
Peer-Reviewed Article

Standards and Guidelines of Phlebotomy: Roles They Play in the Classroom

Sherri Cooper, Ed.D., MA, BA, CMA, PT
Independence University

Abstract: Phlebotomy, both an art and a science, is performed primarily for diagnostic evaluation of the blood. Standards of training in the methods and procedures of phlebotomy are varied depending on the healthcare provider's position and previous instruction. The institutions that provide training are often left to create their own standards and procedures based on subjective experience and relative exposure. The implications of unqualified instructors include poor patient care, poor safety practices and a diminished reputation for phlebotomist.

This study reveals that although there is a common desired outcome, the instructional practices are based on what is important to the phlebotomy instructor's experience. Phlebotomy is a skill that requires some measure of instruction and yet, the assumption is that there is a gap between the desired methodologies set forth by authorities on the matter (OSHA, WHO, and other credentialing bodies) and the methodologies actually used in the classroom.

Keywords: phlebotomy, blood, medical procedures, training, instruction

Introduction

The practice of bloodletting has been performed since before the days of Hippocrates, when it was often performed to restore balance to the humors and remove illness. The procedure came with risks of excessive blood loss and infection, and many patients died because of the treatment rather than the initial diagnosis. Over the centuries, medical providers and phlebotomists have improved upon ancient methods of blood removal. Procedures became safer for both patients and providers with the discovery of aseptic procedure and infection control. Since the introduction of advanced collection devices, the use of phlebotomy as a diagnostic tool has also increased. Patients today can expect a routine blood draw with any hospital visit, and annual blood tests are a common procedure in the doctor's office (Parapia, 2008).

While phlebotomy today is generally performed by phlebotomists or phlebotomy technicians, it is also now recognized as a valuable skill for other healthcare providers. Many of the official nursing programs do not require phlebotomy courses, but instead Registered Nurses (RNs) are expected to receive on-the-job training (Perkins, n.d.). Certified Nursing Aides (CNAs) are also more frequently expected to complete phlebotomy training, which then qualifies them to become certified as a Patient Care Technician, (PCT), (National Healthcareer Association, n.d.). Properly cross-training RNs and CNAs to perform venipuncture and specimen collection can lead to the uniformity of procedures and standards in the patient room.

Standards of training in the methods and procedures of phlebotomy are variable depending on the healthcare provider's position and exposure to instruction. Some technicians attend formal training programs specifically for venipuncture and blood collection. Other programs combine phlebotomy skills with training for jobs such as medical assisting, nursing, or laboratory technicians. State standards vary widely on education and credentials of clinical professionals allowed to perform phlebotomy functions. The standards for training are vaguely established by state agencies that are expected to perform within federal guidelines and laws. Organizations such as the World Health Organization (WHO) and the Occupational Safety and Health Administration (OSHA) also have guidelines phlebotomists are expected to adhere to. Controls provided by these agencies include mechanisms for hazardous waste disposal, avoidance of needle stick injuries, specimen handling, and the use of personal protective equipment (Occupational Safety and Health Administration, 1992). Safety standards must be enforced both in the workplace and the classroom to comply with strict blood borne pathogen protection guidelines.

In most states, clinical phlebotomy instructors and trainers are only required to prove a few years of experience performing phlebotomy functions in a healthcare setting before they are granted access to a classroom (StartupBizHub, n.d.). Academic requirements are secondary, and special certifications are unnecessary or institution-specific. Absence of minimum requirements for instructor training increases the potential for misguided, undertrained, and unsafe phlebotomy technicians.

Problem Background

Venipuncture and phlebotomy procedures will continue to be a crucial tool in diagnostic medicine. Oversight in training institutions and phlebotomy instructors will continue to cause preventable medical errors in the doctor's office and hospitals (Malone, n.d.). Improperly trained technicians are more likely to cause serious medical errors and cause patient harm. Approximately 60-70% of provider decisions regarding patient diagnosis, hospitalization, and discharge are based on outcomes from phlebotomy procedures (Lima-Oliveira, et al., 2012). Countless acute illnesses and diseases are diagnosed solely from blood draws and laboratory diagnostics. Seemingly simple errors, such as failing to properly identify the patient, can cause delays in diagnosis or outright misdiagnosis if the errors go undetected.

Estimations of annual medical errors resulting in death vary widely, as reporting standards are inconsistent and enforcement is nearly impossible. One 2013 study estimates 210,000 to 400,000 deaths from medical errors, about 20% to 40% of which are estimated being from diagnostic errors (James, pp. 126-127). According to Lippi, von Meyer, Cadamuro, and Simundic (2018), approximately 0.3% of all lab procedures contain verified medical errors, with 60% to 70% of those errors happening during preanalytical phase, the time between the request for the test and the actual testing (p. 25).

In addition to the critical nature of using correct phlebotomy techniques for the patient, the industry as a business is reliant on the preparedness and competence of the phlebotomists. Kevin Daugherty (2012) cites a study by Ross and Boone where it was found that preanalytical errors account for 46% of errors made in the laboratory, with non-laboratory personnel making 28.6% of these preanalytical mistakes. This indicates that the education of the phlebotomist makes a noticeable difference in the performance of the lab workers. This is reinforced by the results of one collaborative effort by hospitals in Pennsylvania, where it was revealed that retraining had the greatest impact on reducing identification errors (Center for Phlebotomy Education, 2012).

According to Lippi, Salvagno, Montagnana, Franchini, and Guidi (2006), lack of standardized procedures and training for phlebotomy and laboratory technicians can cause a wide array of preanalytical errors. Various national and local certifying agencies host minimum skills sets and knowledge bases for certification, but the certifying agencies are allowed the freedom to

focus on their individual priorities in phlebotomy. Within the classroom, phlebotomy instructors rely on their personal experiences in their field of interest to draw boundaries and procedures, which may or may not adhere to globally recognized standards. The results of such a conglomeration of subjective experience and differing professional opinions leads to inconsistent classroom standards in venipuncture procedure, specimen collection and management, and safety controls.

A commonly discussed principle in education is the concept of fidelity of implementation, which is defined as “the degree to which teachers and other program providers implement programs as intended by the program developers” (Dusenbury, Brannigan, Falco, & Hansen, 2003, p. 240). In this case, the training of phlebotomy may have a breach in the fidelity of implementation at the level of the instructor who is unaware of the guidelines and standards of the art or is simply operating out of the preferences and personal likes of the instructor. Several adverse conditions can arise including having the implementation gap become too large to restore the original integrity of the programs and decreased levels of student learning.

The trend in advanced education is for instructors to perpetuate the preanalytical errors in phlebotomy that contribute to exorbitantly costly mistakes. The evaluation of current training techniques is critical in order to prevent the kinds of costs and injuries incurred via ineffective phlebotomy. Exposing the source of ineffective training will identify where the trends of errors are located and costs that are currently absorbed by the patients, medical centers, and laboratories can be reduced.

Purpose of the Study

The purpose of the expository case study is to witness the adherence, or lack thereof, to the standards and guidelines set forth by WHO for the performance of phlebotomy (World Health Organization, 2010). The objective is to determine whether the instructors of phlebotomy are teaching the same procedures and whether inconsistencies in classroom curriculum may lead to errors that could adversely affect patient care. The premise here is that the instructors are simply going off of what they determined was best practice based on their own experiences. In revealing any discrepancies in teaching modalities, a closer look can be taken at the application of standards and guidelines in a training setting. Inquiries can then be made regarding training practices and the application of standards and guidelines.

It is expected that variations between the observed instructors will show that the classroom curriculum is not consistent. Differences in each instructor's initial training, clinical experience, and academic expertise have an impact on the policies and procedures the students will eventually apply directly to patient care. Lack of standardized teaching tools and curriculum allows for a multitude of students to enter the field of phlebotomy with inconsistent venipuncture procedures, safety ideals, clinical documentation policies, and patient care techniques. It is expected that although some of the standards will be consistently upheld, the guidelines and standards used in the classroom will be prioritized according to the preferences of the instructor observed. Human nature dictates that people identify and prioritize rules and actions that support views they already uphold. In other words, people will embrace the rules that benefit them and dismiss the rules that hold no perceived benefit. When an instructor only emphasizes the policies and procedures that are important to them, the students may be missing vital components of the standards and guidelines required to provide the highest level of patient care.

The study may reveal that although there is a common desired outcome, the instructional practices are based on what is important to the instructor's experience. This research is designed to reveal what standards and guidelines the instructors are actually following. Phlebotomy is a skill that requires some measure of instruction and yet, the assumption here is that there is a gap between the desired methodologies set forth by authorities on the matter—WHO, OSHA and other credentialing bodies—and the methodologies actually used in the classroom. The goal of the study is to reveal any discrepancies in teaching modalities so that a closer look can be taken at the application of standards and guidelines in a training setting. This study is focused on phlebotomy because it is a complicated skill and one that is loosely regulated at this time. The long-term effect of this study is to initiate a query among trainers regardless of the skill as to how much leeway in teaching variations is detrimental to the outcome of skills acquisition regardless of the skill. This research will also be instrumental in uncovering the importance of implementation fidelity, contributing to a larger conversation within the realm of educators and their trade.

Methodology

This study examines three individual case studies and their subsequent interviews. Each of the three classroom instructors were observed in a normal teaching environment with

phlebotomy students. Two additional instructors were interviewed, although not observed. The study intended to identify the use of lab and lecture time, teaching techniques, phlebotomy standards and procedures as curriculum, and instructor-student interaction in the classroom.

Demographic Description of the Participants

This case study focused on phlebotomy instructors who have been teaching for at least two years. Between the five instructors, the least amount of experience was five years and one participant had 35 years of experience. Each instructor represented a different college or school within the Denver area. Three of the schools offer phlebotomy in conjunction with degree granting programs for allied healthcare, while two of the schools offer programs focused strictly on phlebotomy training. Each participant has a different background and was credentialed by a different agency. Two of the instructors were not certified in phlebotomy at all. One instructor is certified as an Emergency Medical Technician. One is certified as a Registered Phlebotomy Technician through American Medical Technologists and the last one is a Medical Technologist certified through the American Society for Clinical Pathology. There were also significant educational background differences: two hold masters degrees, one holds a bachelor's degree, one is a Registered Nurse, and the last one has no further education or certification than graduating from the vocational program attended to gain the skill of phlebotomy. In all, there were three women and two men between the ages of 35 and 60. Two instructors were interviewed only, not observed.

Approach

Three phlebotomy training settings were utilized within the city of Denver, Colorado and its suburbs. All of the instructors who were observed were also interviewed in addition to interviewing two instructors who are not currently teaching. The researcher used an observation checklist to evaluate the performance of the venipuncture performed by the students under the tutelage of the instructor being observed. After the observations, a questionnaire was used to interview the observed instructors and the same questionnaire was used for those instructors who were interviewed without an observation. The interviews were conversational, although guided by the questionnaire to allow for consistency in topics covered. The face-to-face interview allows participants to provide information about the topic and also gave him or her the chance to say whatever they wanted to say. Through conversation, people learn about experiences,

attitudes, feelings and their own environment (Kvale & Brinkmann, 2009). The observations and interviews were reported via written notes.

The researcher approached this case study from a neutral point of view. Although there were a host of areas where the participating instructors strayed from the policy, the researcher allowed the practices to go on without correction. The instructors were unaware of the guidelines to which the researcher was comparing their activities and comments. Because the researcher was silent about the standards and guidelines, the instructors were able to act according to what was natural for them in their everyday experience of teaching phlebotomy or they were free to discuss what they think and how they did go about the activities of teaching the skill so that a clear assessment could be made.

The interviews were conducted in a variety of ways. The interview with Instructor 1 was conducted a couple of days after the class was observed. It was held in the staff break room at the school where she works. It lasted for 45 minutes. The questionnaire was followed accordingly. The interview for Instructor 2 was held immediately after the observation of her class in the classroom portion of her setting. It lasted only about 20 minutes, as she had to go to her job. The questionnaire was followed at first but then as the time was getting near the time for her to leave, the researcher went to the end of the questionnaire to get the last questions answered. Instructor 3 was interviewed several days after observing his classroom at a nearby restaurant. The interview lasted about 45 minutes and the questionnaire was followed. The fourth and fifth instructors were both interviewed away from a clinical site, one at McDonalds, and the other at Starbucks. Neither of them was observed and the questionnaire was followed closely with both interviews.

Limitations

Qualitative research, according to Claire Anderson (2010), has certain limitations, including a heavy reliance on the researcher's skills and biases. This author is certified in phlebotomy, not the instruction of phlebotomy, but has been teaching for over two decades. This author prefers to teach with a transformational approach, having the students engaged in performing the skill to do the learning, though the structure for the learning stages of the students is rigid and pre-planned according to the experiences that have proven effective.

Another limitation of this study stems from the geographical pool of phlebotomy instructors available to the author. Phlebotomy instructors perform in a specialized position within the structure of allied health education. The Bureau of Labor Statistics (2018) reports 1920 phlebotomists are employed in Colorado, where this study was conducted. As the total number of phlebotomists is necessarily larger than the number of phlebotomy instructors, the measured population is small and affords a small sampling for observation and interviewing.

Certain areas are beyond the scope of this research. Variations and factors brought by individual students are not considered or evaluated. There were authorization forms for students to allow their class to be observed, but the focus is not the students. Likewise, the research does not focus on the facility where the instruction is taking place. Facilities vary including what they offer in terms of space, equipment, class size, ratio of instructor to student. The length of the class—both within each session and the duration of the program—will not be considered. The programs themselves are also not evaluated.

Results

Four main themes emerged from the interviews and observations with the five phlebotomy instructors. The theme of techniques was the original intent of the research, looking to see how the standards and guidelines are carried out in the as lived experience of teaching phlebotomy. The other themes that emerged (credentials, workspace, and classroom) are correlated with teaching phlebotomy and revealed a substantial impact on the ability to carry out the standards and guidelines of phlebotomy in the classroom.

Techniques

The theme of techniques is split into techniques for performing phlebotomy and techniques for teaching. Performance standards were identified by asking specific questions about how phlebotomy is performed, such as “Is it ok to palpate a vein without wearing a glove?” Each instructor answered that it is not technically acceptable, but in practice some veins are hard to feel so they used a bare finger to find the vein and then donned gloves from there. The observed instructors all allowed the students to find the vein with exposed fingers as well. To the question about inserting the needle quickly, two of the five instructors said it was necessary to go in slowly, while the other three said it was necessary to go into the vein quickly. All of the instructors agreed that direct pressure on the site of needle entry after the needle is

removed is best practice for preventing bruising. All of the instructors reported that they invert every vacutainer tube eight times after filling the tube with blood. Each instructor has the same approach to tying a tourniquet, though Instructors 2, 3, and 5 all said a tourniquet should be tied tightly, while Instructors 1 and 4 said the tourniquet should be tight but not too tight. Each instructor gave the same response for the order of draw. Instructors 2, 3 and 5 all went into greater detail regarding order of draw when there is a specialized test that calls for an uncommon vacutainer tube. None of the instructors said recapping the needle was appropriate. The first step in drawing blood solicited different responses from the instructors: three out of the five said the first step is to identify the patient, while the remaining two said it was to assemble the equipment; additionally, Instructor 5 included explaining what is about to be performed on the patient as part of the first step to identify them.

Teaching techniques commonly observed included lectures, question and answer sessions, text reviews, and pop quizzes. Instructors 1 and 3 wrote the agenda for the day on the board. Instructor 1 also wrote out a case study on the board for the students to evaluate what tubes to use and the order of draw for those tubes. Each class observed engaged in having students draw blood from each other and each class had volunteers who came in to allow their friends, family, and colleagues to practice. Instructor 1 had the students tape a cotton ball to the table with a Band-Aid to practice inserting the needle and practice popping on the vacutainer and popping it off without any needle motion. Instructors 1 and 2 had the students use the corner of the alcohol pad placed on the forearm to point to the location of the vein where the student had chosen as the site of entry for the needle.

Credentials

Credentials emerged as a theme because each of the instructors presented a different type of credentialing. There was a wide range represented, with some not being certified at all and some being certified for a more specific role than phlebotomist, like laboratory technician or emergency medical technician. The education level each instructor brought forth as a credential was also substantially different, from having formal vocational training to having a Master's degree in education. Each brought forth a distinct background of experience as well, varying whether or not they had taught before, to differences in their experience in phlebotomy, such as working in a hospital or reference lab versus working in a doctor's office setting.

Most of the instructors stated that they were hired for the credentials they hold, but that the credentials did not actually line up with the job of teaching phlebotomy. Instructors 1, 3, and 5 said they were hired for their credentials and teaching phlebotomy was just one of the skills and topics for which they were hired to teach. Instructor 4 reported that a friend who knew of the job and knew the school owner referred her for the job. Instructor 2 was hired for her experience as a nurse and her willingness to take the course she would ultimately teach in order to be trained to teach phlebotomy in the prescribed manner of the school. Each instructor reported that, in general, other instructors do not have adequate credentials. Instructors 1 and 3 were particularly vocal about the other instructors not having sufficient credentials. Instructor 2 said most other instructors do not have any credentials and Instructor 1 said that her co-workers who also taught phlebotomy had no phlebotomy credentials: “one is a PA, (physician’s assistant), one is a microbiologist, and one is an RN (Registered Nurse), none of which actually focus on the skill of phlebotomy.”

Each of the instructors had an opinion about credentialing requirements for their employment. Instructor 5 said that only two states actually required certification so she really did not see the need for certification since she does not live in one of those states. Instructor 3 said the certifying agency he went through was the best because he had gotten used to them. Each instructor expressed concern over the lack of appropriate credentials held by the other instructors. Instructors 2 and 4 did not know where the certifications came from. Instructor 2 said the accreditation of the school came from the state of Colorado and Instructor 4 said the schools themselves were the certifying body for phlebotomists—which is, of course, inaccurate.

Workspace

Although the intent of the research was not to focus on the environment the instructors were dealing with, the topic continued to arise in the observations and interviews as the instructors found it important to mention. This theme breaks into sub themes to include the logistics of the classroom and the logistics of how a phlebotomy instructor is hired.

When asked if the workspace they taught in was adequate, most instructors said that it was. Instructor 1 said her classroom was crowded and Instructor 5 said her classroom was not well lit, had carpet, and had no sinks—all of which are OSHA violations. Instructor 4 said his classroom/labs were impeccable. They all said they had sufficient supplies, except for Instructor

3 who said they ran short of supplies frequently. All of the instructors reported using donated vacutainer tubes, which were usually expired.

Classroom

The theme of the classroom has two aspects or subthemes: policy and management. Policy has to do with the way they set up the class and the rules they adhere to, whereas management of the class covers the aspects of the actual logistics of the space while the class is happening. Policy includes the questions asked about drawing blood on the first day, allowing food and drinks in the room and following dress code. These are examples of rules set forth for the class. The management of the class refers to how the rules are carried out and dealing with the students and what they face.

Every instructor interviewed said that the students should not draw blood on the first day of class. Every instructor allows students to bring in volunteers to have the students practice with; all of these instructors require a signed consent form by the volunteers as well. All of the instructors said they do not allow food and drink in or near the classroom, yet in all of the settings observed, food and drink remained in the classroom. All of the instructors said they follow a dress code, paying particular attention to hair and shoes: hair must be pinned up so as to not be in the face or mouth and shoes must be hard to prevent penetration should a needle fall to the floor. Like with food and drink, some of the students observed were not following dress code and the instructor did not appear to take any action. The policy for hand washing was reported as required before and after every draw; yet what was observed was occasional use of hand sanitizer between draws. Instructor 2 was most diligent about the hand sanitizer but the other instructors made the sanitizer available without prompts to use it. Also regarding cleanliness, the interviews revealed that the tables and chairs should be cleaned before each shift, yet not one instructor had students clean the chairs and the tables were wiped down in Instructor 1's class only. Each instructor said there were three types of blood draws taught: vacutainer, butterfly, and fingersticks (or capillary punctures). Instructor 2 said she also taught syringe draws. Each instructor said station set up was critical, and although Instructor 2 said she preferred individual buckets or carrying trays for phlebotomists, the lab was set up in advance and no individual trays were used. In the lab used by Instructors 1 and 3, the lab was stocked and the students set up stations by gathering the materials needed and taking them to another

table where a station was set up for the collection procedure about to be performed. Each station had its own portable sharps container and supplies that were then returned to supply cabinets once the lab portion of the class ended.

The management of the classroom was evident in the responses to the questions about students being afraid and how the instruction is conducted. For example, all of the instructors said that all students were scared of hurting someone. Instructor 4 said that the students are scared of hurting people and her job is to build confidence so people were less scared over time. Sometimes the students are shaking and yet it is amazing how much better they are at the end of the course, which is what she tells them to allay their fear. Instructor 3 reported that some of his students have fainted at the sight of blood and he has had to administer first aid. All of the instructors agreed that it is necessary to set the rules in the beginning of the class although the observations revealed the rules set varied. All of the instructors agreed that it is fundamental to be strict in enforcing the policies set forth. The standards for passing the course are generally managed by the school in order to achieve the threshold for achieving certification. Each instructor has different input regarding how many successful sticks were required, yet Instructors 2, 3, 4 and 5 expressed the sentiment that their requirements were insufficient and they wanted students to perform more draws than the minimum acceptable. Instructor 1 said she set a requirement based on the objective of the student since many of her students did not intend to be employed as phlebotomists or in any capacity where phlebotomy is required like administrative work.

Discussion

The purpose of the study was to evaluate and expose the variations in the classroom of phlebotomy instructors as lived. Specifically, the variations of lab and lecture time in teaching phlebotomy techniques were suspected as the root cause of phlebotomy errors and ultimately patient suffering. The overall research question asked was: What roles do the standards and guidelines of phlebotomy play in the experience of teaching phlebotomy as lived?

OSHA offers the clearest guidelines for phlebotomy training. One out of five of the instructors who participated had official OSHA training. Although all of the instructors knew the role of OSHA, they were unable to accurately assess all of the regulations. Their knowledge of WHO guidelines was negligible as well. Instructors often gather or are provided information

on OSHA and WHO compliance much like urban myth, commonly accepted ideas rather than formal training. Most textbooks include extensive information on OSHA compliance and needle safety along with industry best practices. The struggle with best practices from a textbook comes back to the subjective nature of interpretation and personal experience by the teacher. Specific practices such as tourniquet tightness, how to locate the vein, and speed of needle entry can vary widely based on preference and experience. Even something as simple as the proper order of filling blood specimen containers has changed due to time and circumstances (Lippi et al., 2006, p. 7).

In addition, instructors are left to guess at how to interact with the students emotionally and socially. Students are fearful of learning a skill that is as serious as an invasive procedure for the purpose of collecting blood samples through venipuncture or micro-techniques, as well as facilitating the transportation of laboratory specimens and other job skills that are not necessarily known upon entering the phlebotomy classroom setting. Instructors need to provide students a strong technical and emotional foundation, yet students are often not being guided by instructors who use commonly known theories for teaching clinical skills.

Implications

The following are findings that are contrary to the guidelines or are areas of concern and their implications.

The first area of concern is the lack of understanding and consistency among the instructors regarding credentialing. Each of the instructors had a different background for teaching and for performing the skill of phlebotomy. No two instructors had the same credentials and none thought that other instructors they knew of or worked with had any better credential than they did. Those who did not hold a higher degree were the only ones who mentioned that having a higher educational degree made any difference. The hiring factors for the jobs were also quite varied which implies that a general ballpark understanding of phlebotomy is acceptable within the human resources aspect of employment. Most of the instructors were unclear about the programmatic and school accrediting criteria utilized within the setting for which they taught. They were unclear about the agencies through which their students would seek certification as well as the credentialing bodies through which they had received their own certifications.

The second area of concern with negative implications was revealed under the theme of classroom. There are many influences in the classroom in terms of regulation. Policies and the management of students are in some cases, made up according to what the instructor thinks is the best without any solid foundational basis. Some things are done based on certification requirements. For example, most of the instructors said they require a certain number of blood draws, but they were unclear as to where the expectation came from. Some of them thought it was a school expectation, some thought it was an accrediting expectation, and some thought it was negotiable depending on what the student preferred. Some procedures are performed based on what is needed for the specimen testing requirements. Other procedures are set forth based on what the manufacturer of the product recommends, such as how much blood to place in the tube based on the amount of additive per volume of blood in the tube, and each tube is marked differently depending on the manufacturer.

Instructors must balance what is required of the credentialing body, the laboratory, the manufacturer of the products used, as well as what the school administration and common sense tells them to do. The comments and observations regarding classroom space and work conditions shape the context of what the instructor prepares in terms of how the classes will go. If the room is crowded, dark, carpeted, or without sinks, the instructor must be resourceful while knowing the accommodations are inadequate. In some regard, the resourcefulness required to deal with the hardships has led to the creation of some very clever teaching tools, such as placing the Band-Aid on the cotton ball to practice needle insertion and using the corner of the alcohol pad to point to the place of needle insertion on the arm.

Other inconsistencies revealed in the interviews and observations having to do with the performance of phlebotomy stem from the lack of regulatory agencies and the enforcement of their policies. In some cases, the inconsistencies found can be traced to social changes and influences. For example, each instructor said they followed the dress code, when in fact they monitored the shoes and hair rules to ensure safety practices, while the other aspects of dress code were ignored across the board. The use of hand sanitizers represents a social movement towards cleaning without the use of water, whereas OSHA only permits its use as a temporary solution until hands can be washed properly (1992). Again, instructors must balance what they

know against what they think in order to meet the expectations of many sources mandating what is required.

Recommendations

Inconsistent classroom training, lack of regulated phlebotomy standards, and absence of regulatory oversight are wreaking havoc on patient care standards. Standards of phlebotomy must be defined both in the classroom and the exam room. Best practices in the industry should utilize the proper equipment, patient positioning, safety measures, and methodology for best patient outcomes. Classroom instruction should be limited to instructors with verifiable academic and experiential credentials, and curriculum should be regulated in alignment with industry best practices.

The outcomes of this study suggest follow up research in the following four areas: (1) Further research can be conducted to evaluate the effects of such varied regulatory bodies. Is the role of school and programmatic credentialing actually effective in turning out skilled professionals? A closer look could reveal that the credentialing is simply an archaic method for quality assurance that is no longer effective. (2) Further research can be done to evaluate the effects of the education of skills-based instructors. Does the level of education of the instructor make a substantial difference in the outcomes of the students? (3) Would a single agency be able to provide instant resources, feedback, and monitoring of regulations from a variety of sources? Would it be possible to have one agency, preferably an international body, to centralize the information that is currently coming from scattered sources? (4) Further research can be done to actually follow student outcomes to determine best teaching practices for skills based performances. How many students are actually employed in phlebotomy? What are their success rates in terms of successful blood draws? What are their patient satisfaction rates? And what made the difference in the classrooms? This case study has been an expose for setting a foundation to have further questions arise and be answered via further research.

Accreditation and Online Education

Although this article addresses the findings of inconsistent teachings of procedures and policies within phlebotomy practices, the question remains: Where does this tie into online teaching and accreditation?

The need for a foundation of policies and procedures in the world of phlebotomy is believed to bring forth a new realm of preparedness of students and consistency of instructors. Standards and practices, when followed uniformly, can avert preanalytical error, misdiagnosis, or even death. The problem is the subjective nature of the instructor and the student due to inconsistencies; students are being taught from the personal experience, expertise, and perspectives of their instructor. Some technicians attend formal training programs specifically for venipuncture and blood collection, while other programs combine phlebotomy skills with training for jobs such as medical assisting, nursing, or laboratory technicians. State standards vary widely on education and credentials of clinical professionals allowed to perform phlebotomy functions. The reigning confusion about who is the leading authority and what are the actualities in practice make the profession of instruction for phlebotomy subjective and chaotic at best. Which begs the question: how can a standard be developed as a basis for accreditation?

Given the lack of consistent standards in phlebotomy practices today, universal guidelines for teaching and implementation of phlebotomy are necessary for avoiding preanalytical errors and confusion. With the trends seen in education now—such as the flipped classroom, online, blended, and adaptive learning—it is critical to establish the role and influence of the standards and guidelines no matter the setting. One possibility is for standards bodies, institutions, and programs to require all phlebotomy instructors to take phlebotomy instruction training prior to their entry into the classroom. In today's world, the use of online classes is growing rapidly, with many higher education institutions integrating them into their curriculum. Such online training can inform instructors of accrediting standards and test on instructional knowledge, both for their students' specialties and for phlebotomy overall. This will not replace the in-person experiences of phlebotomy training, but it can ensure that gaps in practice and knowledge are filled before it impacts the student and, therefore, the patients that student will one day interact with.

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