



COLLEGE OF HEALTH SCIENCESCHOOL OF MEDICINE MASTERS

THESIS

Effect of clinical clerkship on career choice of second clinical year
medical students in college of health sciences at Addis Ababa
University, Addis Ababa, Ethiopia

A Thesis to Be Submitted to Addis Ababa University School of Medicine in Partial
Fulfillment for the Requirement of Specialty Certificate of Anesthesiology

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Effect of clinical clerkship on career choice of second clinical year medical students in collage of health sciences at Addis Ababa University, Addis Ababa, Ethiopia

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Thesis report declaration

I, the under signed, declared that this is my original work, has never been presented in this or any other University, and that all the resources and materials used for the thesis work, have been fully acknowledged.

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Abbreviations and Acronyms

AAU.....Addis Ababa University

CIIClinical year 2 Medical students

TASH.....Tikur Anbessa Specialized Teaching Hospital

SHMMC.....St. Paul's Hospital Millennium Medical College

WFSA.....World Federation of societies of Anesthesiologists

WHO.....World Health Organization

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Abstract

Background: Anaesthesiology is one of disproportionately affected medical specialty in providing adequate number of professionals, There are misguided assumptions, perceptions and paucity of knowledge regarding this field by medical students and also by General practitioners which might contribute to a Skewed career choices. To alleviate the gap in work force and quality of service Several studies have suggested that Providing medical students with a structured clinical rotation provides an opportunity for students to learn a wealth of medical knowledge, procedural skills and to get a feel of what a career in anesthesiology involves which in turn influences their perception of anaesthesia and carrier choice.

Objective: To explore the effect of a clinical clerkship on career choice in considering anesthesia of C II students attaching from March 19 2021-May 30 2021.

Method: Institutional based Descriptive cross-sectional study is used at AAU School of health science. The source population is all CII medical students attached to anesthesia clerkship form March 19 2021-May 30 2021. Sample size was 149. Data was collected using a pre attachment and post attachment self-administered questionnaire. Descriptive statistics and bivariate logistic regression model was used. Variables with a p-value ≤ 0.25 in bivariate logistic regression were nominated for multivariate logistic regression.

Result: A total of 149 students participated in this study. 100 (67.1%) were Males. On post attachment 49 (32.9%) of the respondents considered anesthesia as a specialty but no one considered it as a first choice. Students with good clinical knowledge of anesthesia has 3.2 times more chance of choosing anesthesia as a career AOR=3.23 (1.32-7.94) with P value 0.01. Students with Good knowledge of the role of anesthesiologist has a high chance of choosing anesthesia as a career AOR = 3.95 (1.39-11.06) with p value < 0.001.

Conclusion: Good knowledge of the role of anesthesiologist and good clinical knowledge of anesthesia has a positive association with career choice.

Keyword: Anesthesia, Career, Knowledge

1. Introduction

1.1. Background

Anesthesiology is one of the most advanced specialties of modern medicine. The classical role of the anesthesiologists is providing the best and safest conditions for surgery. It requires preoperative assessment, postoperative care in recovery rooms, obstetric analgesia (epidural) in delivery rooms, running the intensive care units, pain clinics, and acute pain services. This classical role is no longer confined within the operating rooms; it expanded to activities such as diagnostic procedures for pediatric, radiology, gastroenterology and respiratory medicine patients; palliative care, trauma treatment, resuscitation, emergency medicine, and transport of critically ill patients(1)(2).

Although there is a health workforce crisis across all medical specialties in developing countries, Anesthesia is particularly affected because medical doctors find it difficult to settle for this specialty. As a result instead of Anesthesiology specialist most of Anesthesia services are performed by non-physician Anesthesia providers(3)(4). Due to this task shifting policy critical incidents and anesthesia related deaths have become unavoidable consequences. Therefore great emphasis is warranted in recruitment and teaching of more physicians(5).

Medical school is an ideal time to develop interest in anesthesiology, most graduating medical students entering residency training developed their specialty preferences during medical school(6). Many of these students, however, appear to lack adequate understanding of the scope and proficiencies required of anesthesiologists(7). The role of the anaesthesiologists in fluid management, resuscitation, trauma care, critical care, acute and chronic pain management remain unknown to most of the undergraduate students (7). It is important that medical students possess an accurate representation of the field of anaesthesia and the diversity of tasks anaesthesiologist perform in order to make informed career choice (1)(2)(4). Additionally, a thorough knowledge of the clinical aspects of anaesthesia is important to ensure that once qualified such individuals will be suitably informed to answer patient queries and concerns regarding anaesthesia it also provides the students with an opportunity to learn knowledge and skills that is applicable to whichever field of medicine they choose to specialize(2).

Anesthesiology training for physicians in Ethiopia started in 1991 at Addis Ababa University college of Health Science, the training was only available at Addis Ababa University until Jimma University Hospital started a residency program in Anaesthesiology in 2015, SHMMC in Addis Ababa started training in 2016 and in 2021 two additional universities Bahirdar and Haromaya universities enrolled their first Anesthesiology residents. The intake of physicians in the field of anesthesiology has been growing in number as compared to the previous years but still it is not satisfactory. Hence, Strengthening the anesthesia workforce must therefore be an immediate and ongoing priority(8)(5).

Anesthesiology clinical rotation of students in AAU school of health science started in 2011 for interns and 2014 for CII medical students. The CII rotation is a two week attachment. Students are expected to attend all lectures and practical sessions. The first week of the rotation includes a series of lectures ranging from general overview, introductory courses up to subspecialty lectures. The second week of attachment consists of skill lab sessions that expose them to as many anaesthetic procedures as possible such as hands on experience in airway equipment's, LMA/ET tube insertion, bag/mask ventilation, oral airway and nasal airway insertion, gaining intravenous access and patient positioning. During practical sessions students are encouraged to raise any questions concerning anesthesiology.

In most of medical schools in Ethiopia the undergraduate rotation either doesn't exist or is rudimentary. A multi-center study done in 2014 before the commencement of undergraduate anaesthesia rotation revealed that only 25 % have knowledge about anaesthesiology and 52% of them has a wrong knowledge of anesthesiologist(9). In study done on TASH in 2019, none of the students put anesthesiology as first choice but 3.3 %, 9.8 % put anesthesiology as a second and third choice respectively, this study also stated that 80 % of them has a positive attitude toward the field, 28 % very good knowledge and 45 % has good knowledge of Anesthesia and 80 % of them think a two week rotation is not adequate(10).

Developing an anesthesia clerkship which expose the students to many aspects of anesthesiology in a well-structured and supervised environment provides a positive learning experience that attract medical students to choose anesthesiology as a career(11)(12). Even if a student does not decide upon a career in anesthesia, the anesthesiology clerkship provides them with a means of

improving the image of anesthesiologists as physicians and provides an opportunity to acquire skills and knowledge transferable to other areas of medicine(13)(14).

1.1. Statement of the problems

Anaesthesiology is one of disproportionately affected medical specialty by shortage of work force, WHO recommends 23 health workers, including physicians, nurses, and midwives per 10,000 people to achieve adequate primary care coverage and according to WHO/WFSA international standards for safe anesthesia practice it is highly recommended to achieve 20specialistsurgical work force (surgeon, Anesthesiologist and OB/GYN) per 100,000 people. Inthe number of anesthesiologist with in the specialist surgical work force must be adequate to ensure effective leadership of anesthesia service and delivery of care(15)(5)(4).Ethiopia there is 1.8 health workers per 10,000 people,there are 0.03 physicians per 1,000 people and specifically, 0.02 trained medical anesthesia providers per 100,000 people (17) compared with developed countries per-capita anesthesia provider ratio is 100 times lower in developing countries. Despite the net increase in physicians joining Anesthesiology and the rise in medical schools providing Anesthesiology residency program, due to initial significant disproportionate deficit and expansion of the scope of the practice together with the rising population further augmented the disparity. Thereforeit is mandatory that this gap must be addressed.

Several studies suggested that most of career choices were made during medical training. Although other factors may influence career choices, exposure to a subspecialty in the undergraduate curriculum may significantly affect the career preference of a medical graduate, alter their perception of anesthesia and the role of anesthesiologist and knowledge of anaesthesia that can be applied to other fields(1),(2),(8)(6)(14).Several studies have investigated the benefit of Providing medical students with a structured clinical rotation would benefit in their perception of anaesthesia and produce informed students who are aware of the scope and value of an anesthesiologist, influencing their career choice which intern will alleviate the gap in work force and quality(14)(16)(7).

1.2. Significance of the study

It will identify factors that affect career choice in context of clinical clerkship. Identify knowledge gap concerning knowledge of undergraduate students towards anaesthesia, and shed a light on the influence of anesthesia clinical rotation on their knowledge of the role of anesthesiologist as well as clinical knowledge. It is very essential in making improvement towards delivering a better education and structured clinical clerkship.

2. Literature review

Although Anesthesiology is not top-of-mind amongst medical students when it comes to career choice(1) Studies that are done in developed countries show preference of anesthesiology as a specialty among medical students is higher compared to developing countries(1)(8).

Adudu et al. published 2010, among 206 medical students from Year 1 – 4 at Toronto university Anesthesia was ranked in the top three career choices by 28.2% of students, Interest was lowest in year 1 (16.9% of top three choices) and was stable in years 2 (34%), year 3(30%), and year 4 (33.3%), Top reasons for selecting anesthesia included the scope of practice, practical hands-on experience, broad knowledge incorporation, lifestyle, and acute care nature of the specialty(1). Top reasons for rejecting the specialty included lack of knowledge or low exposure to anesthesia, boredom, and lack of continuity of care. Regarding knowledge of the role of anesthesiologists most students attributed roles, such as perioperative anesthesia and pain management during labour and delivery to anesthesiologists, while less than one-third of the students ascribed roles, such as operating room management and expertise in resuscitation, acute/chronic pain management and fluid management, to anesthesiologists. This trend was more prevalent in first year and second year(1). The study also noted that 54% of students surveyed after their clinical rotation said they thought anesthesiologists were more important than they had previously believed, 17% indicated an increased interest in anesthesia as a career(1). Henschke et al. published 2017, (37%) preclinical-year students and (50%) clinical-year students said they would prefer a clinical rotation, (80%) third-year students and (92%) fourth-year students indicated that they believed knowledge of anesthesia was essential, in addition negative stereotypes surrounding anesthesiologists decreased during the clerkship years(17). Timothy R. Longet.al, Pre-intervention and post-intervention survey done on pre-clinical students at mayo Clinic College of medicine, Students reported significant increases for all survey questions regarding basic concepts and skills. The largest increases were reported in comfort with airway management skills, understanding of the perioperative surgical home model, and vascular access skills. All participants indicated a higher likelihood of pursuing anesthesiology as a career and attributed their increased interest in anesthesiology to the selective(18).

R. W. Watts' set.al, Undergraduate Education in Anaesthesia: The influence of role models on Skills Learnt and Career Choice, done in South Australia in 1998 showed that two thirds of students have identified a positive role model in their anesthetic teachers and this was significantly associated with a satisfactory learning experience and a career intention in anaesthesia. Positive role model identification is clearly a complex psychological process but in some part is likely to occur if the teacher invests time and interest in the student by teaching more advanced anaesthetic skills. The study also shows that those students learning more advanced skills are more likely to be interested in anaesthesia as a career(14).

Weissman et al. in a study published in 2013 showed that, Out of the 234 medical graduates from Israel, 28% considered anaesthesiology as their preferred field of specialization(19). Aisling Smith et al. In a study published 2013, a survey done on 80 Irish medical students, shows a 5% increase between pre-clinical and clinical students of those who would consider anaesthesia as a career, although 27.5% decrease in those who answered possibly and an increase of 22.5% in those who answered no is observed. As for the Knowledge of role of anesthesiologist 47.5% of clinical students were aware that anaesthesiologists participate in running intensive care units a significant increment from 10% pre clinically, 65% knew that anesthesiologists' were involved in the management of chronic pain a significant increment from 30% pre attachment and 100% of clinical students recognized that anaesthesiologist administered epidural analgesia to obstetric patients Verses 87% Pre Attachment(2). In the United Kingdom, a survey conducted in 2003 by G. Turner et al. about career choices for anaesthesiology: national surveys of graduates of 1974–2002, showed that the percentage of doctors choosing anaesthesiology, increased from 5 to 12% the study also revealed that effective role modelling and a pleasant undergraduate rotational experience were the commonly cited reasons attributed to the improved uptake of anaesthesiology as a preferred career choice(13).

When we came to Developing countries, in 2011, at the Aga Khan University in Pakistan, Fauzia et al. Showed that 8% included anaesthesiology in their first 3 choices and only 1.3% as a first choice. The most commonly cited reason was poor mentorship and ineffective role modelling(8)

T C Onyeka et al. in a 2010 study done in Nigeria showed that, out of the 200 students that are interviewed; only 1% chose anaesthesiology as their first choice and 2% as a second and third choice. The most preferred specialty of choice was surgery (29%), Pediatrics and public health

(14% each) tied at second place while obstetrics and Gynecology (12%) came in at third place, a short duration of exposure to anaesthesia, insufficient participation in practical anaesthesia and inadequate provision of teaching aids were cited as contributory factors to the problem of limited interest or non-interest in anaesthesiology(11). A similar study by Eze B I et al. on factors influencing choice of medical specialty of pre-residency medical graduates in south eastern Nigeria, showed only 3.1% of the 316 interviewed, chose anaesthesiology as a specialty of choice. Personal interest in the specialty was the predominant factor that influenced most individuals. Inadequate exposure to anaesthesiology and a brief undergraduate rotation were the main reasons for lack of interest(20). Regarding students' knowledge and perception of anaesthesia Desalu et al. surveyed 56 students at the start and end of their 6-week posting in anaesthesia, prior to their posting 26.8% had limited knowledge of anaesthesia while 21.5% thought it was irrelevant. Forty-eight students (85.7 %) changed their impression of anaesthesia in a positive direction after their posting. At the end, 76.7% found the specialty challenging. Thirteen students (23.2%) would consider anaesthesia for postgraduate training. 80.3% rated the posting as good. Concerning the clerkship program, Cardiopulmonary Resuscitation was the most popular topic (23.2%), while Breathing Systems was the most difficult to understand (28.6%) and Oxygen Therapy the most boring (12.5%); Suggestions to improve lectures included improved audiovisuals (25%) and reduced duration of lectures (17.9%). To improve learning during theatre sessions, 44.7% suggested step-by-step explanation of procedures while 41.1% suggested permitting students to carry out procedures e.g. cannulation, maintenance of a patent airway, and endotracheal intubation(21).

Mubarak Abdul-Rahmana et al. 2015, 183 undergraduate final-year students of the University of Ghana School of Medicine and Dentistry participated, General surgery was the most desirable specialty 26 (17.8%), Pediatrics was the second most desirable specialty 24 (16.4%), whilst anaesthesia 2 (1.4%) ranked seventh, The majority of the students (41.7%) who chose pediatrics as a career indicated that they enjoyed their clerkship in pediatrics while (23.1%) of students that chose surgery indicated the same reasons for their choice. The reasons for anaesthesia not being chosen by the majority of students are related to duration of clerkship are boring and not interesting 55 (38.2%) complex and difficult to understand 11 (26.4%) delicate and risky 9 (6.3%) demanding 9 (6.3%)(12).

In Kenya, a study at the University of Nairobi, in 2010 by P. Mwachaka et al. titled “Specialty preferences among medical students in a Kenyan university” showed that only 4 (1%) of the 385 students interviewed chose anaesthesiology as a preferred specialty. The specialties of choice were surgery (35%), Internal medicine (13.9%), Obstetrics and Gynecology (12.9%), public health (6%) and Pediatrics (4.6%)(22). The main reasons given for those preferences were encouragement by department staff, role models in the specialty, job and financial rewards, prestige of the specialty, lifestyle of practice, ease of raising a family. Similar studies done in 2016, Kenya by Dossajee et al. shows the 4 core specialties predominate as career preferences. Among 176 participants only 5% choose anesthesia, the perceived prestige of the specialty, ease of raising a family, perceived income potential and job opportunity are found influential in making a choice(23).

In Ethiopia a study done in six medical schools across the country in 2015 by T.Assefa et al, out of 959 students 0.1% considered anesthesiology as a first choice, 0.3% of the students as a second choice and 1.1% as a third choice. Reasons influencing career choice include personal interests, income potential, professional prestige, availability of positions, influence of instructors, possibility of working abroad and duration of attachment (24). In a study titled Medical students' choice of specialty and factors determining their choice: A cross-sectional survey at the Addis Ababa University, School of Medicine, Ethiopia done in 2014 by N.Seyoum et.al. a total of 161 students participated, no one chose anesthesia as a first or second choice and only one student considered anesthesia as a third choice. Limited amount of time of the attachment and a few number of attachment to serve as a role model was attributed to the low uptake. This study also showed the main reasons that influenced the students' decisions to opt for a particular specialty were inspiration during their clinical practice in 67 (41.6%). Financial reward (24.2%), dedication to the field (19.2%) possession of competency needed for the specialty (18.6%) and Influence of teacher (16.1%) were also factors that influenced future choice of specialty of the students(25).

3. Objectives

3.1. General objective

- To assess the effect of clinical rotation on CII students considering anaesthesiology as a career choice

3.2. Specific objectives

- To determine the effect of clinical clerkship in knowledge of the role of anesthesiologist
- To determine the effect of clinical clerkship on Clinical knowledge of Anaesthesia of C II students post clinical rotation
- To identify factors affecting career choice

4. Method

4.1. Study design

- It is institutional based cross-sectional study

4.2. Study area and period

- The study was conducted at Tikur Anbessa Specialized Hospital, School of Medicine, College of Health Sciences, Addis Ababa University is the largest referral hospital in Ethiopia. It was established in 1964 GC and currently is the main teaching center for both clinical and pre-clinical training of most disciplines. Anesthesiology training for physicians in Ethiopia started in 1991 at this center and anesthesiology clinical rotation for undergraduate students started in 2011 for interns and in 2014 for CII medical students. There are a total of 14 senior anesthesiologists that are responsible for teaching both post graduate and undergraduate students. The study was conducted at Addis Ababa university school of health science from March 19 2021-May 30 2021.

4.3. Population

4.3.1. Source population

- Clinical year II students at AAU school of health science.

4.3.2. Study population

- C II students on their Anesthesiology rotation from March to May

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

- All CII Students coming to anesthesia rotation from March to May

4.4.2. Exclusion criteria

- C II students that already has their Anesthesiology rotation

4.5. Sample size

- The sample size (n) for this study is calculated by using single proportion population formula. Sample size (n) will be determined by taking the 23.2 % of medical students choose anesthesia as a career at the end of a six week anesthesia attachment based on a study done in Nigeria by Desalu et al.(21). 0.05 expected margins of error (d), and with 95 % confidence level ($Z_{\alpha/2}$). Accordingly the required sample size will be approximately 272.

$$N = \frac{z_{1-\alpha/2}^2 \times p \times (1-p)}{d^2}, \quad \frac{(1.96)^2 \times 0.23(1-0.23)}{(0.05)^2} \approx 272$$

- D= margin of error Since the sample size is <10,000 which is 272 the correction formula will be used to get the final sample size

$$nf = \frac{ni}{1+ni/N} \quad \text{Where } nf - \text{final sample size}$$

ni – initial sample size

N – Sampled population

$$nf = \frac{271}{1 + 271/300} = 142$$

$$nf = 142$$

Adding 10% non-respondent final sample size = 156

- Since it is purposive sampling the sample size (n) for this study included all clinical year 2 students from March 19 2021-May 30 2021. Which is 149.

4.6. Sampling procedure

- All C II students that undergo anesthesia clerkship between March and May

4.7. Study variable

Dependent variable:

- Career choice

Independent variable:

- Sex
- Prior knowledge of Anesthesia
- Students perception of Anesthesia clerkship
- Students' knowledge of the role of anesthesiologist
- Students' knowledge of Anesthesia

4.8. Operational Definition

- Adequate knowledge :- when a student answers $\geq 80\%$ questions correctly, source
- Inadequate knowledge :- when a student answers $\leq 80\%$ questions correctly, source (26)

4.9. Data collection procedure

- The questioner was adopted from two similar studies and customized to be suitable for this study(2,8).The data was collected using self-administered structured questionnaire.Pre-rotation and Post rotation .The post rotation forms were identical to the first set but had five additional questions related to the feedback on the clerkship.The questionnaire sought information on reasons for considering or not considering anaesthesia as a career, knowledge of role of anaesthesiologist, clinical knowledge of anesthesia and students perception of anesthesia clerkship.

4.10. Data analysis procedure

- Data was checked for completeness and was entered using Epi-data software and cleaned then was imported to SPSS 25 software for analysis. Descriptive analysis was done for the participants. The result was presented using frequency, table, percentage and determinants of career choice were analyzed via logistic regression. Odds ratios were calculated on variables to determine the association between the outcome and selected

variables through binary logistic regression. Variables with a p-value ≤ 0.25 in bivariate logistic regression were nominated for multivariate logistic regression. Multivariate Logistic regression was used to control for confounders and calculating adjusted Odds Ratio with p value of 0.05 level of significance and 95% CI.

4.11. Data quality assurance

- The data collectors was trained before data collection and there were meeting after data collection for regular check-up for completeness and uniformity of the data.

4.12. Ethical issue

- Ethical clearance and support letter was obtained from Addis Ababa University department of Anesthesiology, critical care and pain medicine.
- Written informed consent was taken from CII students, they were provided with the information regarding the objective, procedure, potential risks and benefits of participating in the study and the right to withdraw from the study at any time throughout their interview.
- This study will help policy makers, programmers and researchers to give appropriate attention on issues of interest. The participants will be informed that there will be no direct benefit in participating in this study.
- Study participants was assured that their information confidentiality by removing personal identifications and instead using codes not sharing their information to anyone other than the study team. The data collection will be held with strict privacy.

4.13. Result dissemination plan

The study result will be submitted to Addis Ababa University School of medicine and be presented to the health science community and disseminated to the concerned and the result will be published on peer reviewed scientific journals.

5. Result

5.1 Response rate

A total of 149 clinical year 2 students participated in this study. All medical students who consented completed the survey. All questions were answered with no blanks left in the questionnaire, the response rate of questionnaires 100 percent. Results of each section of the questionnaire are presented in a separate table.

5.2 Demographic Characteristics

Table 1 below shows the socio demographic data of the responders, males were 100 (67.1%) and females were 49(32.9%). The 94.6% of responders were between the ages of 20-26. The minimum is 23 years and the maximum age is 27 with Mean of 24.3 ± 0.857 (SD).

Table 1 Socio demographic characteristics of participants in TASH, Addis Ababa, Ethiopia, 2021(N=149)

		Number(N)	Frequency (%)
Gender	Male	100	67.1
	Female	49	32.7
Age	20-25	141	94.6
	>25	8	5.4

5.3 Students perception of anesthesia and career choice

The threeconsecutivetablesbelow contains a total of 18 items that explores the effect of the attachment on the perception of medical students toward anesthesia and career choice

Table 2 explores whether or not the students were aware that Anesthesia is a medical specialty of if it is an established specialty and their future career choices.one hundred and twenty (80.5%) of the students were aware anesthesia is a medical specialty before they started their attachment.One hundred and eighteen (79.2%) think it is an established specialty in Ethiopia.

Table 2 Career choice of CII medical students and perception of anesthesia in TASH, Addis Ababa, Ethiopia, 2021(N=149)

	Pre Attachment	Post Attachment
Where you aware that anesthesia was a medical specialty before coming to anesthesiology attachment?	120(80.5%)	—
Do you think anesthesia is an established specialty in Ethiopia?	93(62.4%)	118(79.2%)
Do you consider anesthesiology as Your future choice of specialty?	32(21.5%)	49(32.9%)
If you consider anesthesia as future specialty		
1 st Choice	2(6.1%)	0(0.0%)
2 nd Choice	3(9.1%)	8(14.8%)
3 rd choice	12(36.4%)	12(22.2%)
>3 rd Choice	16(48.5%)	34(63.0%)

Among the students who wouldn't consider a career in anesthesia 70(59.4 %) of them stated "lack of exposure" as a cause. The second highest reason is "minimum patient contact" 46(48.4%).The third highest reason was "dependence on the surgeon" which is 40(42.1%).

Table 3:C 11 medical students’ reasons for not considering Anesthesiain TASH, Addis Ababa, Ethiopia, 2021(N=149)

	Pre Attachment	Post Attachment
Minimum patient contact	27(22.9%)	46(48.4%)
Dependence on the surgeon	24(20.3%)	40(42.1%)
No previous exposure to specialty	70(59.4%)	-
Lack of recognition by patients	13(11%)	13(13.6)
Lack of recognition by peers	19(16.1%)	13(13.7%)
Not a job for physicians	15(12.7%)	10(10.5%)
Lack of research opportunity	3(2.5%)	8(8.4%)
Less teaching opportunity	7(5.9%)	7(7.3%)
Not interested	19(79.2%)	16(62.3%)
Undecided	4(0.02%)	3(0.02%)
Financial reason	1(0.005%)	5(0.03)
Intimidating	1(0.005%)	2(0.01)

The table below shows the students response concerning the clerkship program itself, 127(85%) of the students stated the rotation has changed their perception Anesthesia in a positive way towards anesthesiology as a specialty the reason for that are, 53(35.6%) of the students found pain management inspiring, 42(28.2%) stated the wide scope of practice appealing, 10(6.7%) said it is lifesaving specially BLS, 8(5.4%) the medical aspect of the practice. 81(54.4%) students think a two week attachment is enough whereas 68(45.6%) of the students think it is not enough of which 33(48.5%) suggested three week and 28(41.2%) suggested four weeks of attachment. Among the attachment activities 87(58.4%) stated they enjoyed skill lab, 19(12.8%) stated they like the digitalized lectures 14(9.4%) liked the BLS class.

Table 4 Response to questions related to evaluation of clerkship Program in TASH, Addis Ababa, Ethiopia, 2021(N=149)

	Post Attachment	
	Yes	No
Has the rotation changed your Perception in a positive way towards Anesthesiology as specialty?	127(85.2%)	22(14.8%)
If the attachment changed your perception in a positive way, which part inspired you?	Wide scope of practice	42(28.2%)
	Lifesaving /BLS	10(6.7%)
	Medical service	8(5.7%)
	Pain management	53(35.6%)
	Teamwork	10(6.7%)
What's the most enjoyable parts of anesthesia rotation?	Basic life support	14(9.4%)
	Lecture (Zoom)	19(12.8%)
	Skill lab	87(58.4%)
	I don't know	14(9.4%)
Do you think two week attachment is enough?	81(54.4%)	68(45.6%)
How long do you think it the attachment should be?	3 weeks	33(48.5 %)
	4 weeks	28(41.2 %)
	No suggestion	7(10.3%)

5.4 Students knowledge of the role of anesthesiologist

The table below Presents students' knowledge about the role of the anaesthesiologist 103(69.1%) of the respondents were aware that the anesthesiologist is the one who decide whether the patient is fit for anesthesia, after the attachment their awareness was increased by 17.45% parallel to this the believe they have that surgeon was the one to decide was decreased by 16 %. Concerning the responsibility of monitoring the patient's vital sign intra-operatively there is an increment from 104(69.9%) to 128(85.9 %) as a role of anesthesiologist .To mention other remarkable results, anesthesiologist role in running intensive care units increased from 76(51%) to 115(77.2%), Treating medical problems that occur intra operatively increased from 46(26.8 %) pre attachment to 98(65%) post attachment, Acute and chronic pain management 73(49%) pre attachment to 121(81%) post attachment , Air way management 101(67.8%) to 140(94%) post attachment, securing central venous line is 64(43%) pre attachment to 118(79.2 %) post attachment, intra op blood transfusion 60(40.3%) to 110(73.8%) and administering epidural anesthetic in Labour/ OB ward 125(83.9%) to 139(93.3%).concerning the difference between Anesthetist and Anesthesiologist 73(49%) were aware of the difference pre attachment versus 127(85.2%) post attachment .

Table 5:C 11 medical students' knowledge of the role of anesthesiologist pre and post attachment Anesthesia in TASH, Addis Ababa, Ethiopia, 2021(N=149)

	Category	Pre Attachment	Post Attachment
Who decides if the patient is fit for anesthesia?	Anesthesiologist	103(69.1%)	129(86.6%)
	Surgeon	44(29.5%)	20(13.4%)
	Scrub nurse	2(1.3%)	0(0.0%)
Whose responsibility is to monitor the patients vital sign intra operatively?	Anesthesiologist	104(69.8%)	128(85.9%)
	Surgeon	19(12.8%)	5(3.4%)
	Scrub nurse	26(17.4%)	16(10.7%)
Who is responsible for airway management?	Anesthesiologist	101(67.8%)	140(94.0%)
	Surgeon	42(28.2%)	8(5.4%)
	Scrub nurse	6(4.0%)	1(0.7%)
Is there a difference between an anesthesiologist and anesthetist?	Yes	73(49.0%)	127(85.2%)
	No	10(6.7%)	12(8.1%)
	I don't know	66(44.3%)	10(6.7%)
Intra-operative blood transfusions		60(40.3%)	110(73.8%)
Administering epidural anesthetic in OB/labor in labor wards		125(83.9%)	139(93.3%)
Running intensive care units		76(51.0%)	115(77.2%)
Giving sedation for procedures		119(79.9%)	126(84.6%)
Securing central venous line		64(43.0%)	118(79.2%)
Treating any medical problem that occurs intra operatively		40(26.8%)	98(65.8%)
Managing acute and chronic pain		73(49.0%)	121(81.2%)

The Figure below compares the difference between pre attachment knowledge and post attachment knowledge .According to the result there is a significant increase in knowledge regarding the role of Anesthesiologist in hospitals. Univariate analysis was done to compare the effect of the training on participant knowledge of the e role of anesthesiologist only 21.5 % scored above 80% on pre attachment and 72.5 % scored above 80% on post attachment.

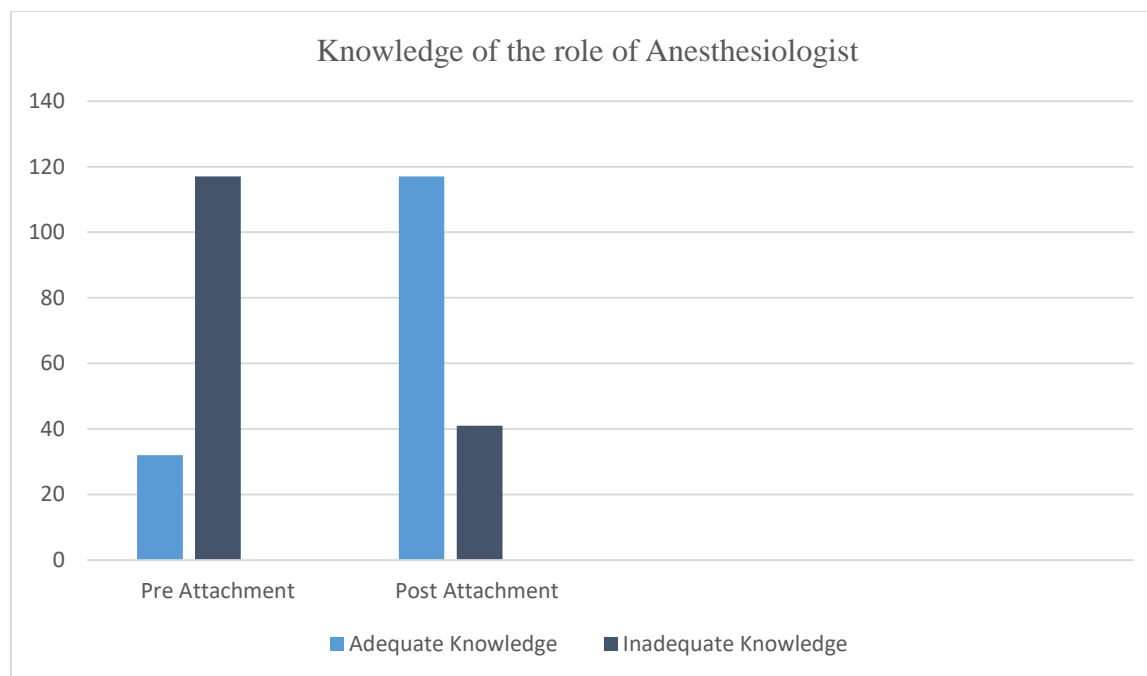


Figure 1 students' Knowledge of the role of Anesthesiologist pre and post attachment

5.5 Students clinical knowledge of anesthesia

Table 6 : C11 medical students' clinical knowledge of Anesthesia in TASH, Addis Ababa, Ethiopia, 2021(N=149)

	Pre Attachment Correct Answer	Post Attachment Correct Answer
According to the current guideline for what length of time should heavy foods not be consumed pre-operatively?	70(47.0%)	91(61.1%)
Which of the following is a contraindication for spinal anesthesia?	59(39.6%)	135(90.6%)
What is the recent recommendation of the number of chest compression per minute during CPR?	50(33.6%)	138(92.6%)
What is the maximum dose of lidocaine without adrenalin for local infiltration?	49(32.9%)	83(55.7%)
Indication for central line insertion		
Dialysis	109(73.2%)	117(78.5%)
parenteral nutrition	69(46.3%)	101(67.8%)
Administration of chemotherapy drugs	69(46.3%)	80(53.7%)
I don't know the indication for central line insertion	25(16.8%)	3(2.0%)

The Figure below compares the difference between pre attachment knowledge and post attachment knowledge by comparing percent. Univariate analysis was done to compare the effect of the training on participant's clinical knowledge of anesthesia. On pre attachment 21.5% of the participants got above 80% while 65% of participants on post attachment got above 80%. Bivariate analysis was done this was statistically significant ($p < 0.005$).

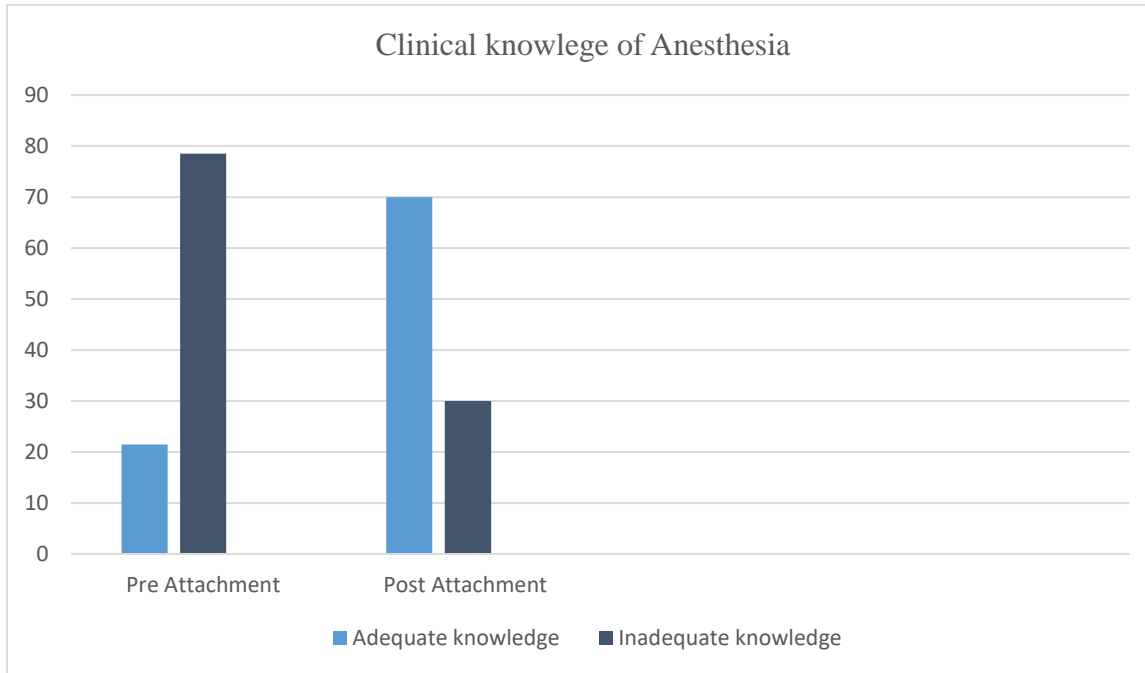


Figure 2 Students clinical knowledge of anesthesia pre and post attachment

6. Regression Analysis

A result obtained from Bivariate and Multivariate binary logistic regression shows a strong and significant association between students' knowledge of the role of anesthesiologist $OR = 3.2$ (95% CI 1.32-7.94) with p value 0.001 and clinical knowledge of anesthesia $OR = 2.67$ (95% CI 1.317-5.449) with P Value 0.007.

The students with good clinical knowledge of anesthesia has 3.2 times more chance of choosing anesthesia as a career $OR = 3.23$ (95% CI 1.32-7.94) with P value 0.01. Students with Good knowledge of the role of anesthesiologist has a high chance of choosing anesthesia as a career $OR = 3.9$ (95% CI 1.5-10.06) with p value < 0.001 .

Table 7 Bivariate and multivariate analysis of CII students' career choice in TASH, Addis Ababa, Ethiopia, 2021(N=149)

variable	Career choice		P-value	COR	P-value	AOR
	Yes	No				
Sex						
Male	33(33%)	67(67%)	0.966	1.01(0.490-2.104)	0.437	1.421(0.584-3.472)
Female	16(32.7%)	33(67.3%)	1	1	1	1
Prior knowledge of anesthesia						
Yes	45(33.3%)	90(66.7%)	0.719	1.250(0.371-4.207)	0.705	0.734-0.148)
No	4(71.4)	10(28.6%)	1	1	1	1
Knowledge of the role of Anesthesiologist						
Adequate knowledge	48(44.4%)	60(55.6%)	1	1	1	1
Inadequate knowledge	1(2.4%)	40(97.6%)	0.001	32(4.244-244)	<0.001	39(5-306)
Clinical knowledge of anesthesia						
Adequate knowledge	25(47.2%)	28(52.8%)	1	1	1	1
Inadequate knowledge	24(25%)	72(75%)	0.007	2.67(1.317-5.449)	0.010	3.23(1.3-7.9)
***Impression of the clinical rotation						
Positive	49(62.4%)	78(38.6%)	1	1	1	1
Negative	1	22(100%)	0.999	0.377(0.533-104)	0.988	0.236(0.004-0.669)

7. Discussion

The aim of this study is to assess the effect of a clinical clerkship on career choice among CII medical students. The study explored this by comparing data obtained from pre-attachment and post attachment relating to their interest in a career in anaesthesia, knowledge of the role of the anaesthesiologist and clinical knowledge of the specialty.

A total of 149 clinical year 2 students participated in this study. Males were 100 (67.1%) and the rest 49 (32.9%) were females. The majority of responders are between the ages of 20-26.

Out of 149 students post attachment 49 (32.9 %) would consider anaesthesia as a career choice a 17.6% increment from pre-attachment this kind of change in medical students consideration of a career in anaesthesia following a clinical rotation has also been shown in other studies. A study done in Pakistan shows 24% would consider anaesthesia as a specialty a 16% increment from pre-attachment (8), a much higher percentage compared to a study done in Ethiopia which is 1.5%, this improvement is attributed to increased exposure to the field (24). A study done in Nigeria revealed 23.2% would consider a career in anaesthesia (21) and a study done in Ireland 25% chose anaesthesia as a career a 5% increment from pre-attachment (2). Overall career choice is higher compared with studies done in other developing countries but it is comparable if we consider the percentages of students that considered anaesthesia as top three choice, There is a 19 % decrement in those that consider anaesthesia as a first top three choice which is similar with a study done in Nigeria (2) This paradoxical result needs further exploration but referencing other studies done in developed countries such as UK and Canada demonstrated those who have a positive role models in their teachers, those who are exposed to advanced skills during their rotation, pleasant undergraduate rotational experience, early and lengthier exposure were considered a contributing factors for both increment of the uptake and also being the top three choices (7)(13)(14). Out of those who will not consider anaesthesia as a career 70 (59.4%) stated lack of exposure on pre attachment whereas on post attachment minimum patient contact 46 (48.4%) and dependence on the surgeon 40 (42.1%) were the main reasons. This result is similar to studies done in Nigeria and Pakistan (8)(11).

There is strong and significant association between students' knowledge of the role of anaesthesiologist $OR = 95\%$ $CI 32 (4.2-244)$ with p value 0.001 and clinical knowledge of anaesthesia $OR = 95\%$ $CI 2.67 (1.317-5.449)$ with P Value 0.007. Students with good clinical knowledge of anaesthesia has 3.2 times more chance of choosing anaesthesia as a career $OR = 95\%$ $CI 3.23 (1.32-7.94)$ with P value 0.01. Students with Good knowledge of the role of anaesthesiologist has a high chance of choosing anaesthesia as a career $OR = 95\%$ $CI 39 (5-306)$ with p value < 0.001 . This result is comparable with a study done in Canada and west Australia (1)(14).

Regarding knowledge of the role of anaesthesiologist, the trend is towards a better understanding across all areas of activity. Post attachment 140 (94 %) students thought anaesthesiologist are responsible for airway management a 26.2 % increment from pre attachment, acute and chronic pain management is attributed to anaesthesiologist by 121 (81.2 %) students a 32% increment from

pre attachment , treating any medical problem that occurs intra operatively 98(65.8%) shows a 39% difference from pre attachment,securing central venous line recognized as anesthesiologists role by 118(79.2%) students on post attachment a 36% increase from pre attachment and the role of running ICU is also attributed to anesthesiologist by 115(77.2%) a 26% increment from pre attachment. Overall concerning the participants knowledge of the e role of anesthesiologist only 21.5 % scored above 80% on pre attachment and 72.5 % scored above 80% on post attachment. This result is as per with other studies done in Toronto (1)(17),Ireland (2), Pakistan (8) and Nigeria (21).

Regarding student's clinical knowledge of anesthesia the proportion of correct answers is greater and the proportion of 'Do not know' answers is less in the post attachment students group. Over all the pre attachment result shows 21.5% of the participants got above 80% while 65% of participants on post attachment got above 80%. Bivariate analysis was done this was statistically significant ($p < 0.005$). This was statistically significant from (18),(14),(21).

Concerning the clinical rotation 127(85.2%) of the participants stated that the rotation has changed their perception in a positive way towards Anesthesiology which is comparable to 85.7% result from Nigeria (21). The low level of uptake of anesthesia as a top three carrier choice compared with 85.2% stating positive attitude could be explained by a study done in Pakistan that reveled the discrepancy in the small percentage of students who would choose anesthesia as a career compared to the large percentage who found the specialty interesting could be altered if more time were dedicated to the practical teaching of anesthesia(27). Out of 68(45.6%) of the participants whostated positive experience 53(53.6 5)of them found pain management inspiring followed by 42(28.2%) stated the wide scope of practice interesting. Concerning the curriculum, the most enjoyable part of the attachment was skill lab 87(58.4 %)followed by lectures 12.8%.81(54%) of the students stated two week attachment is enough whereas 68(45.6 %) suggested three or four week attachment. This result is also comparable with studies done in Nigeria, Pakistan and Ireland(8)(21)(28). Even though the numbers are promising we have a long way to go if we compare it with Developed countries (1)(13).

8. Conclusion

Good knowledge of the role of anesthesiologist and good clinical knowledge of anesthesia has a positive association with career choice. It is of a paramount importance that medical students possess an accurate representation of anaesthesia, a thorough understanding of the role of an anaesthesiologist and the diversity of tasks they perform within the hospital. This in turn ensure that once medical students become qualified doctors they are prepared to collaborate and work efficiently with anaesthesiologist, able to provide accurate and appropriate information to patients regarding their anaesthetic procedure and also they are fully informed when considering their career choice in future years.

9. Limitation

It is a Single institute study and effectiveness of the training is not tested in addition it tested only the short term effects of the rotation.

10. Suggestion

On departmental level anaesthesiologist need to emphasize on the positive aspects and scope of the specialty outside the operating room, the clinical rotation should be structured with mandatory attendance instead of depending on the students own assertiveness and self-motivation, When a medical student is assigned to a clerkship it would be better if a mentor is assigned from the residents.in addition Clerkship program should start at 3rdyear. Increasing the number of teaching staff will increase the quality of exposure of students to a senior.

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12. Index

Annex 1: informed consent form

Consent Form

TITLE OF STUDY

Perception of C2 medical students towards anesthesiology and effect of clinical clerkship at Addis Ababa University, college of health sciences

PRIMARY RESEARCHER

Name - Dr Mihret Dagne Final year ACCPM resident

Primary Advisor- Dr Rahel Tilahun

Department - ACCPM

Address – Addis Ababa

Phone – (251)0912033730

Email – Mihret.dagne@gmail.com

PURPOSE OF STUDY

To know the impact of the two weeks anesthesia attachment in understanding role of anesthesiologist, clinical knowledge of anesthesia and choice of specialty carrier

PROCEDURES

Cross sectional study, clinical II medical students coming at anesthesia attachment will be asked to take part in this study and will take only 5 min to fill the questionnaire

RISKS

There is no anticipated risk to you if you participated in this study

BENEFITS

You will be contributing to the development of anesthesia in Ethiopia

CONFIDENTIALITY

Please do not write any identifying information.

Every effort will be made by the researcher to preserve your confidentiality including the following by assigning code names/numbers for participants that will be used on all research notes and documents

CONTACT INFORMATION

If you have questions at any time about this study, you may contact the researcher whose contact information is provided above.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I consent to take part in the research study of “Medical students’ perception of anesthesia: before and after anesthesia attachment at Addis Ababa university college of health science, Ethiopia”

Participant's Signature _____ **Date** _____

Researcher's Signature _____ **Date** _____

Annex 2. Data Collection Check List (Pre Attachment)

Pre Attachment questioner

I. Demography and Students' career choice

1. Study ID number _____
2. Year of medical school _____
3. Gender
 - a. Male _____
 - b. Female _____
4. Age in years _____
5. Were you aware that anesthesia was a medical specialty before coming to anesthesiology attachment?
 - a. Yes
 - b. No
6. Do you think anesthesia is an established specialty in Ethiopia?
 - a. Yes
 - b. No
 - c. I don't know
7. Do you consider anesthesiology as your future choice of specialty?
 - a. Yes
 - b. No
8. If yes For question 7
 - a. 1st choice
 - b. 2nd choice
 - c. 3rd choice
 - d. > 3rd choice
9. If no to question number 7 what is your reason? (you can choose more than one)
 - a. Minimum patient contact _____
 - b. Dependence on surgeon _____
 - c. Lack of recognition by peers _____
 - d. No previous exposure to specialty _____
 - e. Lack of recognition by patients _____
 - f. Not a job for physicians _____
 - g. Less research opportunity _____
 - h. Less teaching opportunity _____
 - i. Other(give details) _____

II. Students' knowledge of the role the anesthesiologist

10. Who decide if the patient is fit for anesthesia?
 - a. Anesthesiologist _____

- b. Surgeon _____
 - c. Scrub nurse _____
11. Who Decides the mode of anesthesia (you can choose more than one)
 - a. Anesthesiologist
 - b. Surgeon
 - c. Patient
 - d. I don't know
 12. Whose responsibility is it to monitor the patient's vital sign intraoperatively?
 - a. Anesthesiologist
 - b. Surgeon
 - c. Scrub nurse
 13. Is there a difference between an anesthesiologist and an anesthetist?
 - a. Yes
 - b. No
 - c. I don't know
 14. Which one of the following roles do anesthesiologists play in a hospital? **(you can choose more than one)**
 - a. Intra-operative blood transfusions
 - b. Administering epidural anesthetics in obstetric/labor wards for labor pain
 - c. Running intensive care units
 - d. Giving sedation for procedures
 - e. Securing central venous line
 - f. Treating any medical problem that occurs intraoperatively
 - g. Managing acute and chronic pain
 15. Who is responsible for Airway management?
 - a. Anesthesiologist
 - b. Surgeon
 - c. Scrub nurse

III. Students clinical knowledge of anesthesia

16. According to the current guidelines for what length of time should Heavy foods not be consumed pre-operatively?
 - a. From 6 hours before the operation
 - b. From midnight the night before the operation
 - c. From 2 days before the operation
 - d. I don't know
17. Which one of the following is a contraindication for spinal anesthesia?
 - a. Patient refusal
 - b. Short stature
 - c. Obesity
 - d. I don't know
18. What is the recent recommendation of the number of chest compression per minute during cardiopulmonary resuscitation?
 - a. 60

- b. 80
- c. 100-120
- d. I Do not know

19. Which one of the following is an indication for insertion of central venous line? (you can mark more than one)

- a. Dialysis
- b. Parenteral nutrition
- c. Administration of chemotherapy drugs
- d. I do not know

20. What is the maximum dose of lidocaine without adrenalin for local infiltration?

- a. 7mg/kg
- b. 5mg/kg
- c. I do not know

Annex 3. Data Collection Check List (Post-Attachment)

I. Demography and Students' career choice

1. Study ID number _____
2. Year of medical school _____
3. Gender
 - a. Male _____
 - b. Female _____
4. Age in years _____
5. Were you aware that anesthesia was a medical specialty before coming to anesthesiology attachment?
 - a. Yes
 - b. No
6. Do you think anesthesia is an established specialty in Ethiopia?
 - a. Yes
 - b. No
 - c. I don't know
7. Do you consider anesthesiology as your future choice of specialty?
 - a. Yes
 - b. No
8. If yes For question 7
 - a. 1st choice
 - b. 2nd choice
 - c. 3rd choice
 - d. > 3rd choice
9. If no to question number 7 what is your reason? (you can choose more than one)
 - a. Minimum patient contact _____
 - b. Dependence on surgeon _____
 - c. Lack of recognition by peers _____
 - d. No previous exposure to specialty _____
 - e. Lack of recognition by patients _____
 - f. Not a job for physicians _____
 - g. Less research opportunity _____
 - h. Less teaching opportunity _____
 - i. Other (give details) _____

II. Students' knowledge of the role the anesthesiologist

10. Who decide if the patient is fit for anesthesia?
 - a. Anesthesiologist _____
 - b. Surgeon _____
 - c. Scrub nurse _____
11. Who Decides the mode of anesthesia (you can choose more than one)
 - a. Anesthesiologist
 - b. Surgeon
 - c. Patient

- d. I don't know
12. Whose responsibility is it to monitor the patient's vital sign intraoperatively?
- a. Anesthesiologist
 - b. Surgeon
 - c. Scrub nurse
13. Is there a difference between an anesthesiologist and an anesthetist?
- a. Yes
 - b. No
 - c. I don't know
14. Which one of the following roles do anesthesiologists play in a hospital? **(you can choose more than one)**
- a. Intra-operative blood transfusions
 - b. Administering epidural anesthetics in obstetric/labor wards for labor pain
 - c. Running intensive care units
 - d. Giving sedation for procedures
 - e. Securing central venous line
 - f. Treating any medical problem that occurs intraoperatively
 - g. Managing acute and chronic pain
15. Who is responsible for Airway management?
- a. Anesthesiologist
 - b. Surgeon
 - c. Scrub nurse

III. Students clinical knowledge of anesthesia

16. According to the current guidelines for what length of time should Heavy foods not be consumed pre-operatively?
- a. From 6 hours before the operation
 - b. From midnight the night before the operation
 - c. From 2 days before the operation
 - d. I don't know
17. Which one of the following is a contraindication for spinal anesthesia?
- a. Patient refusal
 - b. Short stature
 - c. Obesity
 - d. I don't know
18. What is the recent recommendation of the number of chest compression per minute during cardiopulmonary resuscitation?
- a. 60
 - b. 80
 - c. 100-120
 - d. I Do not know
19. Which one of the following is an indication for insertion of central venous line? **(you can mark more than one)**

- a. Dialysis
 - b. Parenteral nutrition
 - c. Administration of chemotherapy drugs
 - d. I do not know
20. What is the maximum dose of lidocaine without adrenalin for local infiltration?
- a. 7mg/kg
 - b. 5mg/kg
 - c. I do not know
21. What was the most enjoyable part of your anesthesia rotation?
-

22. Do you think Two week attachment in anesthesiology is enough?

- a. Yes
- b. No

23. If no to question 22, how long do you think it should be? _____

24. Has the rotation changed your attitude in a positive way towards anesthesiology as specialty?

- a. Yes
- b. No

25. If your answer to question 24 is No , specify your reason

26. If your answer to question 24 is yes, which part inspires you? _____
