

A mixed method approach to address harmful language in biochemistry textbooks as an early intervention for future healthcare providers

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Introduction

Harmful language used by healthcare professionals negatively impacts patient care.¹⁻⁴ The American Medical Association (AMA) suggests avoiding dehumanizing language, blaming and the use of negative adjectives or verbs when referring to groups of people receiving care or treatment.⁵⁻⁶ During a student's training there are multiple sources of exposure to harmful language. These include textbooks, teacher behavior, exams, tacit knowledge or supplemental/external resources (Figure 1). For this study, harmful language includes language which either dehumanizes the patient, reinforces a physician held bias or erodes trust between the physician and patient.

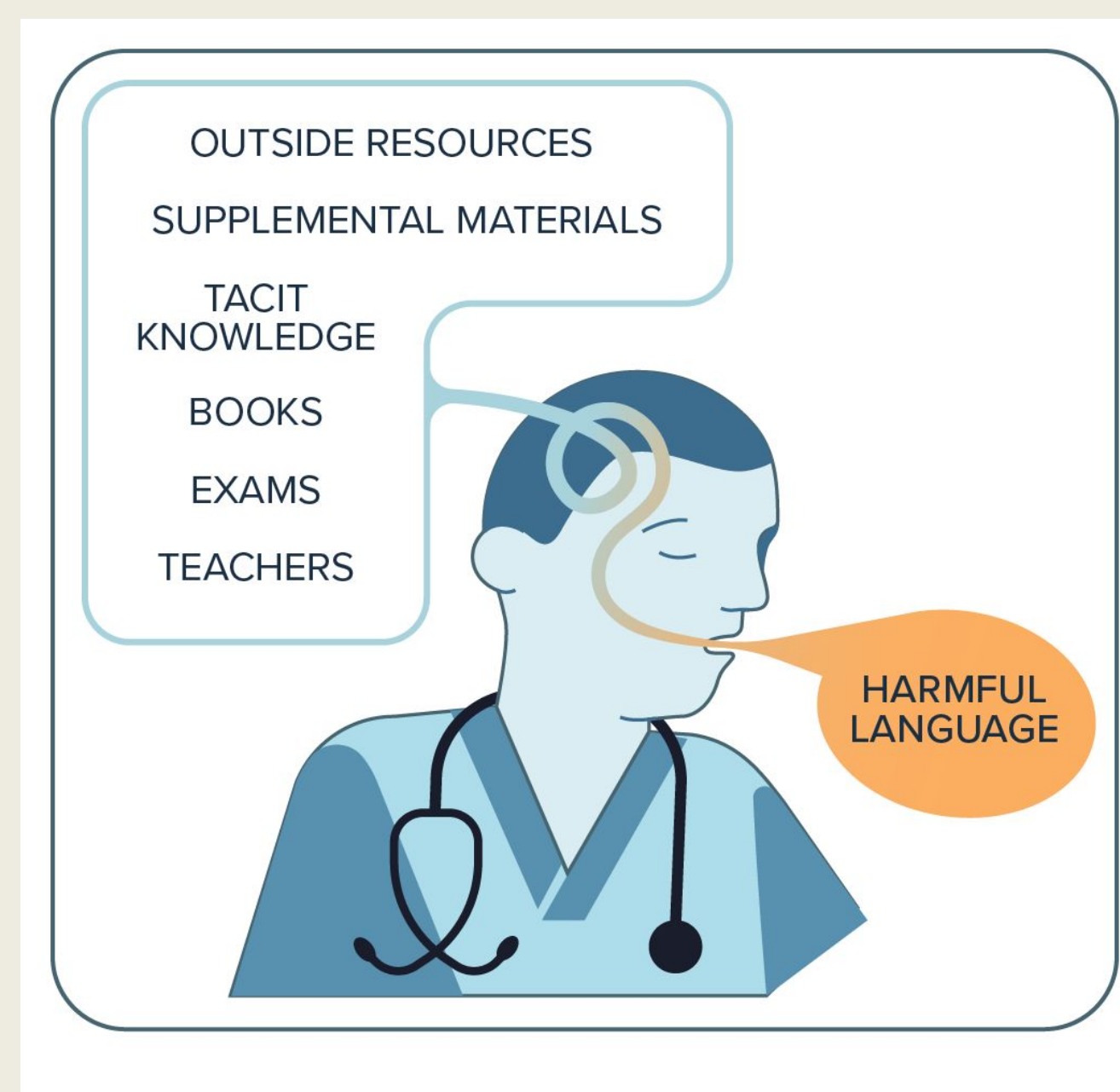


Figure 1. Sources used in training of healthcare professionals which reinforce harmful language.

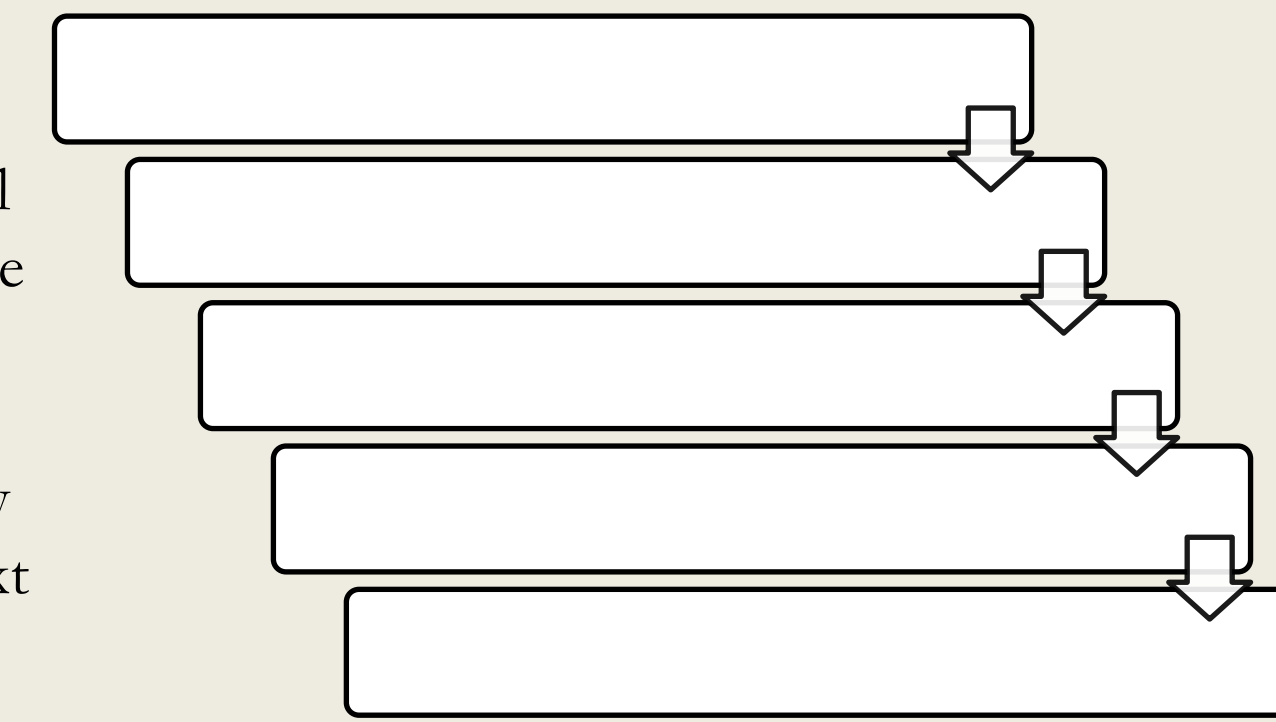
Aims and Objectives

- Identify and quantify harmful language in pre-clinical textbooks (Figure 2).
- Link use of harmful language to impact on patient care.
- Describe examples of harmful language in pre-clinical textbooks (Figure 3).

Methods

This project involved the review and thematic analysis of pre-clinical, foundational biochemistry textbooks for harmful language when describing people and their conditions in an educational setting.

We followed previously published methodology for this evaluation: Familiarization, Coding, Generating Themes, Defining/Naming Themes, Writing Up.⁷ We selected the three most recommended biochemistry textbooks within Michigan-based medical schools for further analysis. Books were published between 2017-2019 and at the time of this study, textbooks were the most recent edition. We created a glossary of terms that were established as 'harmful' by previous literature. Then a codebook was developed for analysis using NVIVO. Two authors reviewed the textbooks to identify harmful language and a third was used to reach consensus for any disagreements. Text was evaluated for context rather than searching for individual terms. Final themes were agreed upon by all authors.



Results

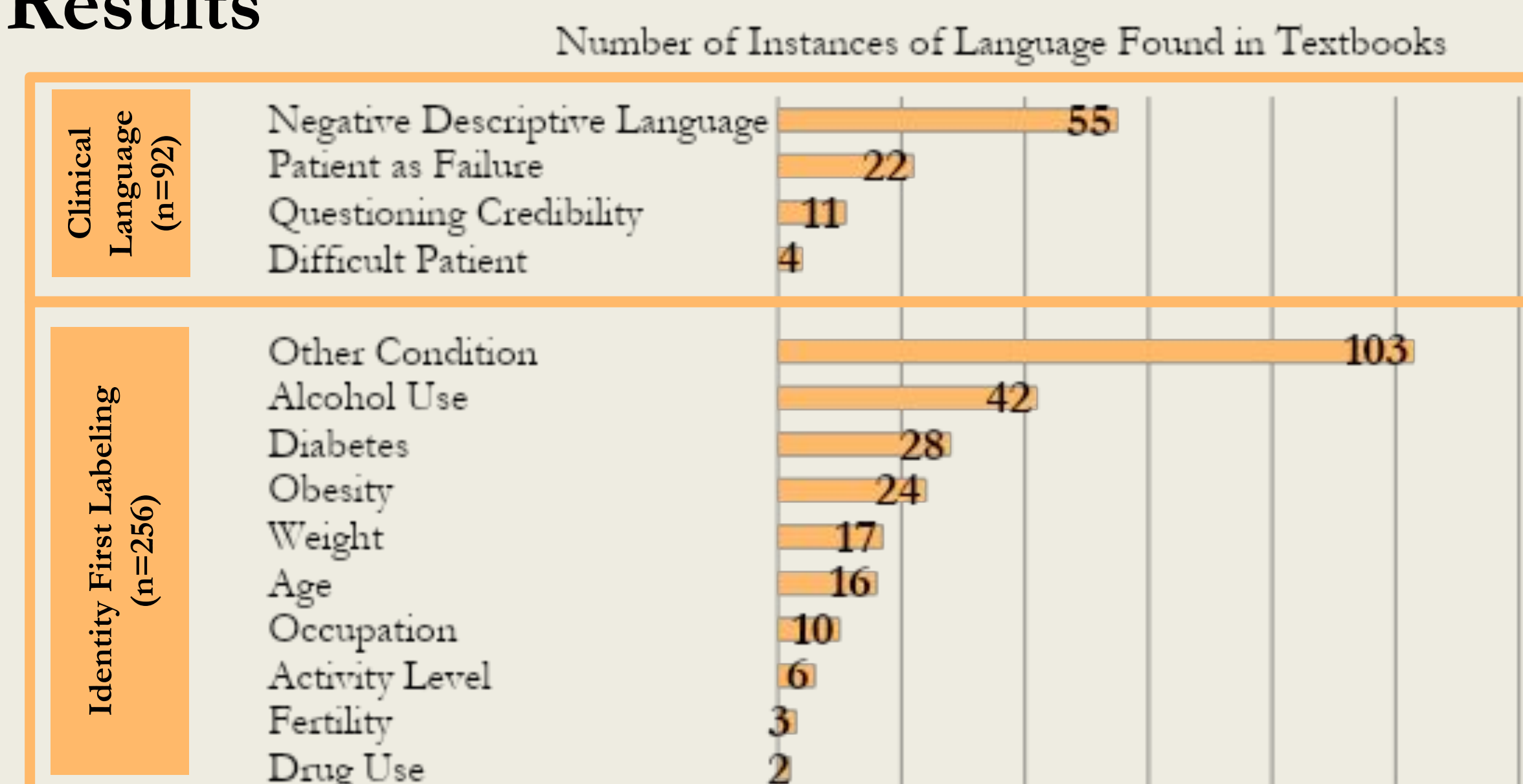
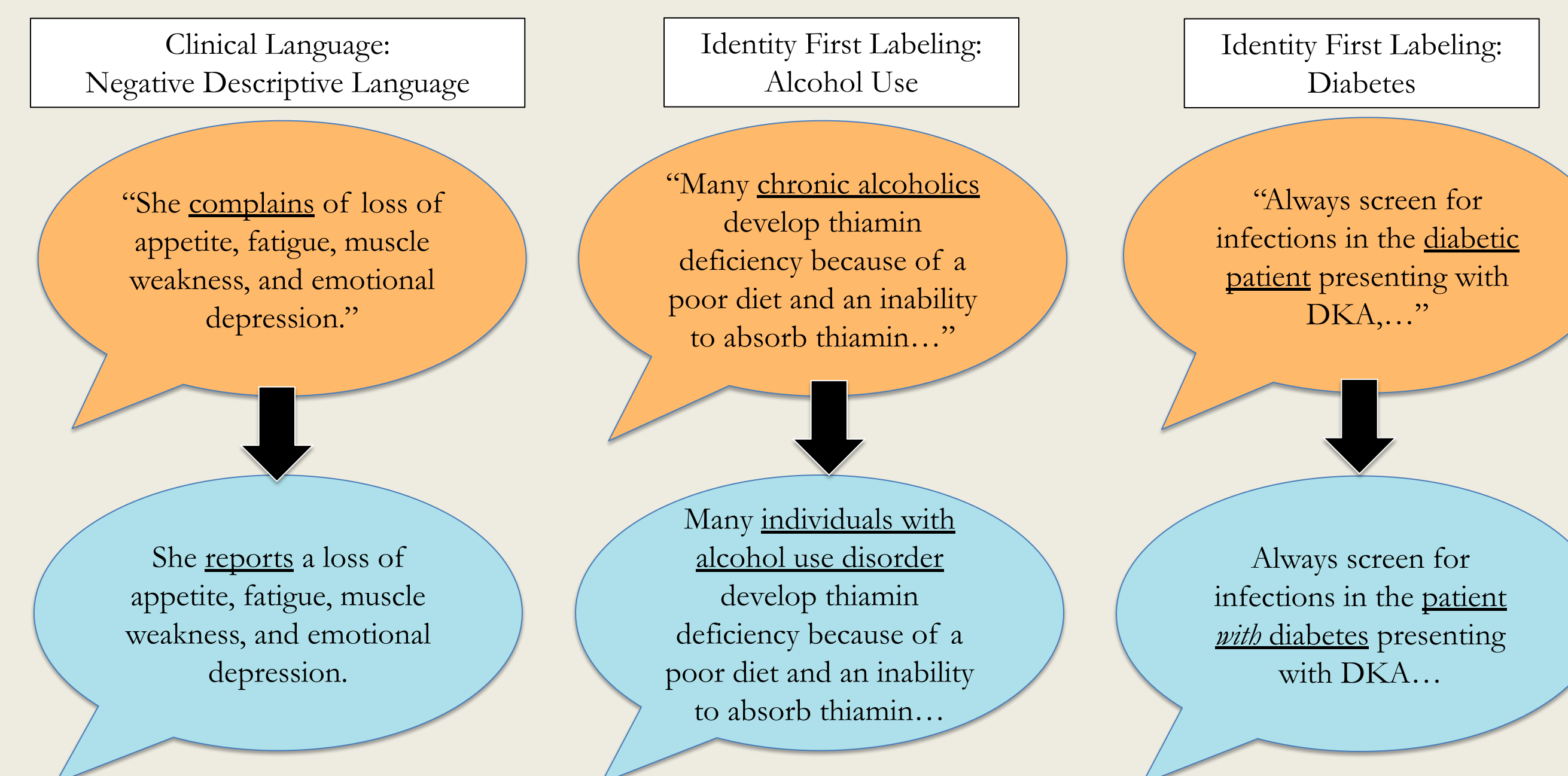


Figure 2. Distribution of Codes and Themes from Harmful Language Analysis. A total of 343 uses of harmful language were documented across all of the selected textbooks. Codes are supported by previous literature: Clinical Language^(1,14); Identity First Language^(1, 12, 14-16, 18-24)

Figure 3. Harmful language examples from textbooks.

Examples of harmful language from textbooks by theme/code paired with suggestions for more humanizing language. Codes are supported by previous literature.



Discussion

We identified two main themes of harmful language used to describe people and their conditions in biochemistry textbooks (clinical language and identity first labeling). In order to minimize learning of harmful language, educators need to intervene at an early stage of training, rather than to take corrective action later (Figure 4). Therefore, addressing harmful language in our educational resources serves two purposes: to reduce the burden of unlearning for healthcare providers and to highlight the impact of the basic science educator in promoting instruction that addresses healthcare disparities and inequity (Figure 4).

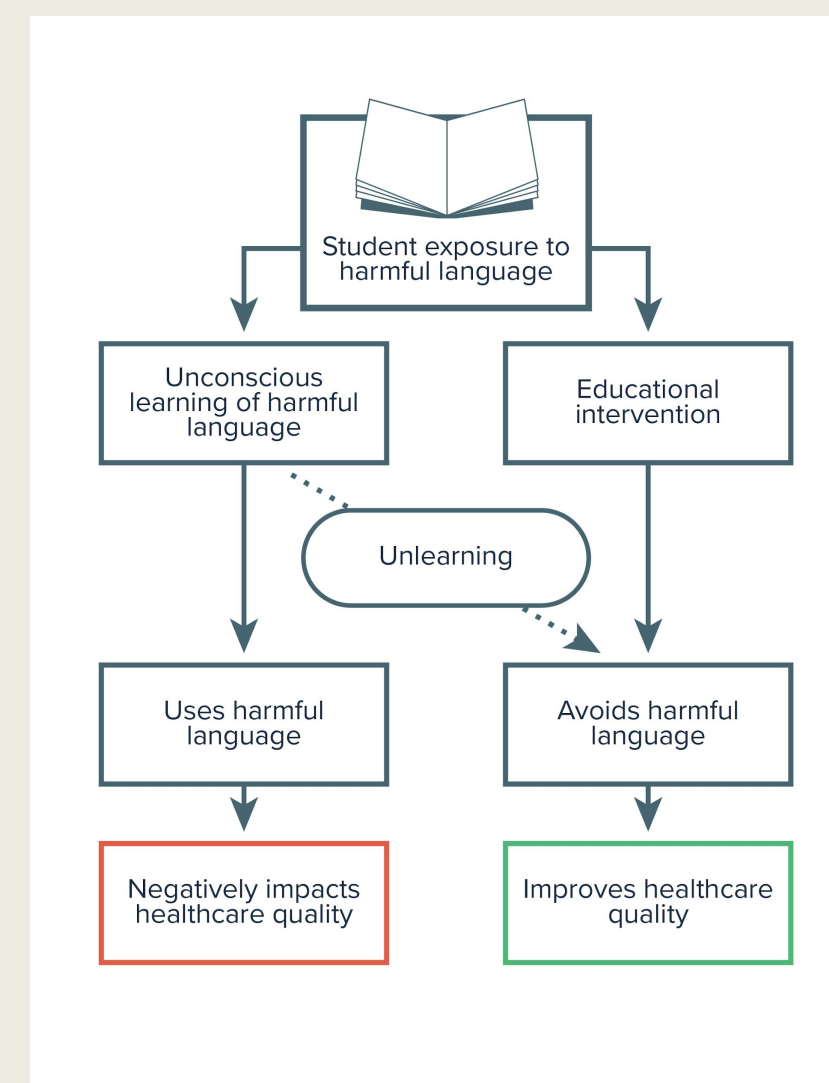


Figure 4. Outcomes from learning Harmful Language in Higher Education

Conclusions

Textbooks used in the basic science instruction contain harmful language. Educators should be aware of the impact of using harmful language when describing a patient to their students. Early learning of appropriate language promotes consistent education leading to humanized care.

Limitations

For this analysis, a limited number of textbooks were screened (3). However, these findings could be applied to other textbooks/materials. Further, we did not generate novel categories of harmful language, meaning that each code had to be previously supported in the literature. Given this, it is possible that other types of harmful language would be undercounted or not yet recognized.

Future Directions

Future work for this project will aim at assessing the use of harmful language in other instructional materials such as commercial resources for standardized testing, instructor generated slides, assessments, and seminars. Further, we aim to design workshops to help instructors and students understand how harmful language is used and how it can be replaced with humanizing language.

Potential Impact

This work has the potential to motivate educators to remove harmful language in preclinical curricula. Reduction of this language will minimize its use by future physicians and improve clinical care by reducing stigma and bias against patients.

References



Absence of Lung Encountered During Anatomy Dissection Course Provides an Opportunity for Improving Respiratory Anatomy Education

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Introduction

Anatomical Foundations of Clinical Practice (AFCP) is a two-course sequence completed in the first semester at Oakland University William Beaumont School of Medicine. An essential component of these courses include student-lead cadaver dissection labs, aimed at enhancing the understanding of essential anatomical knowledge required for clinical practice

Aims and Objectives

In recent decades, a push for greater foundational and clinical curriculum integration has led to the development of strategies such as case-based, problem-based, team based, simulation and blended learning¹.

Here, we highlight how the encounter and subsequent investigation of the absence of the right lung by students provides opportunities for the enhancement and integration of anatomical education through a modified case-based learning approach.

Acknowledgement

The authors sincerely thank those who donated their bodies to science so that anatomical research could be performed. Results from such research can potentially increase mankind's overall knowledge that can then improve patient care. Therefore, these donors and their families deserve our highest gratitude. The authors also like to thank anatomy faculty and lab manager Dan Schlegel for allowing this project to be successful.

Methods

Students encountered anatomical variation, pathology, or evidence of surgical procedures during dissection. They then investigated the variation they encountered through a literature search. Students presented their findings to their peers in the laboratory setting.

Results

- Right Lung: Absence of the right lung, reduced size of the right pulmonary cavity, thickened pleura, pink gelatinous substance in the pulmonary cavity
- Left Lung: Enlargement of left lung, presence of horizontal fissure
- Other: Tracheal bifurcation, no branching of right primary bronchus

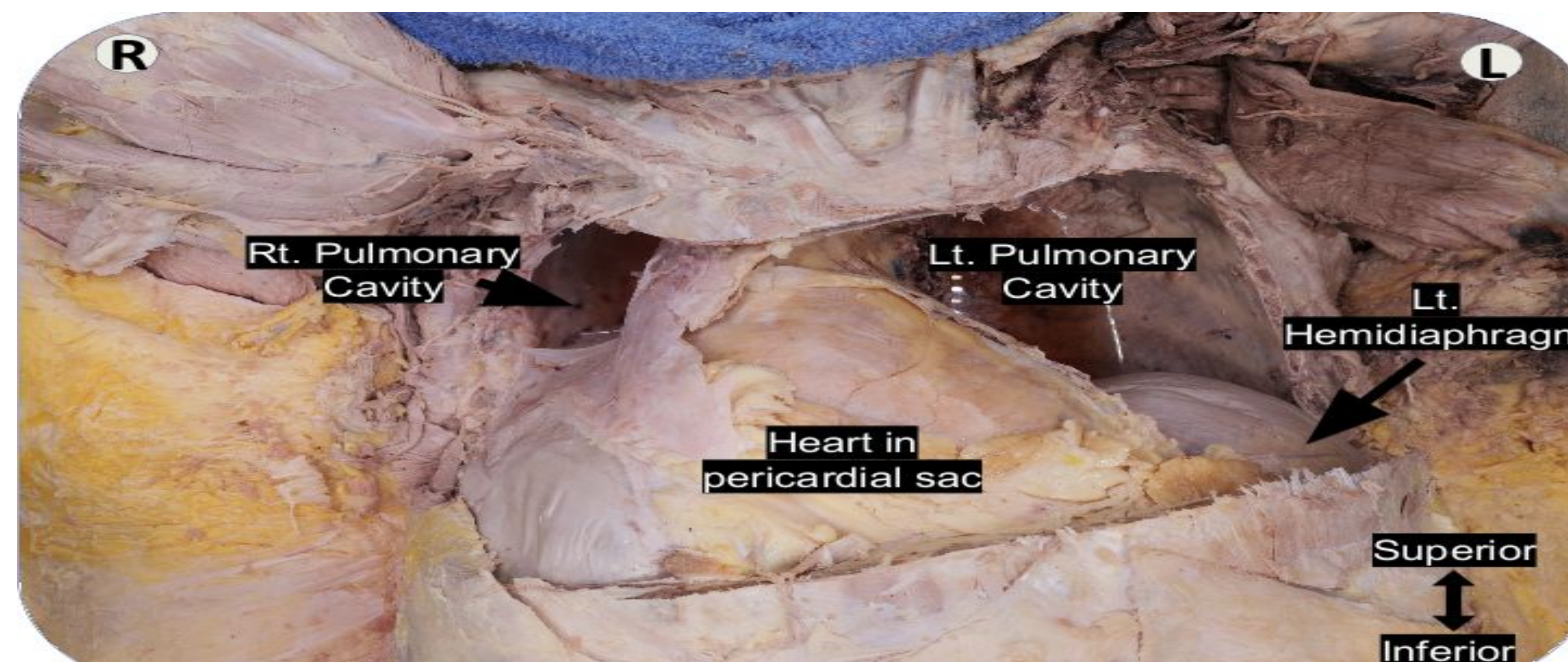


Figure 1: Dissection depicting the reduced size of the right pleural cavity due to the absence of the right lung.

Pneumonectomy

With absence of the entire lung, students reasoned it potentially could have been a pneumonectomy. Students were skeptical as they did not find any evidence of a posterolateral thoracotomy scar². The students found evidence that pleural cavity reduction can occur post-pneumonectomy³ and that the abrupt ending of the primary bronchus could be explained by the transection of bronchus during a pneumonectomy⁴.

Unilateral Pulmonary Agenesis

Students reasoned that the cause of the variation encountered must have occurred earlier in life, due to the vast size reduction of the right pleural cavity reduction compared to the left. Students also investigated the possibility of Unilateral Pulmonary Agenesis. The pleural cavity size differences observed in the donor were similar to those of an x-ray in a case report of unilateral pulmonary agenesis⁵.

Discussion

Encountering and researching anatomical variations and pathology during dissection offers an opportunity for students to investigate topics beyond those covered in traditional anatomy curriculum.

The experience students had encountering, researching and presenting anatomical variations is an enriching educational experience that can only be had by participating in cadaveric dissection, and highlights its importance in medical education.

If developed as part of the curriculum, exploring anatomical variations encountered in cadaveric dissections provides a potential avenue to implement Self-Directed Learning in accordance with LCME standards.

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Assessment of Confidence in Nutrition Counseling Skills in Preclinical and Clinical Clerkships in Medical Education

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Introduction

National educational efforts have been made to increase the nutrition content in the medical school curriculum, including nutrition assessment skill training, with limited success in implementation.¹ Many institutions have created initiatives to strengthen the nutrition training of their medical students, though, students are still rating their nutrition knowledge as substandard and their confidence in nutrition counseling as inadequate.¹

Aims and Objectives

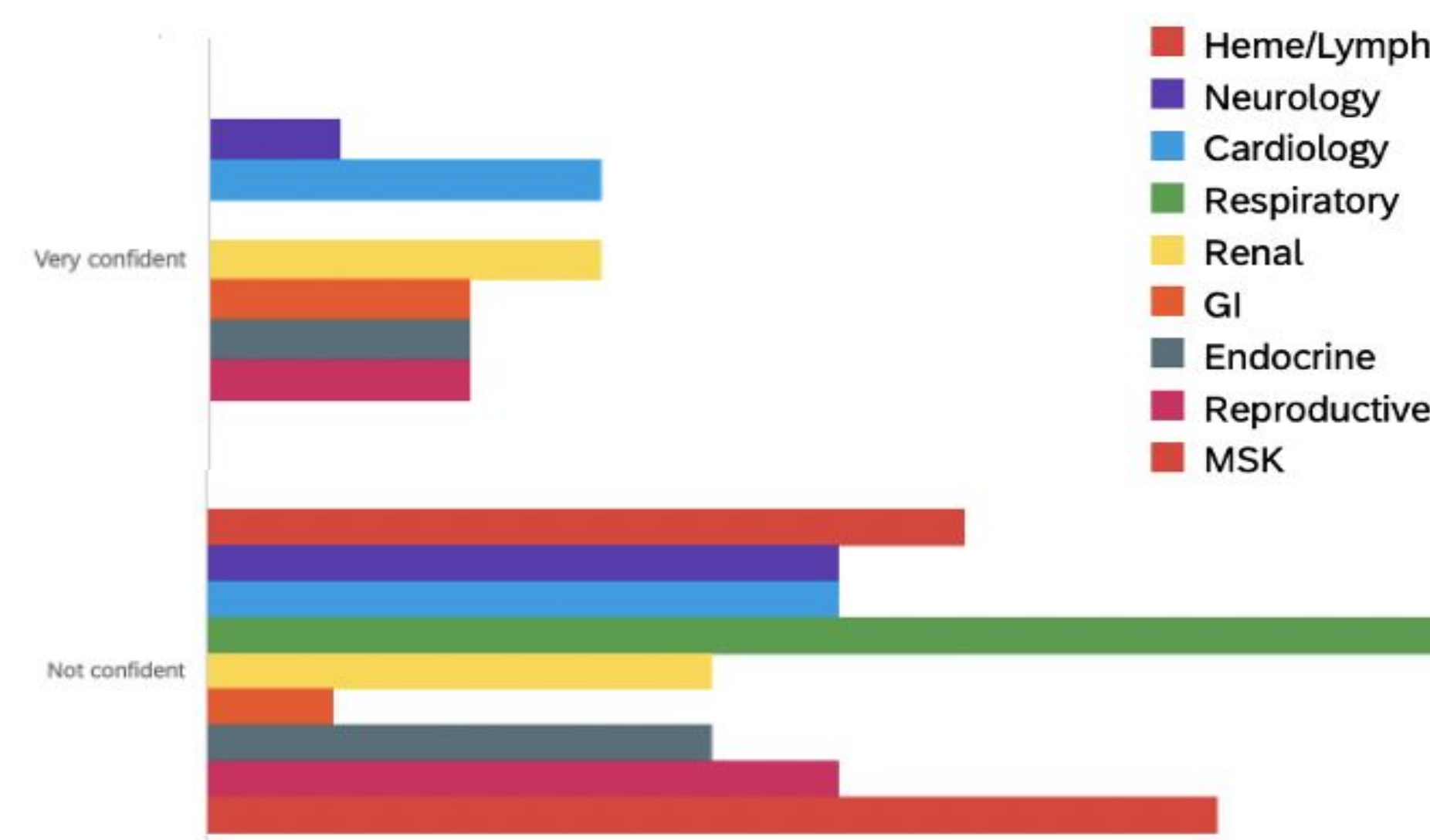
To assess the nutritional knowledge of M3 students before and after their first clerkship, specifically evaluating their ability, attitude, confidence, and opportunity to proficiently apply nutrition counseling skills in the clinical setting.

Methods

Administration of a two-part survey to all M3 OUWB medical students in the Class of 2023 and 2024 before and at the end of their first clinical clerkship rotation. The first survey was 22 questions and the second survey was 25 questions administered through an online Qualtrics platform. Questions include information on nutritional knowledge and counseling abilities in preclinical years compared to post first clinical clerkship during medical school.

Results

The statistical analysis revealed that students reported a slightly increased confidence in their preclinical nutrition knowledge after their first clerkship rotation. Though, students reported lower confidence in their counseling abilities in the fields of gastroenterology and hematology.



Individual Student Reports of Barriers in Nutrition Education

“Not sure how and where to find resources for proper nutritional counseling”

“How do I consult a registered dietician?”

“There is decreased interface with registered dietitians in practice”

“No resources provided by medical education regarding nutrition counseling”

“There is lack of opportunity to implement nutritional counseling in preclinical education in medical school”

Discussion

Our study demonstrated the limited amount of nutrition knowledge medical students have obtained in their preclinical and clinical years, with specific recommendations from students about barriers to education and opportunities that can enhance the educational initiative. Our outcome supports current research that identifies the lack of nutrition education in medical curricula resulting in students and physicians lacking confidence in their ability to implement nutrition counseling in clinical practice.²

Conclusion

Our study identified the lack of medical students’ perceived nutrition knowledge and application before and after their first clerkships, supporting the importance of greater integration of nutrition education into the medical school curriculum.

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Effect of Anatomical Studies Prior to Medical School on Medical School Anatomy Study Success and Residency Choice

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Introduction

What pre-matriculation factors influence specialty choice? This research investigates whether taking anatomy courses prior to medical school affects medical student academic success and residency choice in anatomy-heavy specialties. This would be illuminating information for the many shareholders in this process, including students, pre medical advisors, medical school admissions committees, and residency directors seeking strategies to increase interest by under-represented groups in their specialty. In one previous study, it has been found that prior anatomy studies do have a positive impact on medical school anatomy and histology grades.¹ However very little other research has been done on this topic, especially where it relates to under-represented groups in these fields.²

Aims and Objectives

Aim 1: to investigate the effect of anatomy courses prior to medical school on medical school anatomy grades

Aim 2: to investigate whether students who took anatomy courses prior to medical school are more likely to be interested in a surgery or radiology career. Within this aim is the goal of determining whether there is an effect on the career goals of under-represented minorities within these fields.

Methods

After IRB approval (IRB # IRB-FY2021-64), a retrospective model was used in which a survey was sent to fourth year medical students at Oakland University William Beaumont School of Medicine (OUWB-SOM) in two consecutive years (Winter semesters 2021 and 2022 prior to the Match. Students were asked whether they took an anatomy course prior to medical school. They were then asked to self-report their grades in pre-clinical anatomy courses and in STEP 1 score and STEP 2 CK. To investigate the aim of whether students who took anatomy are more likely to be interested in a surgery or radiology career, students were asked to report whether they applied to these fields. They were also asked whether they were a member of one or more under-represented minority identities.

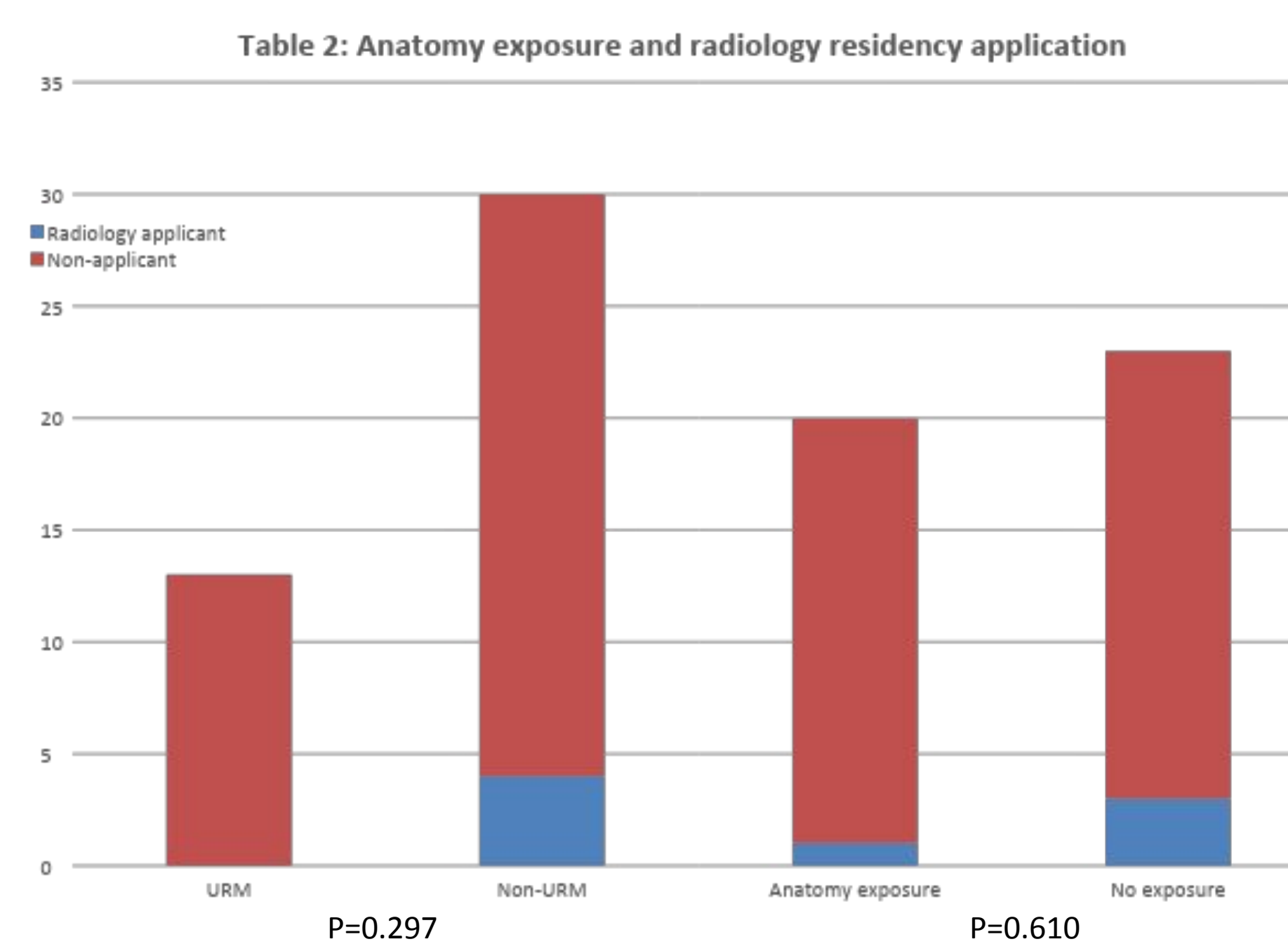
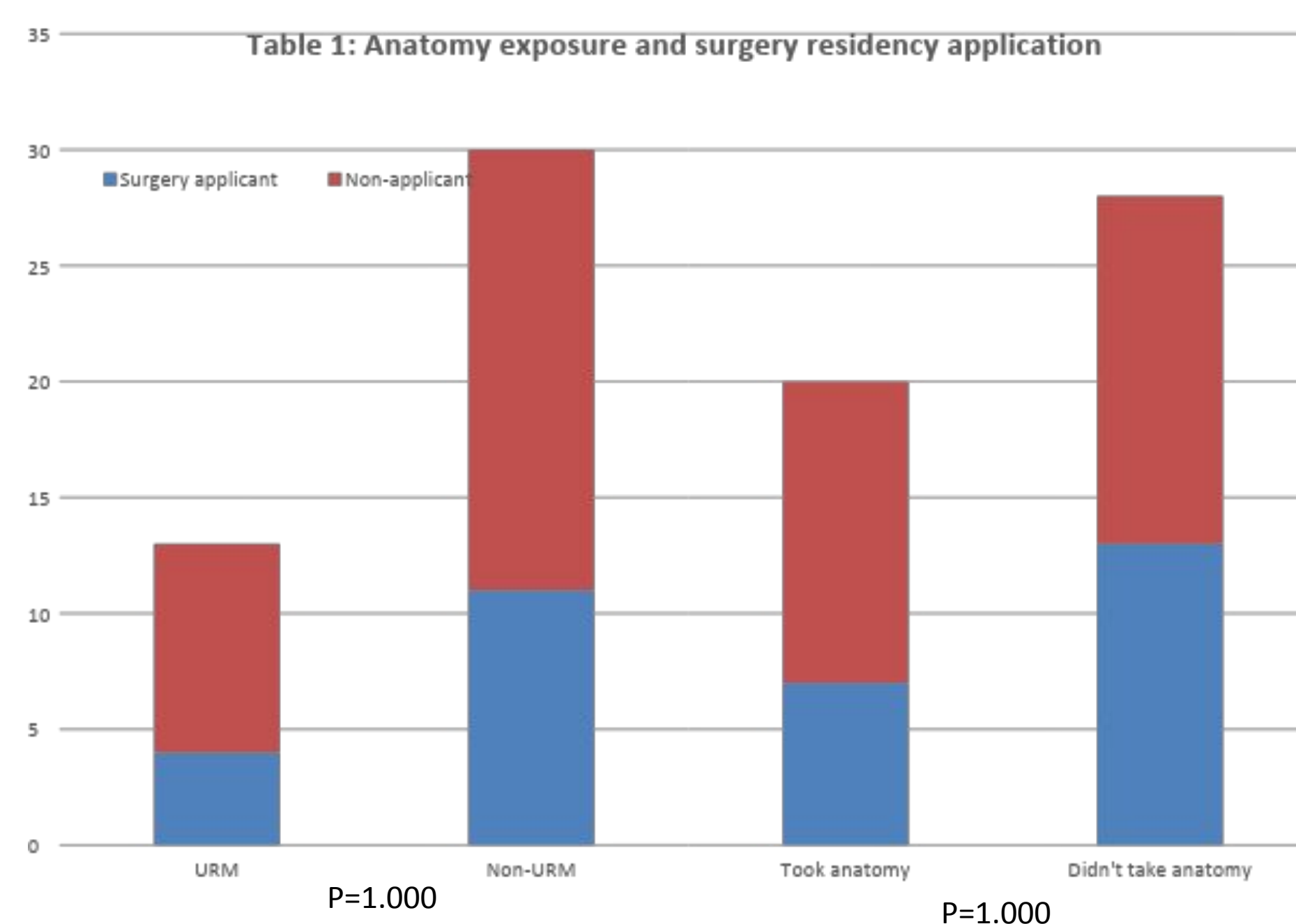
Results

Aim 1: do pre-matriculation anatomy courses effect medical school anatomy grades?

There were no statistically significant effect of having taken anatomy on medical school anatomy grades or on STEP 1 score or STEP 2 CK score.

Aim 2: do pre-matriculation anatomy courses effect residency choice, particularly for underrepresented minorities?

Findings were that STEP 1 and STEP 2 CK scores had a statistically significant effect on the likelihood to apply to a surgical or surgery subspecialty. However, having taken anatomy prior to medical school had no effect on whether students applied to surgery or radiology specialties. This included students who identified themselves as an under-represented minority.



Conclusions

Analysis of first-year medical school anatomy and STEP 1 and 2 CK scores showed that students who took anatomy prior to medical school had no improved performance over those who did not take anatomy prior to medical school.

Discussion

For the stakeholders interested in increasing applications to anatomy-heavy specialties, especially by under-represented minorities, it will be important to investigate other avenues of intervention. Previous literature has shown some interventions in medical school can be taken,³ but further attention could be paid to student characteristics prior to matriculation. Among this sample there was no statistically significant effect of under-represented minority status on a student's likelihood of applying to a surgical residency. Thus this sample could be non-representative.

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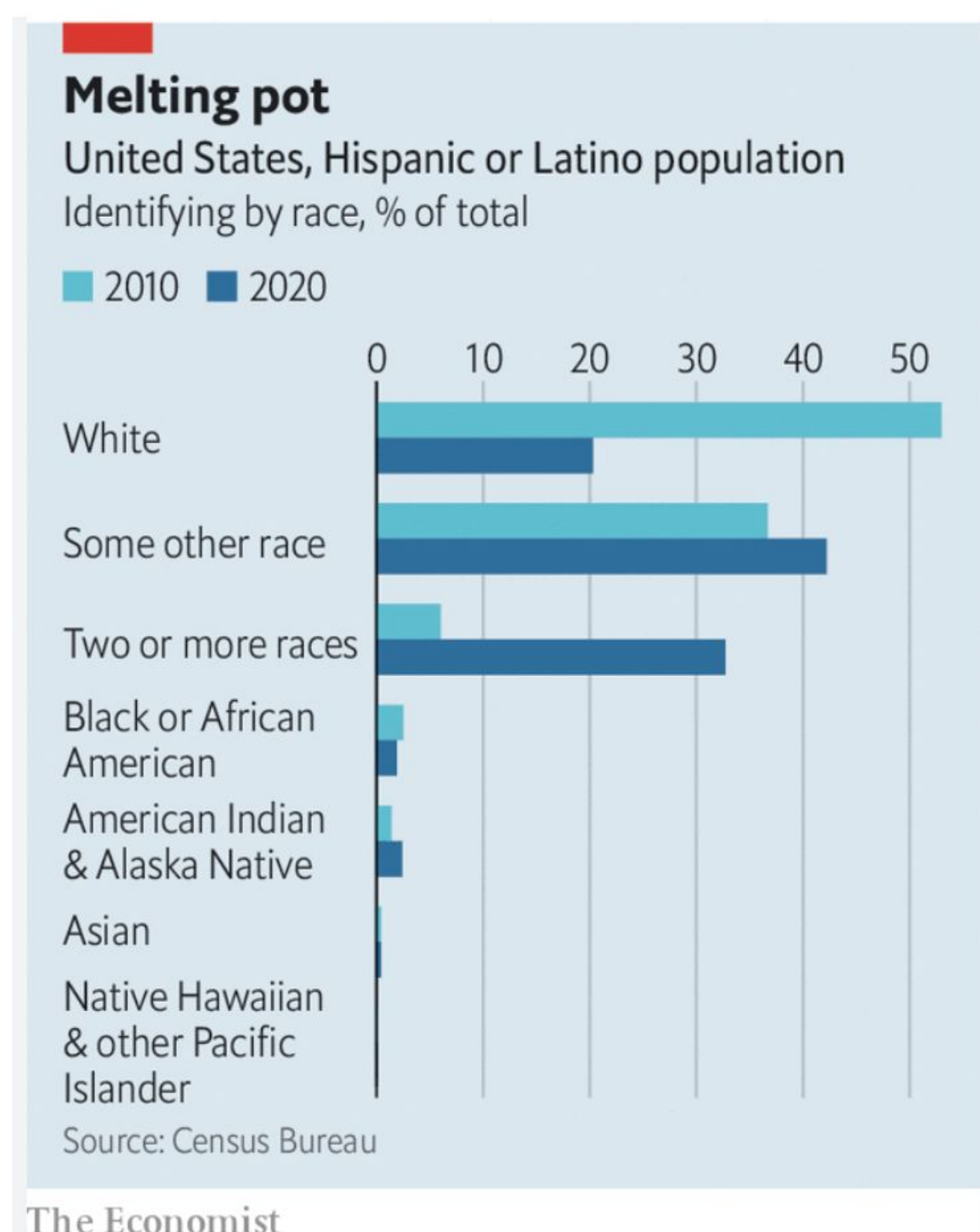
In Medicine, It's Not All Black and White: The Case to Account for Multi-Racial Identities in Medical Education Curricula

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Introduction

- Medical schools place a large emphasis on increasing diversity and inclusion in their educational curricula.¹
- Race and its associations with various medical conditions are common topics in pre-clinical lectures and board preparation materials. For instance, students are commonly taught to associate sickle cell disease and sarcoidosis with patients of African American heritage.²
- In teaching students to recognize certain races and ethnicities as buzzwords for specific pathologies, medical schools perpetuate the idea that race and ethnicity are definite, mutually exclusive categories useful for medical practice.



Questioning Race-Based Medicine and Deficiencies in Current Medical Education Practices

- Despite the fact that Americans are no longer purely white, purely black, or purely Asian, the vast majority of medical school curricula focuses on patients who identify as a single race rather than as multi-racial or of mixed ethnicity.
- America is becoming increasingly diverse. According to the 2020 census, 33.8 million people in America are multiracial, which is a 276% increase from 2010.³ As time goes on, it will be increasingly difficult for medical students to discern a patient's racial background from mere appearances.
- Currently, identification with a particular racial group has the potential to affect a patient's diagnosis or treatment in many ways. For example:
 - Kidney failure: Because a 1999 study found that African Americans had higher muscle mass, some health systems use a different formula to calculate glomerular filtration rates (GFR) for black individuals.⁴ This is of unique significance because GFR is a key component in determining a patient's eligibility for a kidney transplant. For multiracial patients, this may have lifelong consequences. For example, there are documented cases in which a patient's categorization as either black or white determined whether or not they received lifesaving treatment.^{5,6,7}
 - Diabetes treatment: The BMI threshold for diabetes testing for some individuals of Asian descent than it otherwise would be for white individuals.⁸
- However, little guidance is provided to medical students on how to apply these race-based medical protocols to multi-racial patients. This guidance is not provided in our formal curricula, and professional societies similarly fail to address this important topic.

Proposed Changes in Medical Education

- Medical students should be trained to collect the most nuanced information about a patient's racial and ethnic background as possible.
- Additionally, students should be taught to account for the different influences of nature versus nurture when it comes to patients who might have been adopted, and therefore have different genetic and environmental influences that span multiple races.
- Finally, medical education curricula might de-emphasize race and instead place a greater importance on variables such as diet, family unit, type of neighborhood, etc. These factors are the determinants which ultimately may be more likely to influence a person's health than their race or ethnicity.

Conclusions

- Additional attention should be provided to the topic of multiracial patients during lectures on diversity and inclusion.
- Professional medical societies must provide more clarity and guidance on how to treat multiracial patients, especially as America's population shifts towards a majority of patients being of mixed race.

Discussion

- If medicine continues to use race as a factor which determines diagnosis, care, and treatment, medical students must be trained to thoughtfully approach the unique and growing population of multiracial patients.

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Meckel's Diverticulum : A Case Report

Ethan Dimock¹, Dylan Moran¹, Nahid Yosufi¹, Ryan Victor-Joseph¹, Genevieve Richardson¹, Derrik Nghiem¹, Malli Barremkala²

Introduction

- Meckel's Diverticulum (MD) is an anatomical variation in the human body that results from a persistence of the vitelline duct, which normally obliterates during the fifth week of fetal development.¹
- MD is the most common congenital defect of the gastrointestinal tract but is still relatively rare and only occurs in 2% of the general population.³
- This occurrence is usually clinically silent, therefore most individuals that have the abnormality are unaware unless it becomes pathologic.¹
- This variation usually ranges in size from 3-6cm, but there have been reported cases of giant MD with sizes of up to 18 cm.³
- Surgical resection is the most common treatment and has a good prognosis.²

Aims and Objectives

- Explore anatomical variations and their prevalence in the anatomical laboratory.
- Discover the unique characteristics and presentations of Meckel's Diverticulum.
- Engage in team-based collaboration and data collection.
- Investigate both current and future corrective surgical techniques for patients that present with this variation.

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Methods

- Complete dissection was conducted by first year medical students on 21 (10 male, 11 female) formalin-embalmed donors.
- 7 donors (3 male, 4 female) from the Oakland University Doctor of Physical Therapy program were included.
- The ileum and jejunum were inspected closely in each cadaver for Meckel's Diverticulum.
- A 96-year-old male was found to have a Meckel's Diverticulum originating in the ileum

Results

- One of the twenty-eight cadavers dissected was found to have a Meckel's Diverticulum in the ileum (3.5% prevalence rate)
- The Meckel's Diverticulum found had a length from base to apex was 6.2cm, the circumference was 6cm, and the distance from the ileocecal junction was 37cm.



Figure 1: This image displays the donor's small and large bowels with the mesentery intact and the liver above. The Meckel's Diverticulum is seen in the bottom left from the ileum.

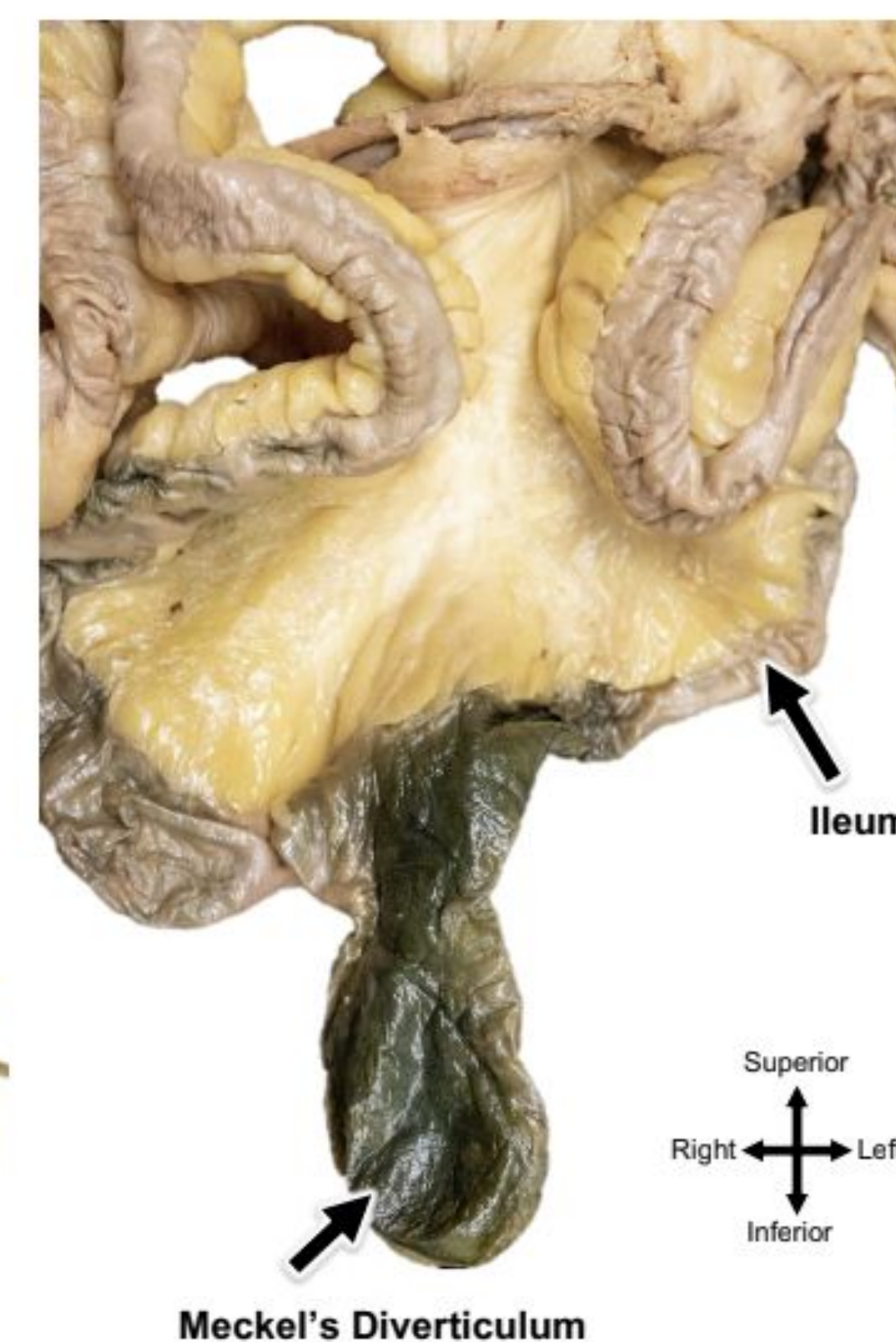


Figure 2: This is a close-up image showing the Meckel's Diverticulum in the ileum. It is fully intact without any signs of past complications for the donor. The students suspect that the donor was not aware of the anomaly.

Conclusions

In this study of anatomy lab donors, the hypothesis of the rarity of MD was supported. Only 1 out of 34, approximately 2.9% of the donors in the lab, presented with this congenital defect.

Discussion

In this study of anatomy lab donors, the hypothesis of the rarity of MD was supported. Only 1 out of 34, approximately 2.9% of the donors in the lab, presented with this congenital malformation. Future research that could be done on MD includes, but is not limited to, the clinical presentation of people with this congenital abnormality and how they present relative to the size of their diverticulum. This study supported the relative rarity of this abnormality, but exploring further pathologic presentations may prove fruitful.

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Medical Student Perspectives on the Immediate Impact of the Transition to a Pass/Fail Step 1 Exam

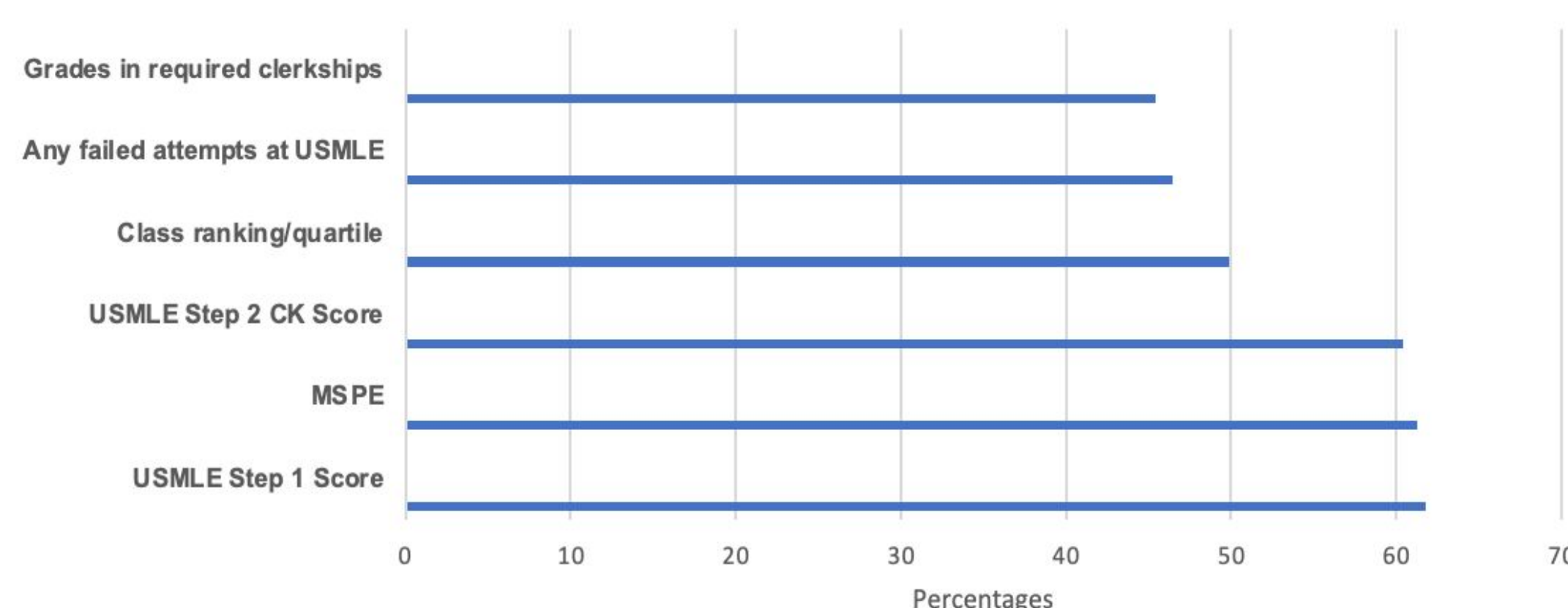
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Introduction: The Historical Significance of the USMLE Step 1

The United States Medical Licensing Exam (USMLE) is composed of three written examinations which physicians must pass before earning their medical license. The first portion, USMLE Step 1, is typically taken between the preclinical and clinical years. Historically, it was scored from 1 to 300, with higher scores correlating with higher proficiency. A student's Step 1 score traditionally determined how competitive they would be in the residency match, and even which types of residencies they would be eligible for.

Figure 1: Education and Academic Performance Characteristics Considered by Residency Program Directors in Deciding Whom to Rank (%)¹



USMLE Step 1: Recent Developments

In February 2020, the USMLE announced that the STEP 1 would transition to a pass/fail scoring system.¹ One of the main factors driving this change was the fact that medical students and residency programs were attributing too much weight to an exam meant to assess competencies for medical licensure, but not to stratify for residency programs. A secondary result of this change was the idea that it would lessen the amount of stress placed on students and support their well-being. We argue to the contrary, at least for the next few classes of medical students. We believe Step 2 CK will simply replace Step 1 scores.

USMLE Step 1 Preparation Evolution

At its inception in 1993, the minimum passing score for the USMLE Step 1 was 176. Between 1997 and 2022, the minimum passing score for the USMLE Step 1 was increased 6 times, for a total increase of 20 points (176 to 196). In the meanwhile the most popular test preparation resource First Aid for USMLE Step 1 book has continuously increased in length.

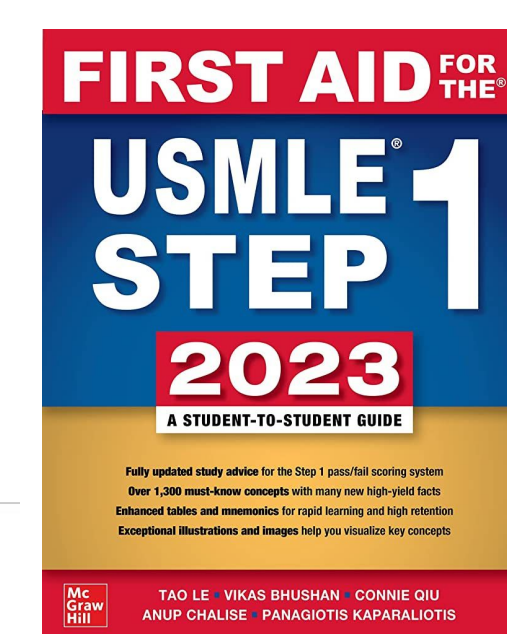
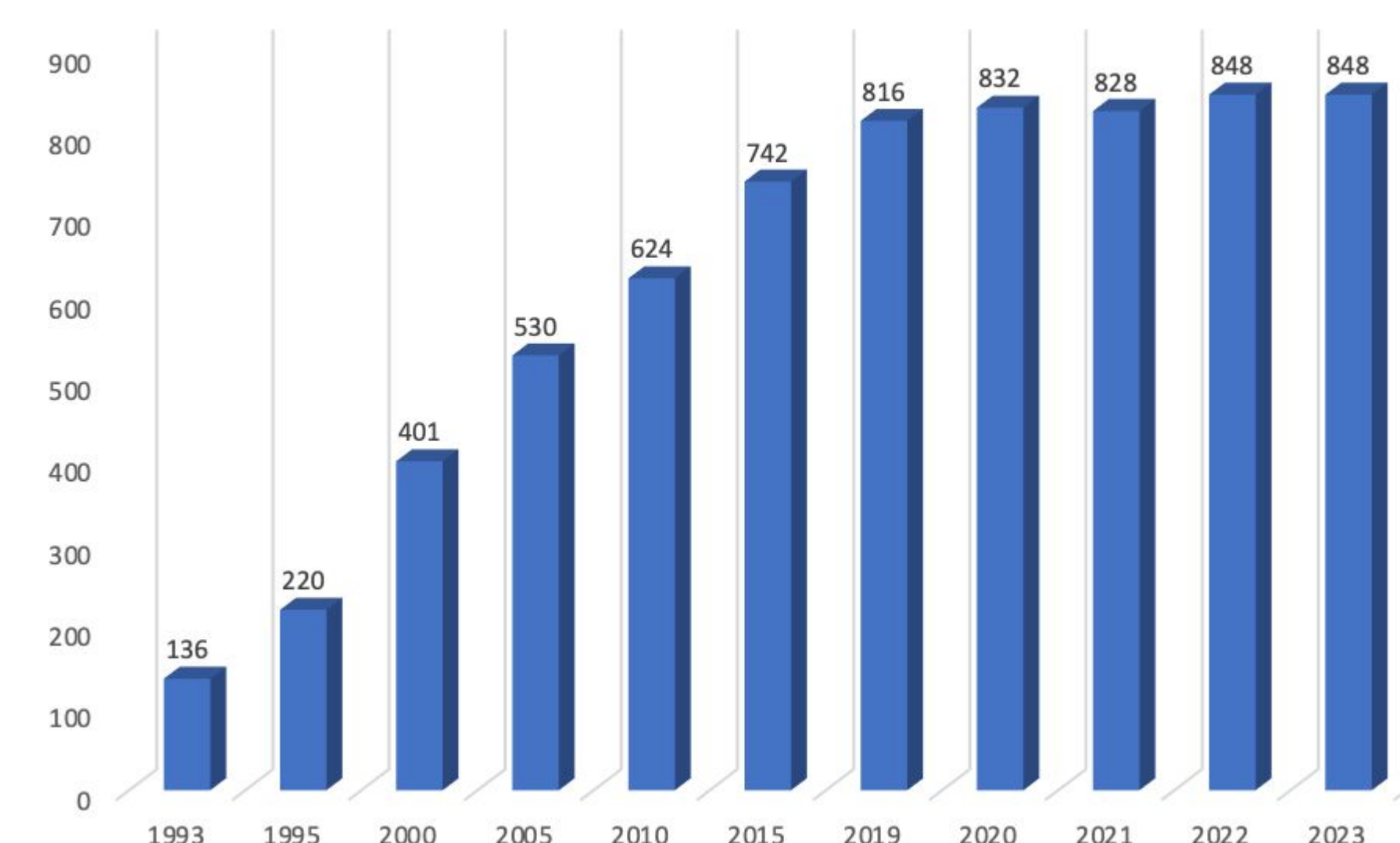


Figure 2: Pages of First Aid for the USMLE Step 1²



Impact on Medical Student Curricula

This change is in line with a recent move away from the decades-old medical school curriculum in which students spend two years in the classroom followed by two years in the hospital:

- According to an AAMC survey of medical school curricula, for 2017-2018, 46% of schools reported that they were shortening their students' pre-clerkship years, with some even condensing what was previously two years of material into a single pre-clinical year.
- New innovative models allow students to enter the hospital earlier and provide students with greater time to explore different fields before choosing a specialty to pursue.

While many schools have not made this transition, we anticipate more will adopt a similar model in the coming years

Thoughts on Holistic Review

Many hope that residency program will now engaged in a holistic review of medical students' applications. However, it is unrealistic to believe that programs have the time or resources to read every MSPE, Letter of Recommendation, and personal statement for all of the thousands of students who may be applying to one of their 10 residency spots. As a result, most believe that the single differentiator will become one's score on the Step 2 Clinical Knowledge examination.

Students also fear that greater emphasis will be placed on their medical school's prestige. While students from middle- to lower-tier medical schools could historically set themselves apart by achieving a high STEP 1 score, that opportunity has vanished. Students at lower ranked schools may now face greater disadvantages in the match process.

Conclusions

- Due to the recent changes in Step 1 scoring, medical school advisors lack the data required to direct students appropriately.
- As the first class to graduate without a scored STEP 1 exam, our class is unsure how to approach STEP 2 CK.
- It will be years until we understand the full effects of the transition to a pass/fail STEP 1 exam. In the long run, we anticipate it will promote student wellness during the preclinical years and greater opportunities for long-term career development.
- In the short term, it is a stressful and highly uncertain era for medical students, and we hope that our efforts will be enough to ensure a successful match.

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Motivators for Ramadan Intermittent Fasting Among Muslim Students

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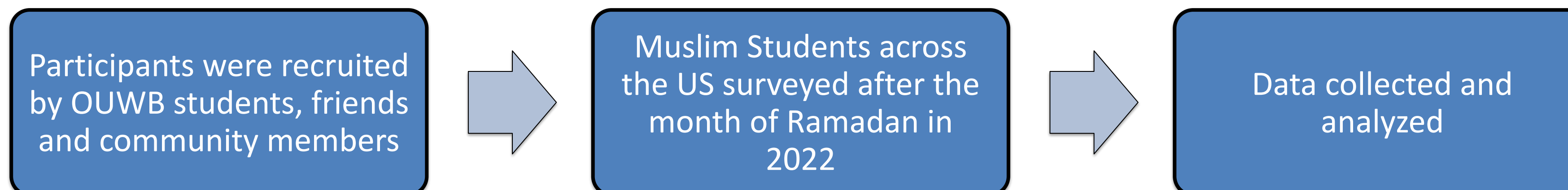
Introduction

- Muslims are members of the Islamic faith. Muslims in the United States are as many as 4.4 million.
- Ramadan fasting in Islam requires no consumption of food or drinking of any liquid substances from sunrise to sunset for thirty consecutive days.
- Young Muslims who have reached puberty, and are of sound mind and health, are required to fast for all thirty days of the month.¹
- Intrinsic religious motivations are defined as internalizing the core values of the religion into one's practice. Extrinsic motivation is in which religion is a motive for other desired ends.²
- No previous research conducted on Adolescents in the US who participate in Ramadan intermittent fasting (RIF).³

Aims and Objectives

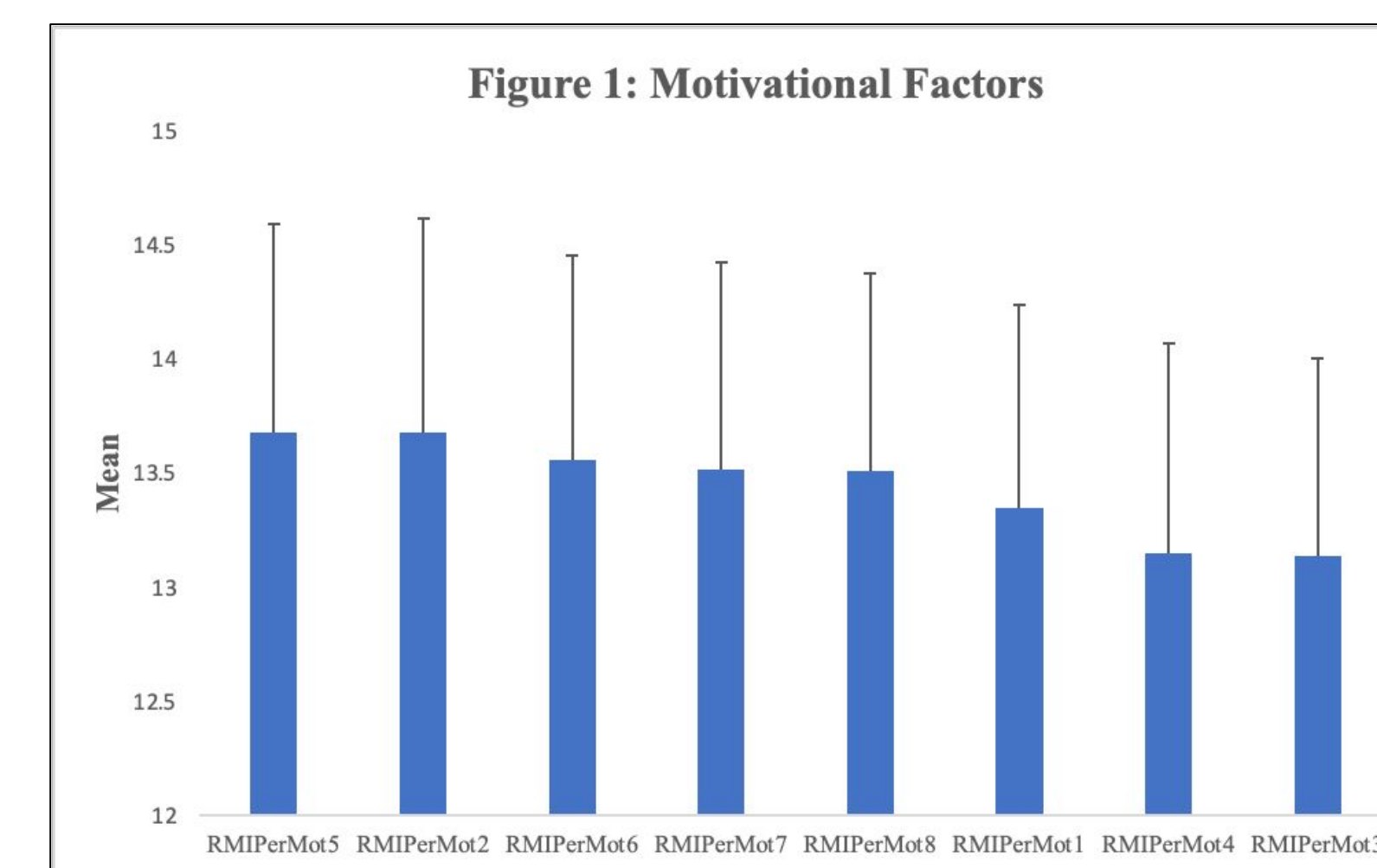
- Identify the association between specific motivators with RIF practices among Muslim students living in the United States.
- Understand the perspectives of individuals participating in religious practices within a minority religious country
- Provide a better understanding for parents, educators and community members on the most useful tools to motivate young people to participate in religious practices.

Methods



Results

Figure 1. The motivational factors ranked from 12-15. Intrinsic factors (RMIPerMot 2, 5) were ranked higher than extrinsic factors (RMIPerMot 3, 4). Mean ± SD.



Intrinsic - RMIPerMot 2, 5, 6, 7, 8, **Extrinsic** – RMIPerMot 1, 3, 4

Motivational Factor	Beta (β)	p-value
RMIPerMot2	0.197	< 0.001 *
RMIPerMot3	-0.130	0.004 **
RMIPerMot4	-0.138	0.002 **
RMIPerMot5	0.223	< 0.001 *
RMIPerMot6	0.153	< 0.001 *

Table 1: Motivational factors vs days fasted through a linear regression model. Intrinsic motivators (RMIPerMot 2, 5, 6) were statistically positively associated with days fasted. Extrinsic motivators (RMIPerMot3, 4) were statistically negatively associated. *p < 0.001, **p < 0.01.

Motivational Factor	Pearson Correlation (r)	p-value
RMIPerMot2	-0.140	0.001 **
RMIPerMot5	-0.203	< 0.001 *
RMIPerMot6	-0.111	0.012 ***
RMIPerMot7	-0.198	<0.001*
RMIPerMot8	-0.208	<0.001*

Table 2: Motivational factors vs religiosity. Intrinsic motivators (RMIPerMot 2, 5, 6, 7, 8) were statistically negatively correlated with lower religiosity. *p < 0.001, **p < 0.01, ***p < 0.05

Discussion & Conclusion

- First study among US Muslim students to identify motivational factors for RIF.
- A strong positive association between fasting and intrinsic motivation shows a clear representation of the effect that one's own religious beliefs plays on their ability to adhere to strict practices the religion requires.
- By drawing attention to the internal aspects of motivation, one may also be able to affect objective outcomes in practice.
- In a society where many young people often have difficulty drawing motivation for spiritual practices, this finding could prove useful in enhancing youth religious participation for future generations.
- Self-ascribed religiosity is largely subjective and can be based on a number of factors.
- Further research on the nature of "religiosity" and how different dimensions of one's belief can play a role in one's adherence to practice would provide further insight into this area.

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Pillow CPR: Using a Low Resource Method to Teach Hands-Only Cardiopulmonary Resuscitation (CPR) to Hispanic Adolescents in a Community Setting

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Introduction

Heart disease is the number one cause of death in the United States and worldwide.¹ Early initiation of Hands-only CPR has been shown to double the chance of the survival of a cardiac arrest.² Hands-only CPR training for adolescents in community settings is often limited by training device availability. This pilot study's objective was to investigate the feasibility, participant knowledge gains, and attitude changes through hands-only CPR training using a pillow for skill development.

Aims and Objectives

Aim I: To determine the feasibility of using a novel low-resource training device "Pillow CPR" to teach Hispanic adolescents in a community setting.

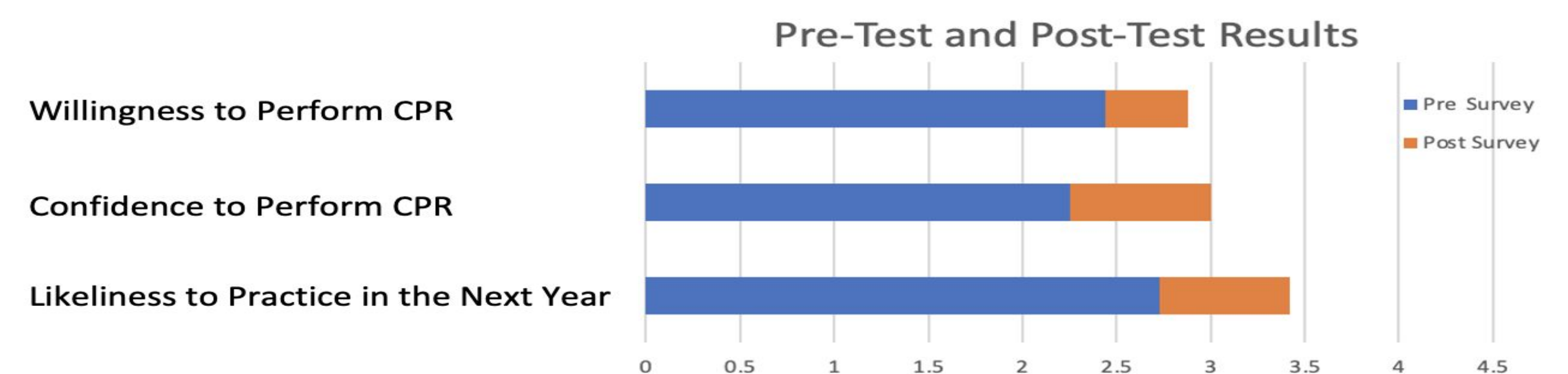
Aim II: To determine the gain in knowledge, skills, and confidence in performing compression-only CPR when taught with the "Pillow CPR" technique.

Methods

In collaboration with a local community organization program, we offered a hands-only CPR training session for adolescents. Participants watched a CPR demonstration followed by interactive CPR practice with medical student mentors using the "Pillow CPR" technique. A customized pillow case was used to show hand position and review information; each participant kept their pillowcase to support future practice. Using a one-group pre/post-test design, participants (n=16) completed questionnaires which included questions that evaluated CPR knowledge and opinions. A five-point Likert scale was used to assess attitudes/knowledge about CPR; as well as confidence and willingness to perform CPR.

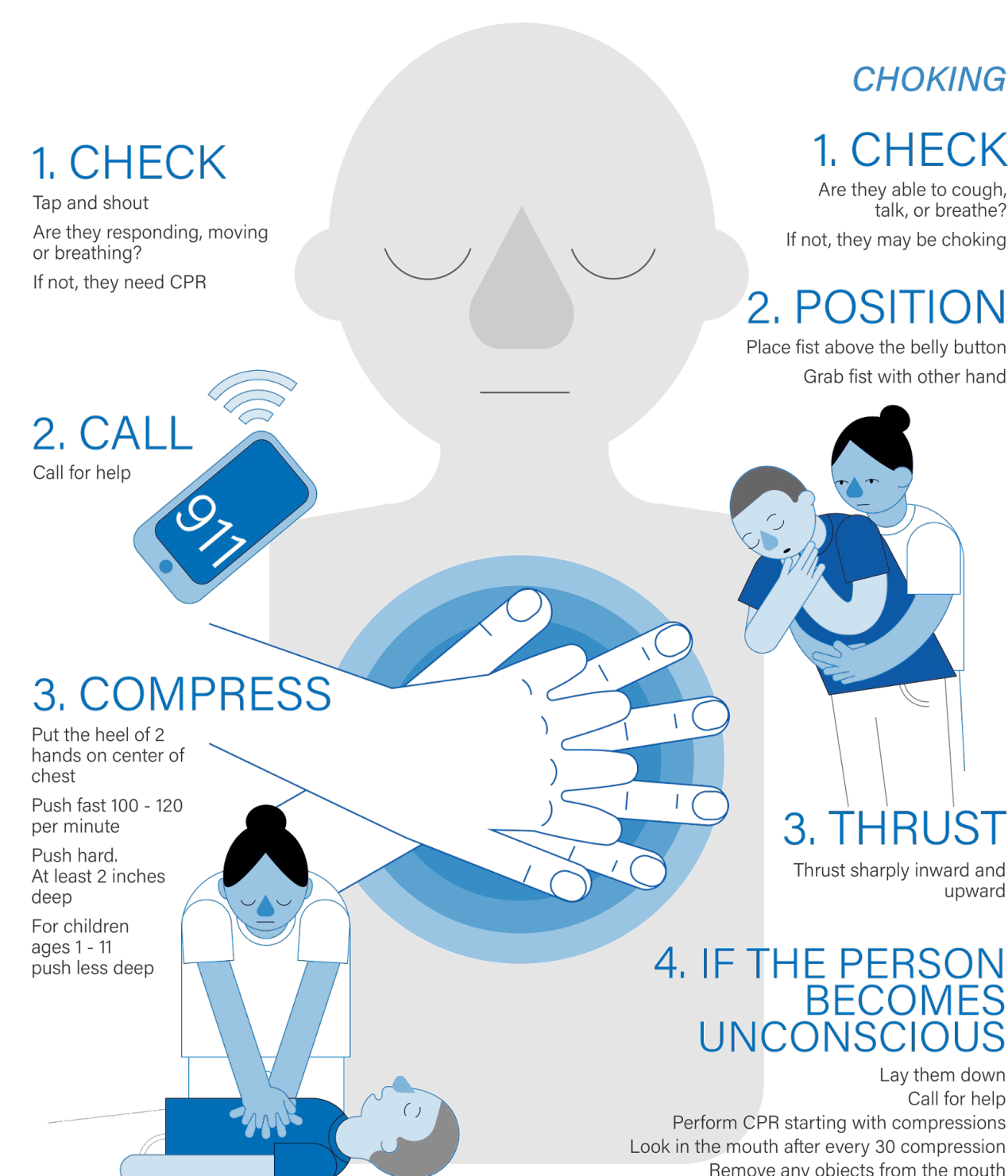
Results

In the pre-test 14 participants (87.5%) indicated no prior CPR training and supported the belief that all adults should be trained in CPR. Post-test results indicated that knowledge regarding compression depth increased 34% (9 to 15) while speed of compression increased 44% (5 to 12). In a paired analysis of pre/post results: willingness to perform CPR increased 25% (gain=0.69, pre test=2.73, p=0.011), confidence to perform CPR, 33% (gain=0.75, pre test=2.25, p=0.018), likeliness to practice in the next year, 18% (gain=0.44, pre test=2.44, p=0.110).



Pillowcase Design

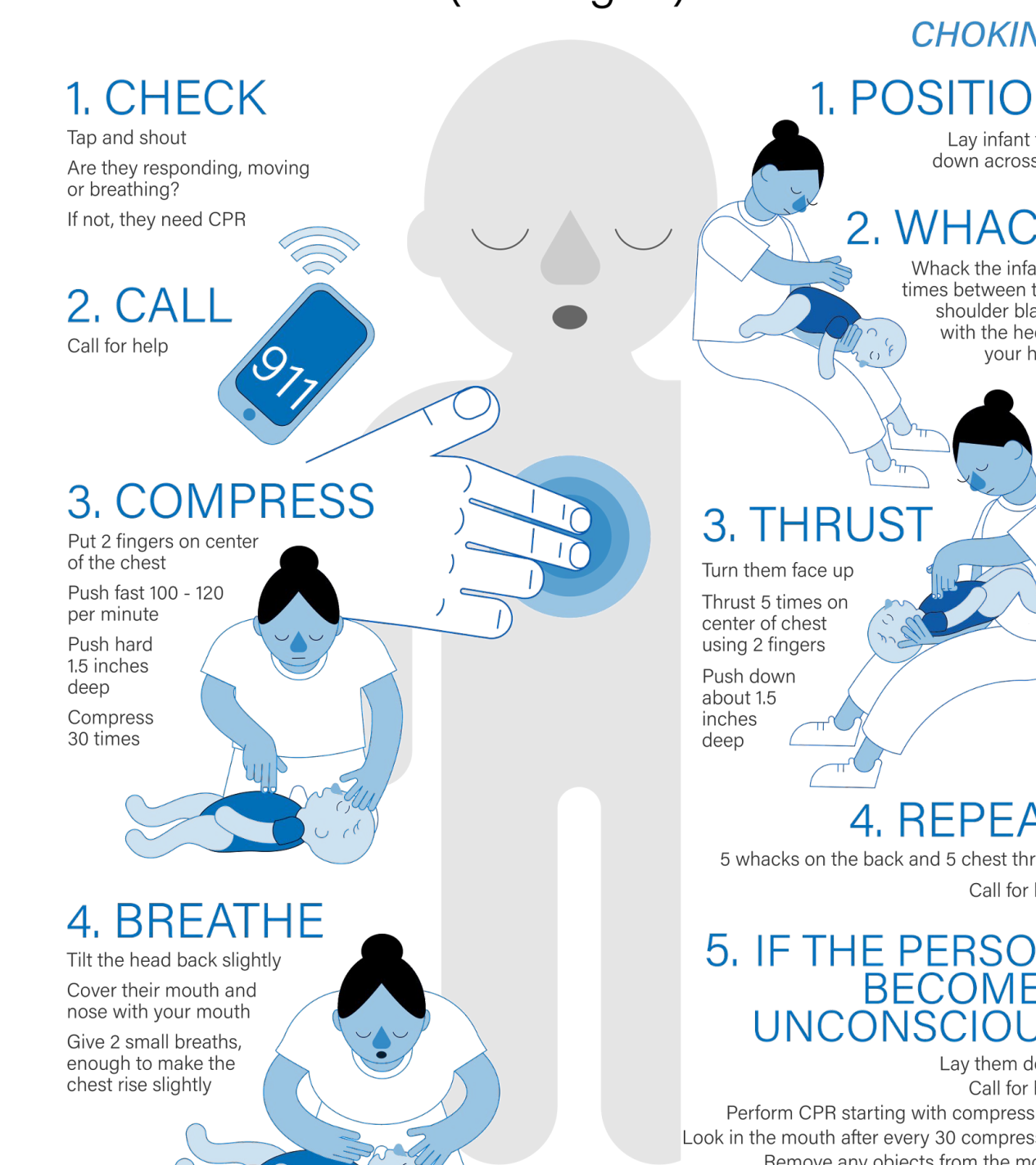
PILLOW CPR Adult & Child



LEARN MORE AT
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PROJECT BY
BEN GOLDSTEIN

PILLOW CPR Infant (until age 1)



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WWW.PILLOWCPR.COM

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Conclusions

Adolescent participation in hands-only CPR training using a low resource device for practice resulted in knowledge gains and improved attitudes in the areas of willingness and confidence to perform CPR, and skills practice likeliness. This pillow training method was feasible and provides an accessible and cost-effective means for providing CPR training for adolescents. Future plans include continuing to collect outcome measures of this pillow method for CPR training in greater numbers of adolescents in community settings.

Event Pictures



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Surgical Interventions and Disease Manifestations on Donors and Their Effect on Anatomy Learning

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Introduction

Modern anatomy curricula lays emphasis on active problem-based learning, early clinical exposure, and clinical application of concepts in the preclinical years. To meet the needs of modern medical education, anatomists are rapidly adopting newer teaching modalities to heighten interest, clinical relevance, and retention of anatomical knowledge.¹ Despite these reforms, the cornerstone of anatomical medical education continues to be gross anatomy learning through hands-on dissection. Numerous studies exist which endorse the ability of gross anatomy dissection to offer unrivaled spatial knowledge.² However, few studies have examined the effect of surgical interventions or pathologies seen on cadavers and their direct impact on students' understanding and retention of anatomical knowledge. At OUWB, students in each cohort dissect 21 cadavers during their 1st year at medical school. Approximately, 50% of these cadavers present with some pathology with surgical interventions such as bypass grafts, surgeries of the biliary tract, hernia mesh repairs, uterine and renal pathologies, chemotherapy ports and others. Herein, we discuss the suitability of this invaluable resource to the pedagogy of modern education.

Aims and Objectives

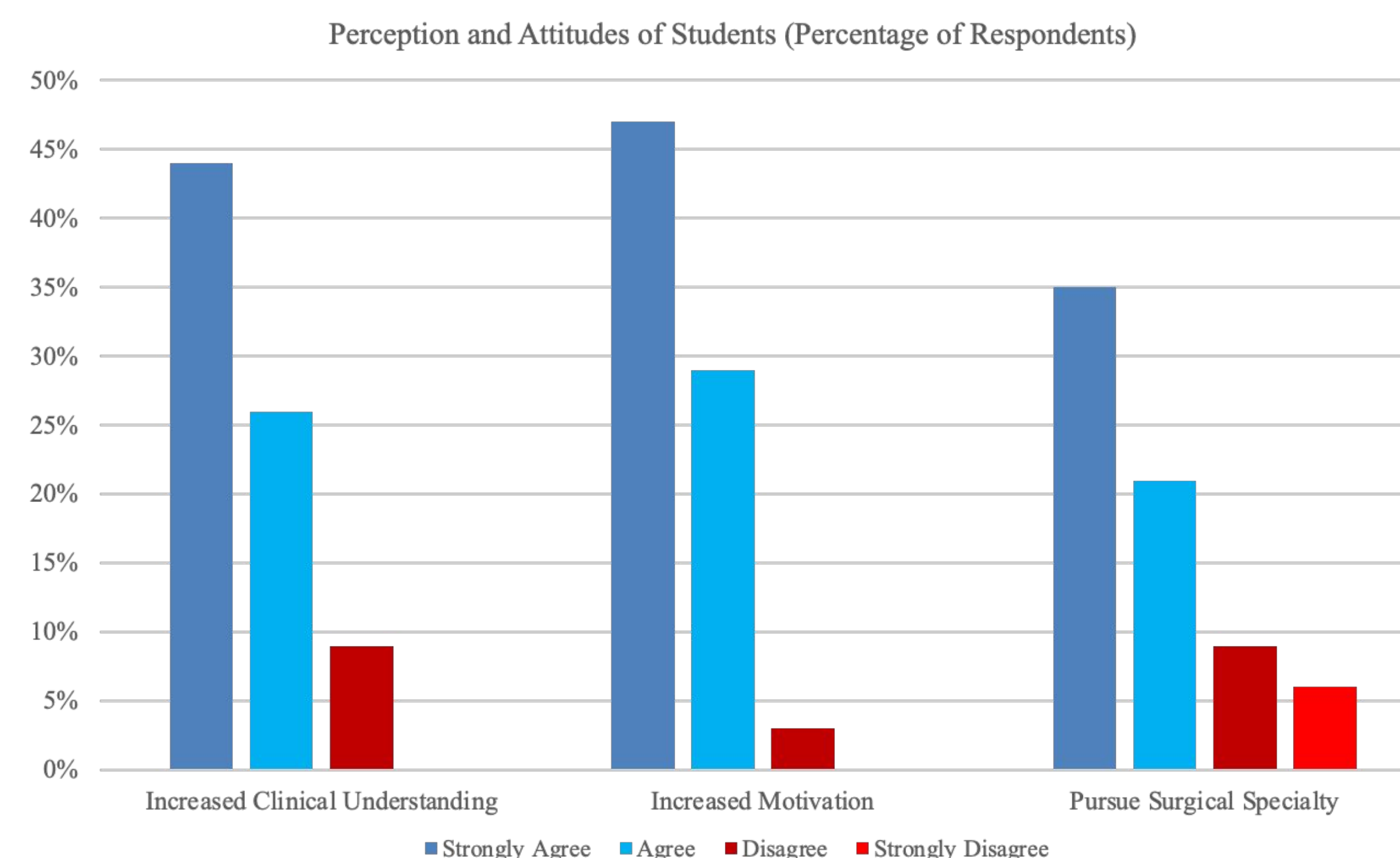
1. Analyze student perception and attitudes towards surgical interventions/pathologies seen on donors
2. Propose an integration and evaluation plan using these resources within the integrated curriculum at OUWB

Methods

A Likert-scale survey was conducted of first-year medical students at Oakland University William Beaumont School of Medicine assessing student attitudes toward in-person gross anatomy cadaveric dissections. Furthermore, students were surveyed on whether surgical interventions and/or common disease manifestations seen in donors impacted their understanding and attitude towards anatomical learning and pursuing surgical specialties. (IRB-FY2023-113)

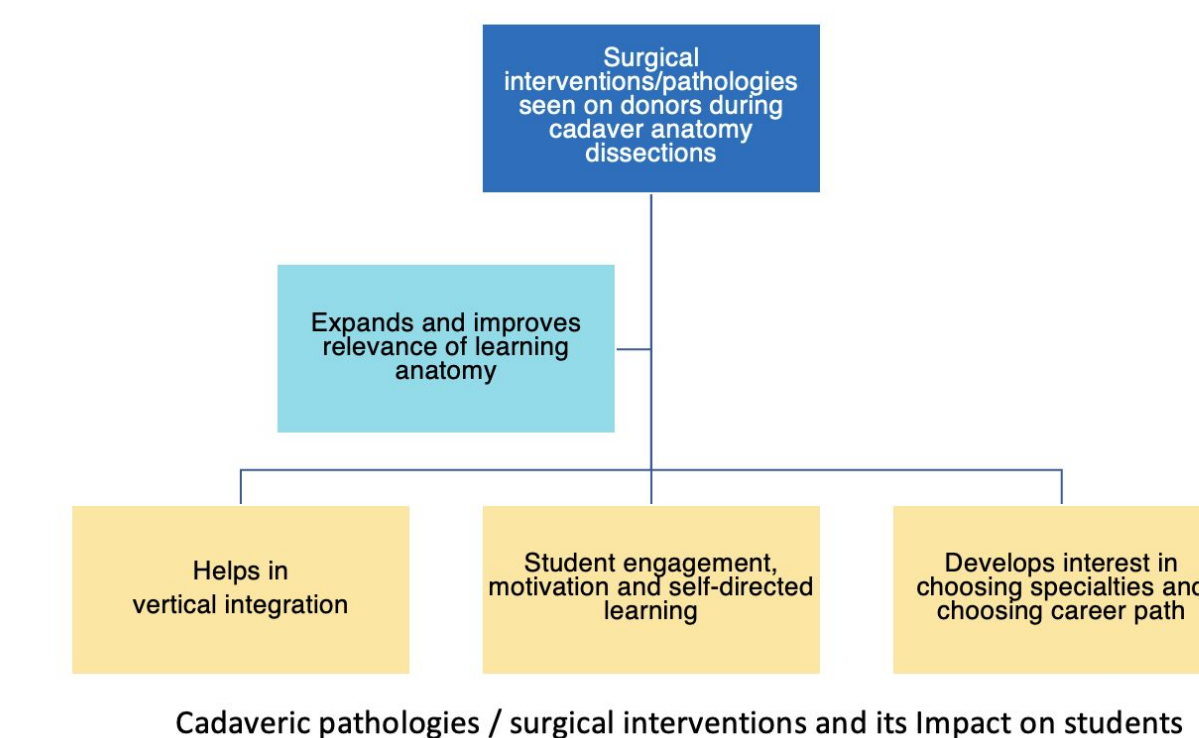
Results

Out of 34 respondents, 24 respondents either "Agreed" or "Strongly Agreed" that seeing surgical interventions or common pathologies seen on cadavers significantly enhanced their clinical understanding of concepts taught in anatomy better than didactics would have alone. Furthermore, it was also found that witnessing surgical interventions in cadavers significantly motivated students to learn more about relevant clinical concepts and inspired students to explore surgical specialties for residency.



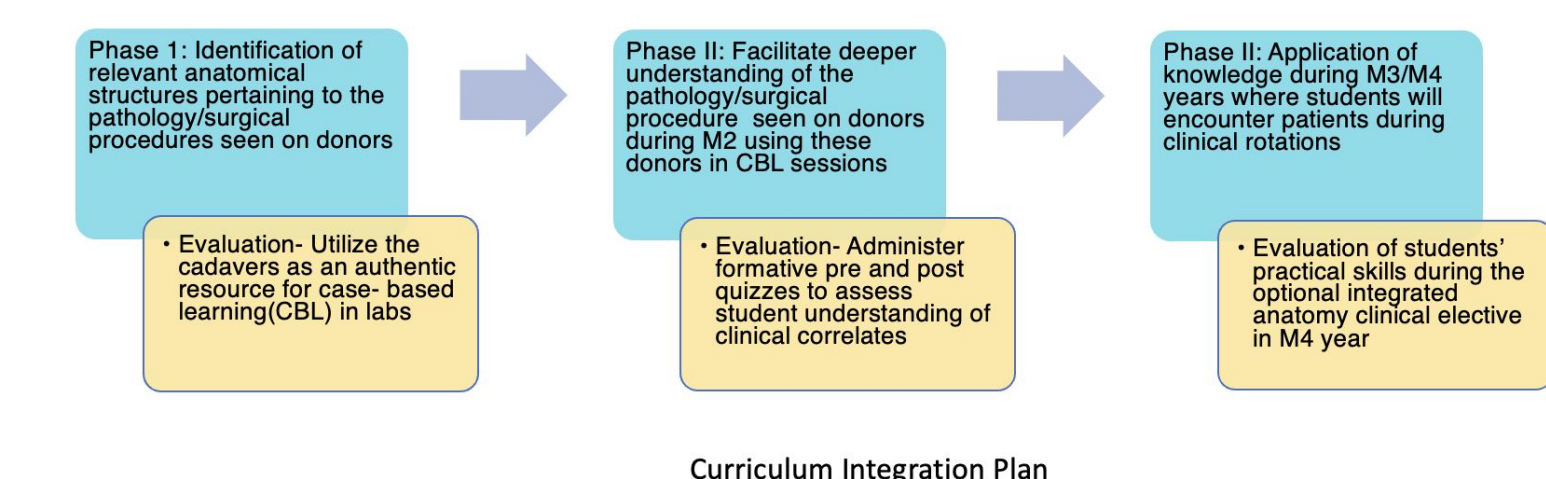
Conclusions

This analysis of student attitudes towards cadaveric dissections highlights the valuable impact of cadaver labs. Students positively associated surgical interventions and pathologies seen in cadavers with an increased understanding of core concept material taught in anatomy. Additionally, this survey revealed a strong impact on student motivation to study the clinical underpinnings of observed pathologies and to look into surgical specialties for residency. Through hands-on experience, first year medical students are able to make meaningful connections between theory and practice that serves to be incredibly motivating and inspiring early on in the preclinical curriculum.



Discussion

As shown, in-person cadaver labs continue to be an essential tool in the arsenal of anatomy teaching for a number of reasons. In the short-term, we propose a curriculum plan that highlights dissection and the observation of surgical interventions as seen on donors in a longitudinally integrated curriculum plan. Moving forward, one potential avenue for future research is to investigate how different types of surgical interventions affect student learning in anatomy. Moreover, it may be worthwhile to explore whether certain teaching pedagogies or technological tools can further enhance the learning benefits of surgical interventions or clinical pathologies in cadaveric dissection.³



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Teaching the Ethics of Brain Death Through Simulation: A Pilot Study

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Introduction

The most recent American Academy of Neurology guidelines suggest, but do not require, that a physician with specific expertise in brain death be a part of the final brain death diagnosis.¹ In fact, only 33% of hospitals require examinations to be done by a physician with expertise in neurology or neurosurgery while 30% do not specify who is authorized to declare brain death.² This suggests that residents across multiple specialties may be called upon to perform brain death testing at hospitals that lack specialty neurology or critical care services after they graduate and take on attending positions. To better prepare residents to both perform brain death examinations and communicate with surrogate decision-makers about its attendant ethical issues, we developed an 'ethics of brain death' session that incorporated simulation with a high-fidelity mannequin followed by a group discussion.

Aims and Objectives

1. Describe the procedure for determining brain death in adults and how death is determined in the Uniform Determination of Death Act (UDDA).
2. Reduce participants' frustration toward surrogates who hold high-brain or circulatory views of death.
3. Shift participants' willingness to accommodate the three views of death toward greater consistency with the UDDA.
4. Shift participants' view of high-brain and circulatory death toward a greater degree of philosophical reasonability.

Methods

Simulation

- The resident was tasked with explaining the brain death examination to a surrogate decision maker, performing a brain death examination on a mannequin, and communicating the findings to the surrogate while the rest of the participants viewed the interaction from the control room.

De-brief

- The de-briefing session allowed for constructive feedback from the co-residents and research team. It also included didactic teaching and discussion covering the three views of death (high-brain, whole-brain, and cardiopulmonary) and common ethical issues that arise in the brain death context.

Survey

- Knowledge-based and attitude-based measures were scored on a Likert scale (n=35).
- Optional open-ended questions allowed the residents to give feedback to the research team.

Results

Table 1. Description of cohort (n=35).

Gender	Male (17), Female (17), Prefer not to answer (1)
Program	Internal medicine (19), Emergency medicine (6), OUWB medical student (4), PCCM (3), Med-Peds (1), Anesthesiology (1), Transitional year (1)

Table 2. The difference in means (\bar{x}_{diff}) between post-simulation and pre-simulation responses across nine measures. Statistics were calculated with a paired t-test. Variance is reported as standard error of mean (S.E.M).

Survey Item	S.E.M.	p-value
Confidence in performing brain death examination	1.114	.158
Understanding of dead donor rule	1.200	.196
Understanding of the criteria for death outlined in the UDDA	1.686	.231
Understanding of the high-brain and circulatory views of death	1.829	.226
Appreciation for the philosophical basis of defining death	.971	.176
Frustration towards families who hold a circulatory view of death	.057	.158
Frustration toward families who hold a high-brain view of death	.086	.132
Confidence in responding to common ethical issues that arise in the context of brain death	.943	.174
Confidence in communicating with families about brain death	1.057	.158

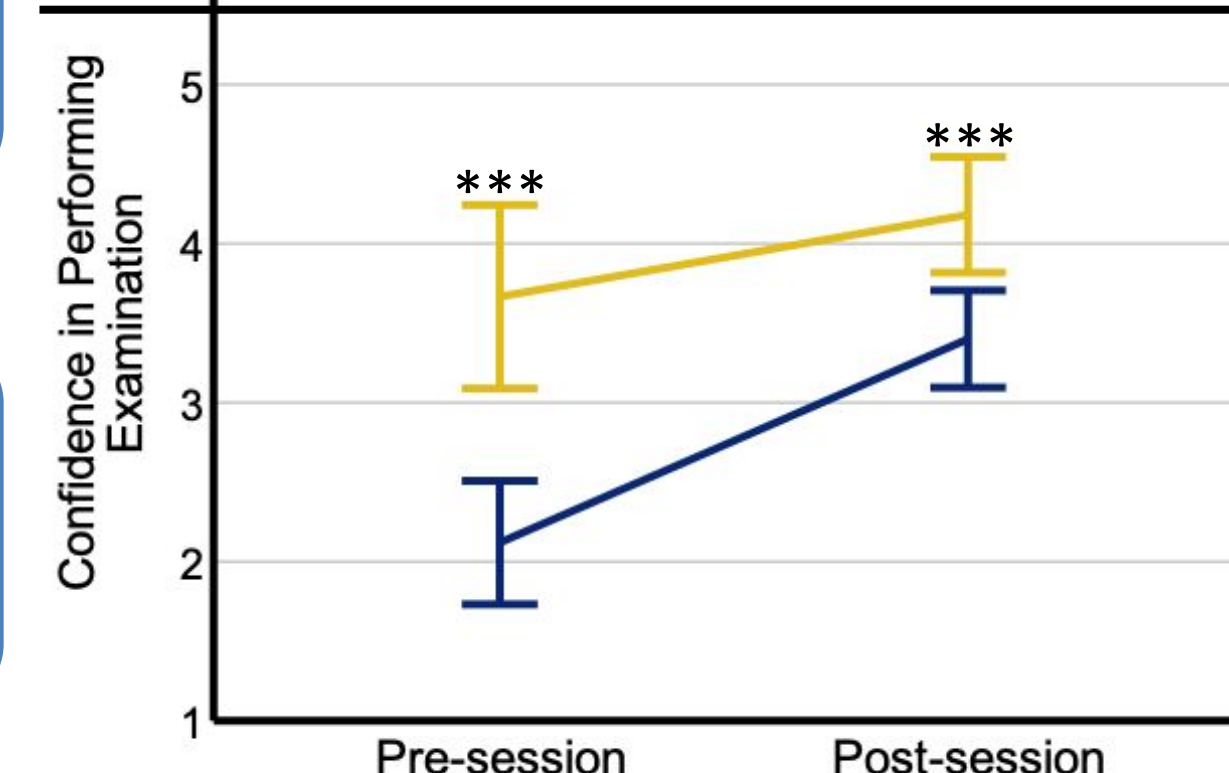


Figure 1. Residents and fellows who had previously performed a brain death examination (n=10) were more confident in performing an examination compared to those who had no prior experience (n=25). Errors bars represent the standard error of mean. Statistics represent the difference in means between pre-intervention and post-intervention scores. ***p<.001

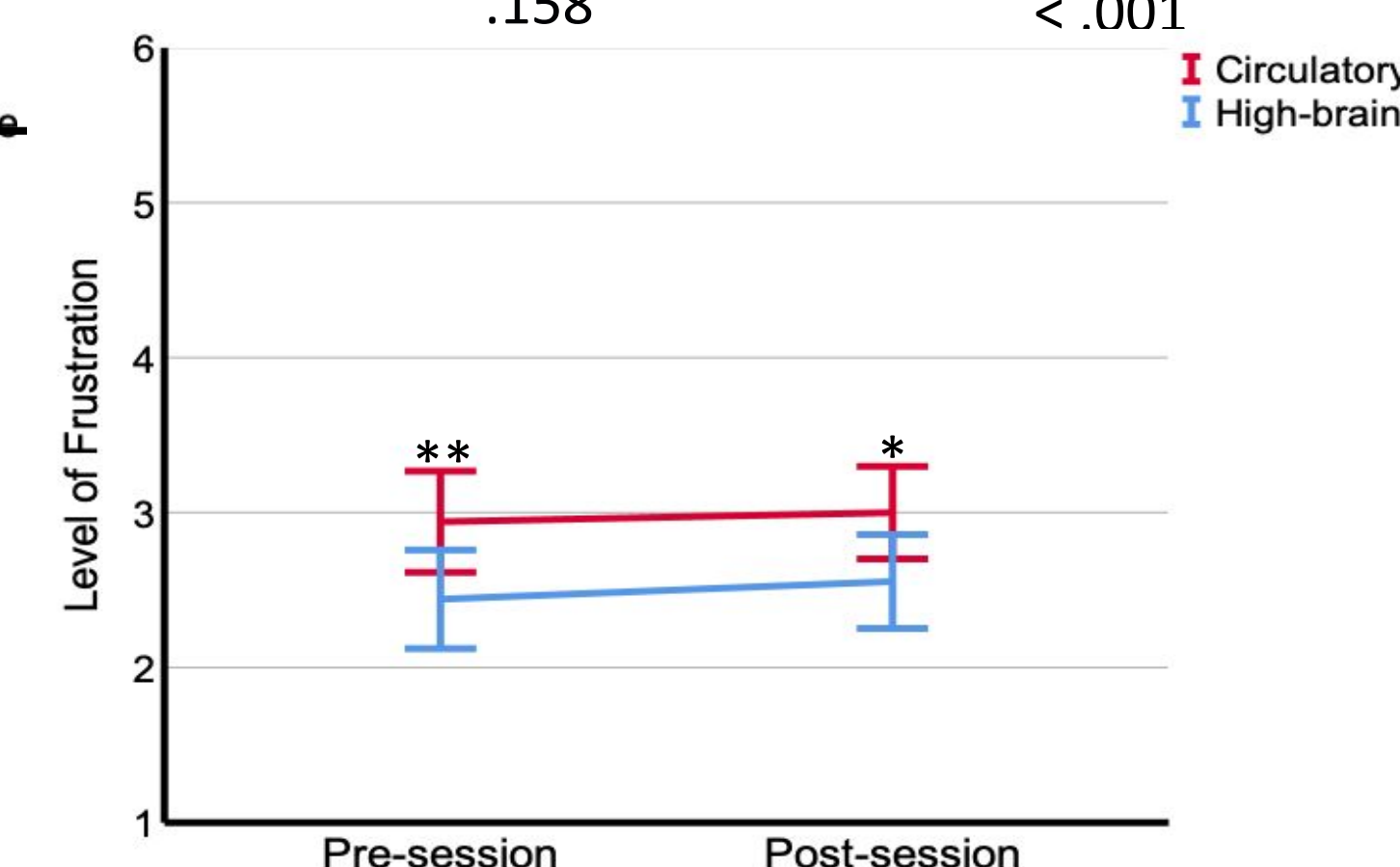


Figure 2. Residents and fellows expressed less frustration toward the high-brain view of death compared to the circulatory view of death both before and after the session. Errors bars represent the standard error of mean. Statistics represent the difference in means between pre-intervention and post-intervention scores. *p<.05, **p<.01.

Discussion

There were no significant differences between specialties across all nine measures, suggesting that knowledge of, and attitudes toward, brain death are not significantly influenced by one's area of practice. Even though residents and fellows who had previously performed brain death examinations were more confident than those who had not, they still experienced a rise in confidence from pre-session to post-session (p<.05). This highlights the importance of iterative interventions in graduate medical education. While real-life experience may make one more confident in performing examinations, this confidence can be elevated through supplemental teaching in a low-stakes, simulated environment. Furthermore, the disparity between the two non-standard views of death suggests that residents and fellows have differential attitudes toward the high-brain and circulatory views of death. This aligns with previous data from OUWB medical students that shows positive attitudes toward the high-brain view and negative attitudes toward the circulatory view.³ However, unlike the medical students, the residents and fellows attitudes were unchanged after the session *despite* an increase in the appreciation for the philosophical basis of death.

Conclusions

- Simulation sessions that implement the use of both clinical and communication skills are an effective method for teaching the ethics of brain death. Our data support the continued utilization of simulation in graduate medical education.
- While residents reported increases in their understanding of brain death and the common ethical issues that surround brain death, their attitudes toward the high-brain and circulatory views of death were unchanged.
- Residents reported high satisfaction in their feedback, with the many citing the interactive component as being their favorite part of the session.

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The Impact of Early Clinical Experiences on Undergraduate Medical Education

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Introduction

Clinical experience is an essential aspect of undergraduate medical education. The way medical schools provide this experience varies. There is no standard for providing clinical experience, but comparing how schools do so could provide data showing the trend of how these experiences are being provided and the clinical learning outcomes from these experiences.

Aims and Objectives

- To Identify how medical schools in the United States and Canada provide clinical experience to their students
- To determine what clinical experience they provided for students to prepare them for clerkships and residency
- To assess the impact of clinical experience on medical students

Methods

Data regarding early clinical experience distribution methods, timing, and outcomes were collected from two primary sources:

- 1) The AAMC Snapshot that reports on how LCME-accredited Medical Schools provide clinical experience and general trends in undergraduate medical education;
- 2) A scoping review of publications on clinical experiences in undergraduate medical education (**Figure 1**).

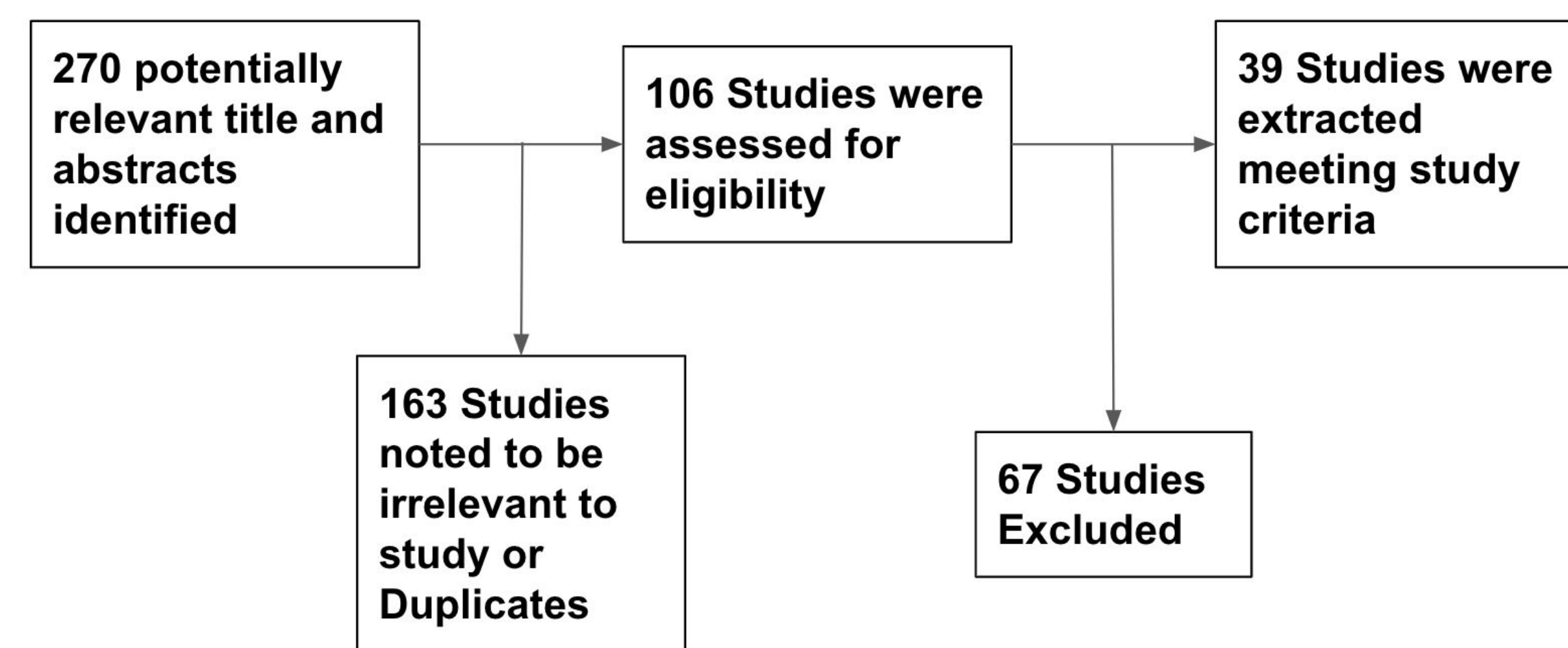


Figure 1: PRISMA Article Screening Diagram

Results

In most studies reviewed, clinical education was introduced in the 1st year curriculum (53.8%). The two most common forms of clinical experience presented were case-based lectures (13.9%) and skill-learning sessions (13.9%) (**Figure 2**). Students' perceptions and satisfaction with early clinical experience revealed four areas of benefits (**Figure 3**). The AAMC Snapshot showed that 84% of the medical schools listed either recently completed, planned, or were in the middle of a curriculum change. Curriculum changes were related to having earlier clinical encounters through either shortening the preclinical period or incorporating earlier clinical experience into the preclinical curriculum.

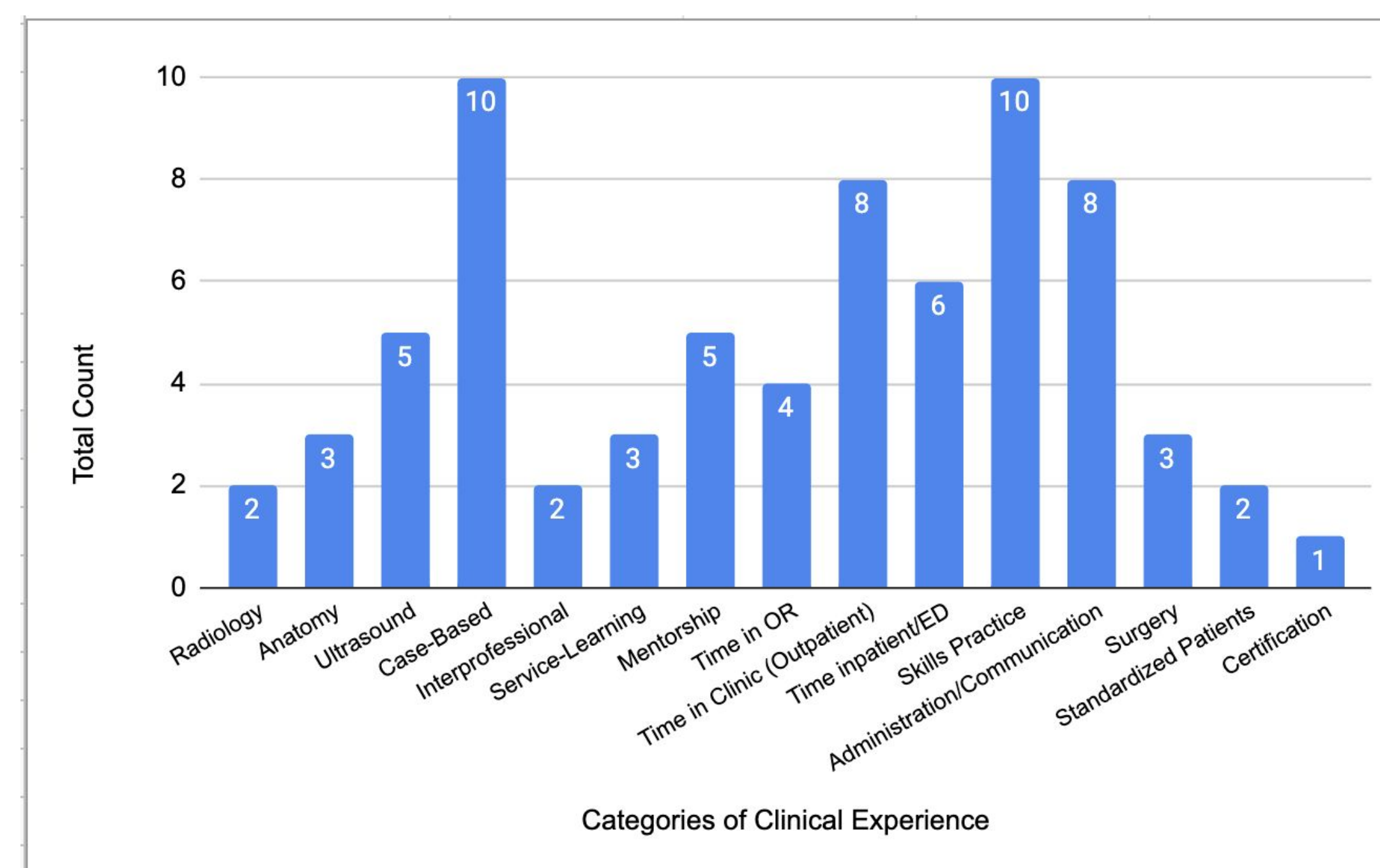


Figure 2: Types and Total Count of Clinical Experiences

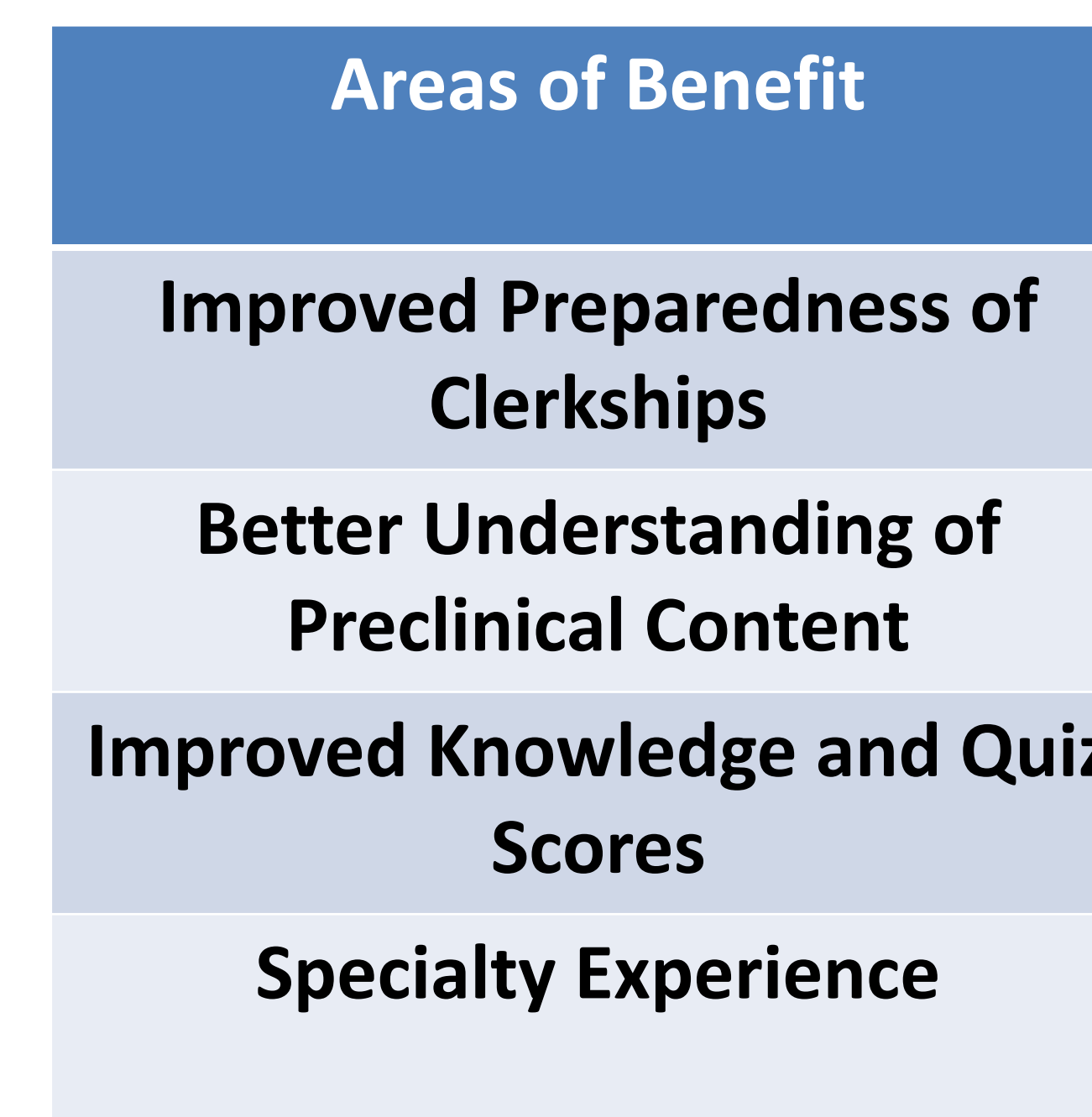


Figure 3: Areas of Benefit Seen

Discussion

The study points to a strong implication for medical schools to introduce earlier clinical experiences to reap the benefits for medical students. There are a variety of ways to include this into undergraduate medical education curriculum. Further studies could measure quantifiable outcomes, such as clinical shelf scores, board exam scores, and residency match results, compared before and after curriculum changes to obtain measurable outcomes.

Conclusions

- Undergraduate Medical Education is trending towards including more clinical experience prior to the start of clerkships.
- Common ways of introducing clinical education included, skills practice, case-based learning, and direct interaction with patients.
- Introducing clinical experience early showed four areas of benefit for students that could positively affect their experience in the clinical portion of their education.

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The Impact of Virtual vs. In-Person Anatomy Lab Experiences on Student Confidence in Clinical Rotations

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Introduction

Human cadaveric dissection forms the cornerstone of anatomy education. Dissecting cadavers is akin to being in an operating room and working on a patient, as both are hands-on experiences requiring manual dexterity and spatial awareness. These early experiences prepare medical students for the clinical years and might help students develop an interest in choosing a surgical specialty.

However, during the COVID-19 pandemic, most medical schools switched from in-person to virtual anatomy lab experiences without knowing how it would impact students' readiness for the clinical years and their future choice of a specialty. At OUWB, the entirety of the first-year anatomy curriculum was delivered online via pre-recorded lectures and dissection images from different resources during AY 2020-2021. While students were responsible for the same content knowledge, they did not have the opportunity to work with cadavers and acquire hands-on experience.

We hypothesize that the completion of in-person vs. virtual anatomy lab experiences impacts clinical rotations in the M3 & M4 years and may affect students' pursuit of a surgical residency programs.

Aims and Objectives

1. To study students' perceptions and attitude towards virtual anatomy lab experiences
2. To compare students' confidence in answering anatomy related questions between the virtual and in person anatomy lab groups
3. To evaluate students' perception of factors that influence the choice of a surgical residency specialty

Methods

A 20-question electronic survey was completed by 68 first-, second-, and third-year medical students who took part in either virtual or in-person anatomy lab experiences at OUWB. Students were recruited through class rosters, group chats and through word of mouth. Participant-reported demographics were summarized using descriptive statistics and reported as frequencies, percentages, and means +/- standard deviations. Comparative analysis focused on demographic characteristics and anatomy lab experiences as well as student opinions about the importance of various experiences in selecting a residency specialty. Two-tailed T tests were performed and p values <0.05 were considered significant.

Results

There was no significant difference between the control group and the experimental group with regard to age or gender. Both groups had comparable rates of anatomy experience before medical school with cadaver dissection and/or prosection (20.4% [n=10] of the in-person anatomy group and 21.1% [n=4] of the virtual anatomy group). Both groups had comparable rates of anatomy experience before medical school without cadaver dissection and/or prosection (26.5% [n=13] of the in-person anatomy group and 31.6% [n=6] of the virtual anatomy group).

Figure 1: Student Confidence in Answering Anatomy Questions

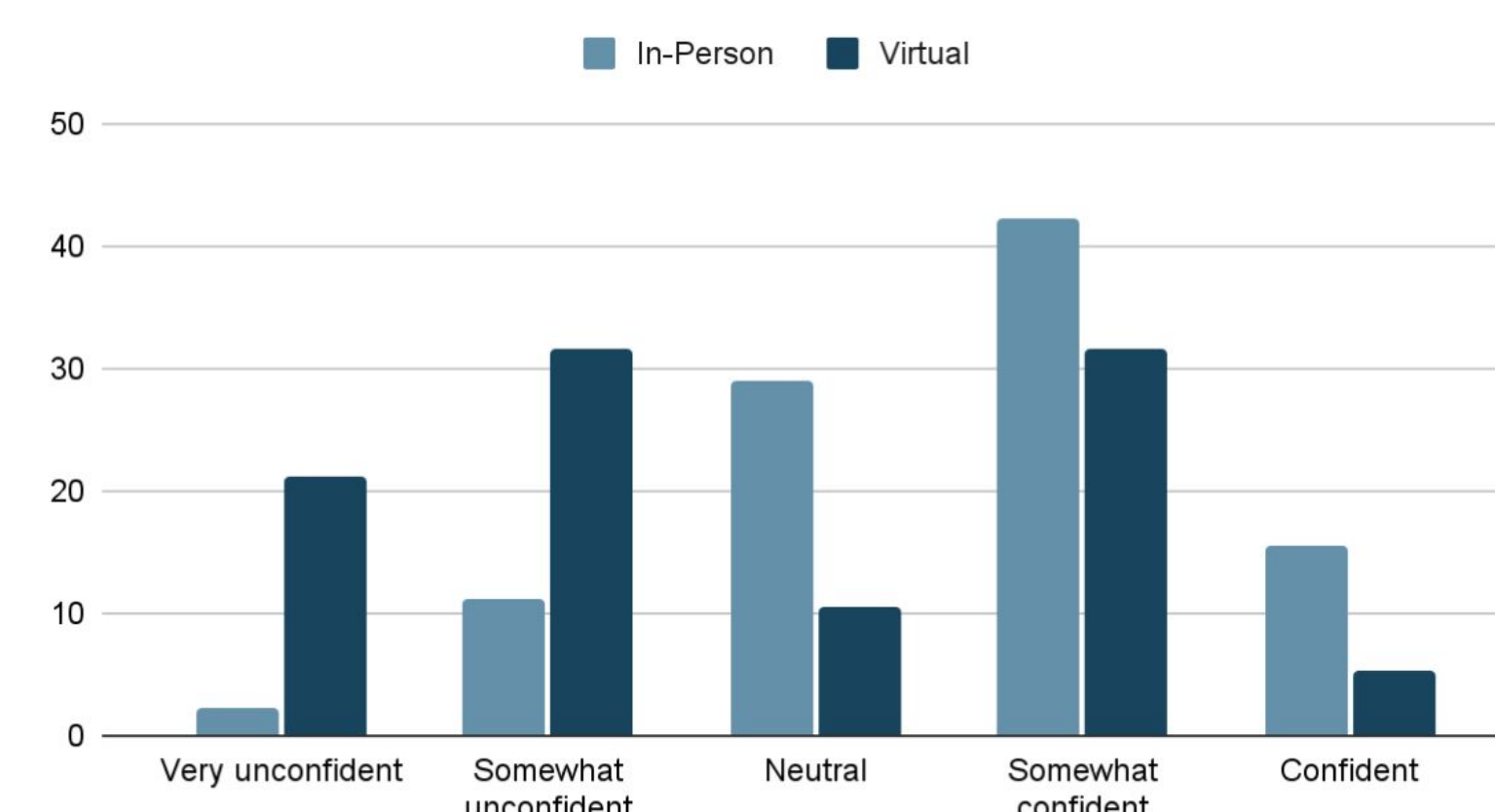


Table 1: Student Perception of Virtual Anatomy Experience Quality

Question	n	%
Completely inferior	14	21
Worse	6	29
Neutral	5	30
A bit better	16	19
Superior	30	6

Table 2: Student Perception of Factors that Influence Choice of a Surgical Specialty

Factor	In-person Mean	In-person SD	Virtual Mean	Virtual SD	p Value
Anatomy experience	3.5	1.3	2.9	1.1	0.4530
Peer influence	4.1	0.7	3.5	1.3	0.1611
Motivated by faculty	3.8	1.0	4.0	1.1	0.6186
Attraction toward high pay	2.5	1.1	3.1	1.4	0.2225
Passion for procedural skills	1.1	0.3	1.6	1.0	0.1469

Though no student experienced both types of anatomy laboratory, the virtual group perceived their experience as inferior to an in-person experience (Table 1). Furthermore, the virtual group expressed a lack of confidence in their abilities to answer anatomy questions correctly (Figure 1). The two groups rated various factors based on their ability to influence a student's selection of a surgical specialty on a Likert scale. Although there are many factors which influence a student's choice of a residency specialty, there was no significant difference between the perceived importance of anatomy experiences and the choice of a specialty between the virtual and in-person cohorts (Table 2).

Conclusions

- While completely virtual anatomy laboratory experiences may be possible under extenuating circumstances, they are not the preferred option for overall student learning.
- Medical students who completed a fully virtual anatomy course felt their experience was inferior and expressed feeling less confident when it came to anatomy and its clinical applications, especially in surgical settings.
- COVID-19 had a negative impact on anatomy education. Additional anatomy electives or in-person lab experiences may help bridge deficiencies and prepare students for successful clinical rotations and future careers.

Discussion

Our study's results are similar to another study in which 75.5% of students who experienced both face-to-face and virtual anatomy believed that virtual experiences could not substitute for the real thing (Antonopoulos et al., 2022). Future studies might compare the performance of those who completed entirely virtual experiences to that of cohorts who experienced full cadaver dissection. It is possible that students who never experienced in-person cadaveric dissection performed worse on their surgical clerkships due to decreased knowledge and confidence, or were even less likely to pursue a surgical specialty. Focus group interviews should be conducted to acquire further in-depth information about students' perceptions of how anatomy experiences might affect specialty choice.

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