics, all physicians who are able to order blood products, including those in the early year of residency should have adequate knowledge on TM. We set a minimum score of 60% for a satisfactory response, which indicated the fundamental knowledge level required.

One study done on Internal medicine residents from 9 different countries (Australia, Canada, England, Ireland, Italy, Germany, The Netherlands, Spain and USA) which included a total of 474 residents, The overall mean score of the exam was 45.7% with an individual range 10% to 85%. This is slightly higher than the mean score of this study, although the residency programs are different.

In a study done in western India which included 85 residents from Internal medicine, surgery, obstetrics and gynecology, pediatrics, orthopedics and anesthesiology, found that Pediatric residents scored 32.8 % which was low and which is slightly lower than our finding. Overall, the knowledge level in this study is comparable to previous study that was carried out internationally.

7. Limitations of the study

- This study assessed only the knowledge of pediatric resident on transfusion medicine specific to pediatric patients and factors affecting it. It would have been better to include the attitude and practice of pediatric residents on the same topic to give a full picture of the gap.

8. Conclusion

The findings of this study showed that, the knowledge level of pediatric residents on transfusion medicine was very poor. According to the finding of this study age, Sex, Year of residency, work experience, training in medical school, training in residency and presence of guideline were independent of knowledge level.

9. Recommendations

- Based on the findings of our study, we recommend Increasing the amount of time spent on training (lectures, sessions and/or seminars) specific to transfusion medicine both at pre and postgraduate programmes and Incorporating transfusion, specifically pediatric transfusion medicine to our management guidelines

10. Reference

1. J P, S K, T C, Rs M. Knowledge of Transfusion Medicine Among Resident Doctors in Clinical Specialities: A Cross-Sectional Study from a Tertiary Care Centre. Indian J Hematol Blood Transfus Off J Indian Soc Hematol Blood Transfus [Internet]. 2015 Sep [cited 2023 Jun 15];31(3). Available from: https://pubmed.ncbi.nlm.nih.gov/26085724/

2. Haspel RL, Lin Y, Mallick R, Tinmouth A, Cid J, Eichler H, et al. Internal medicine resident knowledge of transfusion medicine: results from the BEST-TEST international education needs assessment: Medicine Resident Transfusion Knowledge. Transfusion (Paris). 2015 Jun;55(6):1355–61.

3. Wheeler AP, Delaney M, Fung M, Gorlin J, Kutner JM, Lam JCM, et al. Pediatric resident knowledge of transfusion medicine: Results from the BEST-TEST3 international education needs assessment. Transfusion (Paris). 2021 Aug;61(8):2487–95.

4. Delaney M, Wendel S, Bercovitz RS, Cid J, Cohn C, Dunbar NM, et al. Transfusion reactions: prevention, diagnosis, and treatment. The Lancet. 2016 Dec;388(10061):2825–36.

5. Oakley FD, Woods M, Arnold S, Young PP. Transfusion reactions in pediatric compared with adult patients: a look at rate, reaction type, and associated products: Epidemiology of Transfusion Reactions in Pediatric Patients. Transfusion (Paris). 2015 Mar;55(3):563–70.

6. Karp JK, Weston CM, King KE. Transfusion medicine in American undergraduate medical education: TM IN US UNDERGRADUATE MEDICAL EDUCATION. Transfusion (Paris). 2011 Nov;51(11):2470–9.

7. Arinsburg SA, Skerrett DL, Friedman MT, Cushing MM. A survey to assess transfusion medicine education needs for clinicians. Transfus Med. 2012 Feb;22(1):44–51.

8. Saidenberg E, Pugh D. The use of an objective structured clinical examination to assess internal medicine residents' transfusion knowledge: Transfusion Medicine OSCE. Transfusion (Paris). 2014 Jun;54(6):1537–41.

9. Graham J, Grant-Casey J, Alston R, Baker P, Pendry K. Assessing transfusion competency in junior doctors: a retrospective cohort study: Transfusion Competency in Junior Doctors. Transfusion (Paris). 2014 Jan;54(1):128–36.

10. O'Brien KL, Champeaux AL, Sundell ZE, Short MW, Roth BJ. Transfusion medicine knowledge in Postgraduate Year 1 residents: PGY-1 KNOWLEDGE IN TRANSFUSION MEDICINE. Transfusion (Paris). 2010 Mar 19;50(8):1649–53.

11. Maskens C, Downie H, Wendt A, Lima A, Merkley L, Lin Y, et al. Hospital-based transfusion error tracking from 2005 to 2010: identifying the key errors threatening patient transfusion safety: Transfusion Error Tracking. Transfusion (Paris). 2014 Jan;54(1):66–73.

12. Haspel RL, Lin Y, Fisher P, Ali A, Parks E, Biomedical Excellence for Safer Transfusion (BEST) Collaborative. Development of a validated exam to assess physician transfusion medicine knowledge: Transfusion Medicine Exam. Transfusion (Paris). 2014 May;54(5):1225–30.

13. Salem-Schatz SR, Avorn J, Soumerai SB. Influence of Knowledge and Attitudes on the Quality of Physicians?? Transfusion Practice: Med Care. 1993 Oct;31(10):868–78.

14. Al-Riyami AZ, Louw VJ, Indrikovs AJ, Nedelcu E, Bakhtary S, Eichbaum QG, et al. Global survey of transfusion medicine curricula in medical schools: Challenges and opportunities. Transfusion (Paris). 2021 Feb;61(2):617–26.

15. Kumarage S, Fernando R, Gunasekara L. A Survey of Knowledge and Practices of Transfusion Medicine Among Post Intern Doctors in Specialized Hospital in Sri Lanka. Lab Med. 2017 Feb;48(1):46–50.

16. Gharehbaghian A, Javadzadeh Shahshahani H, Attar M, Rahbari Bonab M, Mehran M, Tabrizi Namini M. Assessment of physicians knowledge in transfusion medicine, Iran, 2007. Transfus Med. 2009 Jun;19(3):132–8.

ANNEX I Information Sheet

Title of Project: Pediatric Resident Knowledge of Transfusion Medicine in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia,2024

Name of the Investigators: Elias Tadesse

My name is Dr. Elias Tadesse and I am a third year Pediatrics and Child Health resident at TASH. I am conducting research on the mentioned topic and you are invited to participate in this study. Before you decide to take part it is important for you to understand why this research is being done and what it involves. Please take time to read the following information carefully. Raise a question if there is anything unclear. Thank you for the time you have spent already.

What is my objective?

I am trying to assess the knowledge, of transfusion medicine among pediatric residents at TASH. You will be assessed with a prepared questionnaire.

Possible harms? There is no harm in participating in this study.

Benefits: - You will not directly benefit from this study. However, the findings of the study will help plan an appropriate intervention.

Confidentiality: All information which is collected about you during the course of the research will be strictly confidential.

Autonomy: All the information you give us is highly valuable to the study. If you decide to participate, you will be given this information sheet to keep and be asked to sign a consent form. Whether you consent or do not consent to be part of the study, your rights for care in the health care facility will not be compromised.

What will happen to the research? The data will be collected over four month's period and the result will be available in 8 months' time.

Who is organizing and funding the research? This research is funded by Addis Ababa University. The research will be reviewed by the Institution's REC.

Thank you in advance!

PI address: Elias Tadesse, MD
Pediatrics and Child Health Resident
TASH, Addis Ababa University, Ethiopia
Mobile No. : +251927731442
E-mail: elijahtad56@gmail.com

Annex II CONSENT FORM

I understand all conditions stated above. I have understood that Participation in this study is entirely voluntarily. I have been told that my answers to the questions will not be given to

anyone else and no reports of this study ever identify me in any way Therefore, I am Ready and willing to participate in this study. You decided:

1. Agree to participate [ ] _____signature, continue

2. Not agree to participate (stop here); thank you very much!

If the study subject agrees to participate in the study, start the interview.

NB: No need of enforcing the respondent to be included in the study

Data collectors name _____ Signature _____Date __/__/____