ORIGINAL RESEARCH

ABC's: A reality based pedagogy for clinical nursing evaluation

Cynthia Chernecky [1], Jacqueline Miller[2], Kitty Garrett[1], Denise Macklin[3]

1. Department of Physiological & Technological Nursing, Georgia Health Sciences University, United States. 2. Department of Biobehavioral Nursing, Georgia Health Sciences University, United States. 3. Vascular access consultant, Marietta, Georgia, United States.

Correspondence: Cynthia Chernecky. Address: Georgia Health Sciences University, United States.
Email: cchernecky@georgiahealth.edu

Received: June 7, 2011 **Accepted:** November 7, 2011 **Published:** February 1, 2012
DOI: 10.5430/jnep.v2n1p51 **URL:** http://dx.doi.org/10.5430/jnep.v2n1p51

Abstract

Background: Current barriers to effective student evaluations in the clinical area are numerous and growing and new pedagogies need to be developed. We developed an educational pedagogy to aid in critical thinking for graduate and undergraduate nursing students in clinical areas that can replace or augment written care plans.

Methods: Evaluate the effectiveness of the new ABC's pedagogy (A=Anatomy/physiology, B=Best care, C=Complications, D=Drugs, E=Evidence based practice) for clinical teaching, using a 5 point Likert scale, for both graduate and undergraduate students and faculty through course evaluations.

Results: Total undergraduate students (N = 37) evaluated the ABC's pedagogy as follows; 98% rated as excellent and 2% very good. For graduate students (N= 8) 88% rated the ABC's as excellent and 12% very good. Staff nurses and advanced practice nurse preceptors (N =17) rated the pedagogy as 88% excellent, 6% very good, and 6% neither good nor bad.

Conclusions: The use of the ABC's pedagogy in clinical care is a way to evaluate undergraduate and graduate students' critical thinking, and to facilitate learning during practicum. It offers a systematic approach to replace written care plans includes the major benefit of real-time questions/answers between the professor/preceptor and students and incorporates evidence-based practice into individualized patient care. The ABC's are one way to better prepare nursing students in areas of communication, critical thinking, providing care in clinical experiences, discussion of ethical and professional issues, as well as affording one-on-one time with the clinical preceptor/professor and promoting exponential learning in a pre- and post-conference environment.

Key words

Nursing, Education, Clinical, Teaching method

1 Introduction

Methods of evaluation related to nursing student knowledge, synthesis and critical thinking in the clinical area are essential for faculty. Current barriers to effective evaluation include a growing body of research, high patient acuity, limited time, required higher-order thinking and a faculty shortage [1]. Due to increases in student enrollments, decreases in faculty numbers, increased faculty workload and limitations of clinical sites the primary author decided to invent a clinical

pedagogy that would address these concerns while maintaining student learning and faculty/preceptor satisfaction. A new educational pedagogy for clinical has been designed and tested that organizes information into a systematic fashion based on a selected topic that can replace or enhance written nursing care plans. The topic can be a sign, symptom (Nausea/vomiting), condition, medication (Docusate sodium), medical diagnosis (Acute myocardial infarction), nursing diagnosis (Impaired gas exchange), problem (Vein selection for peripheral intravenous start), or issue (i.e.: ethical, legal, treatment choice). The topic may be presented in either a written or verbal format.

1.1 ABC's of sign/symptom (Chemotherapy Induced Nausea & Vomiting (CINV))

Topic = Sign/Symptom: CINV

A: Two major pathways: central/brain (CTZ) and peripheral/GI (TVC). Delayed N&V starts up to 48 hours and can last up to 7 days.

B:
- Important to know which medications are highly emetogenic (i.e.: DDP) and patient history of emesis. Pre-treat with IV antiemetics to both pathways, may need oral antiemetic pre-treatment for car ride to facility and post treatment for up to 5 days.
- Evaluate if current treatment effective and plan accordingly for prevention of nausea and vomiting.
- Dehydration = assess lab values of H/H, skin turgor, I&O.
- GI = assess vomit for blood via hemoccult or visual blood, labs H/H and RBC, BP for hypotension.
- Fatigue = assess RBC, H/H for anemia, amount sleep and pattern, score fatigue on 1-10 scale.

C:
- Dehydration
- GI bleed
- Fatigue

D:
- Patient prescribed ondansetron HCL (Zofran), 5-HT3 antagonist, during 2-hour Platinol treatment and 32 mg orally 30-minutes prior to chemotherapy.
- Half life is 2-3 hours.
- Alternative could be 5-HT3 medication granisetron HCL (Kytril).
- Patient takes Chinese herbal ginger 1 capsule before chemo to help nausea and has a 4 year history of smoking marijuana on average of twice per month. Acupressure can be tried as adjunct therapy.

E: Latest research [45]

Four of seven acupressure band trials supported the positive effects of acupressure, whereas three trials negative results had methodological issues. Acupressure bands were effective in controlling acute nausea, whereas finger acupressure controlled delayed nausea and vomiting. The overall effect of acupressure was strongly suggestive but not conclusive. Acupressure should be strongly recommended as an effective, nonpharmacologic adjuvant intervention for CINV control if its positive effects are reproduced in future acupressure clinical trials.

1.2 ABC's of medication docusate sodium

Topic = Medication: Docusate sodium

A: Trade name Colace. Stool softener, prevents constipation, and does not increase peristalsis. Allows water to get into the stool thereby making it softer and easier to pass. Used mostly as soft gel form (looks like a dark red jelly bean) but also comes in liquid form. Onset is 1-3 days, half-life unknown, and cost $0.15/pill. No prescription needed, OTC medication. Liquid form used off label to soften ear wax.

B: Given mostly patients on narcotic analgesics. Do NOT give if nausea, vomiting, signs of acute abdomen, allergic

 ISSN 1925-4040 E-ISSN 1925-4059

to docusate or dehydrated. Expect results in 24-48 hours with proper hydration (6-8 glasses/day). Adverse reactions = cramps, skin rashes, throat irritation. Assess color, consistency, amount of stool, abdominal distention, bowel sound x 4 quadrants. With long term dependence may have electrolyte imbalances so assess serum Na^+, Cl^-, K^+. If cardiac patient teach to avoid Valsalva maneuver. Consider sennoside instead of docusate sodium in hospitalized cancer patients.

C: Dependency and electrolyte depletion.

D: Usual dose = 50-200 mg & maximum 500 mg daily. No known drug interactions but should not be given within 2 hours of mineral oil as increases absorption of Colace.

E: Evidence based practice [46]

There is no consensus on the effectiveness of the variety of cerumenolytics (use of a wax softening agent) in use. Meta-analysis reveals a propensity of triethanolamine polypeptide over saline in preventing the need for syringing, but no differences found between the effectiveness of either sodium bicarbonate ear drops, chlorbutanol, triethanolamine polypeptide oleate condensate or docusate sodium liquid versus a sterile water or saline 'placebo'. Using drops of any sort appears to be better than no treatment, but it is uncertain if one type of drop is any better than another. Future trials are needed.

1.3 ABC's of problem Acute Myocardial Infarction (AMI)

Topic = Problem: Acute Myocardial infarction (AMI)

A: AMI can result in an array of cardiac functional impairments, which can range from mild to severe. Physiologic changes can include reduced contractility with abnormal wall motion, decreased stroke volume, altered left ventricular compliance, decreased ejection fraction, increased left ventricular end-diastolic pressure, and sinoatrial node malfunction.

In the presence of atherosclerotic plaques, particularly during the more advanced stages, myocardial blood supply is already compromised. In these instances in which myocardial reserve is extremely limited, any event that increases the workload or further impairs the blood supply to the heart places the individual at increased risk for suffering ischemic cardiac changes. The situation is one of simple supply and demand: an oxygen deficit results when there is demand that outweighs the supply, which results in myocardial ischemia and possibly even infarction. When an individual has CAD, the danger of plaque rupture is present at any time. This event can lead to two disastrous consequences. Upon rupture, the embolic plaque travels into the coronary vasculature and obstructs flow. Alternatively, even if the plaque does not become an embolus, the irregular surface of the damaged endothelium causes platelet aggregation and fibrin deposits, which lead to thrombus formation and result in the partial or total occlusion of the artery. The area of myocardium served by this coronary artery branch is then subjected to a lack of perfusion.

The lack of oxygen available for oxidative phosphorylation to take place results in cellular anaerobic metabolism in an attempt to survive. Lactic acid, a deleterious by-product of anaerobic metabolism, accumulates rapidly within the myocardium and inhibits normal enzyme physiologic activity. In the presence of lactic acid, enzymes, which are essential for intracellular function, cease to work. In addition, the necessary reserves of adenosine triphosphate (ATP) are exhausted within minutes and the myocardium is unable to sustain anaerobic activity. Without ATP, the transmembrane pump fails to work, resulting in free movement of ions across the plasma membrane. The most crucial effect of this ionic movement is the change in membrane potential as sodium moves into the cell and potassium moves out. This change ultimately inhibits the conduction of electrical impulses and thus myocardium contractility. Additionally, because water follows sodium into the cell, swelling occurs.

Cardiac cells can withstand ischemic conditions for approximately 20 minutes before irreversible cellular death begins. If these ischemic changes are not reversed, then water continues to move into the cytoplasm, eventually

causing structural and functional changes, including lysosomal and mitochondrial swelling. The eventual rupture in these membranes leads to the autodigestion of cellular contents by the hydrolytic lysosomal enzymes as well as disruption of organelles and genetic material. Cardiac contractility and output are negatively impacted as the area of the affected myocardium necrosis, losing the ability to meet the metabolic requirements of the body.

Cellular necrosis causes the release of endogenous catecholamines and activates the body's inflammatory process. The increase in circulating epinephrine and norepinephrine levels stimulates glycogenolysis and lipolysis, which causes a surge in plasma concentrations of glucose and free fatty acids. In an attempt to heal the injured cells, the inflammatory process initiates the release of leukocytes, which infiltrate the area. These neutrophils and macrophages begin the process of phagocytosis to degrade and remove the necrotic tissue. When this process is completed, a collagen matrix is laid down, which eventually forms scar tissue. Although the scar tissue is strong, it is unable to contract and relax like healthy cardiac muscle, which can lead to ventricular dysfunction or pump failure.

Rationale for symptoms includes:

- The initial surge of catecholamines can contribute to a variety of signs and symptoms such as tachycardia, hypertension, anxiety, palpitations, apprehension, and feelings of impending doom.
- Stimulation of the medulla is mediated via vasovagal reflexes and can result in nausea and vomiting.
- Fever may be present secondary to the activation of the inflammatory process. As the infarction progresses and the heart's pumping ability become impaired, cardiac output drops.
- Symptoms associated with decreased cardiac output include hypotension, restlessness, dyspnea, jugular vein distention, oliguria, and confusion.

B:

- Administer oxygen via nasal cannula ($\leq$ 6 L) or mask to decrease hypoxia.
- 12-lead ECG: Because of pathophysiologic manifestations the membrane potential is altered in the infarcted area of the myocardium, making it unable to depolarize and repolarize. Thus conduction abnormalities can usually be detected. Whereas routine cardiac monitors look only at the conduction system from one angle, the 12-lead ECG allows the clinician 12 views from many perspectives on the body surface, making it far superior in diagnosing AMI.
- Establish IV access (at last one peripheral18 gauge and one 20 gauge in an adult)
- Monitor pulse oximetry (oxygen saturation), vital signs (hyper/hypotension, pulse and respirations and pain) and blood sugar (hyperglycemia due to cell rupture)
- Monitor laboratory and diagnostic test results (see pages below)
- Administer medications (see page below)
- Conduct quick history and physical: describe pain, assess mental status, level of consciousness, skin buccal membrane color, hematuria, hemoptysis, GI bleeding, and history of allergies, cardiac, blood pressure, diabetes, PVD or heart problems.
- I & O every 2-4 hours, urinary catheter usually inserted.
- Bed rest
- Provide emotional support and quiet environment
- Educate patient and family on sexuality, risk reduction, signs/symptoms of cardiac ischemia, medication adherence, low sodium diet, BP monitoring, cardiac rehabilitation, smoking cessation, anxiety and depression.
- Prepare for transfer to intensive care, arterial line and/or pulmonary arterial catheter insertion, and surgery.

C:

- Arrhythmias (affect 90% of patients)
  First-degree AV block: Usually requires no treatment. May treat underlying causes such as undergoing

 ISSN 1925-4040 E-ISSN 1925-4059

adenosine stress testing, electrolyte imbalances, mitral or aortic valve annulus calcification, infectious disease, infective endocarditis, diphtheria, rheumatic fever, Chagas disease, Lyme disease, tuberculosis, or collagen vascular disease (rheumatoid arthritis, systemic lupus erythematous, scleroderma). Medication treatment may include the use of calcium channel blockers, beta-blockers, digoxin, or amiodarone.

Second-degree AV block: Medications may include Atropine, TCP, Dopamine, and Epinephrine.

Third-degree AV block: Medications may include Atropine, TCP, Dopamine, and Epinephrine. Never treat 3rd degree heart block plus ventricular escape beats with Lidocaine.

Atrial fibrillation: Medications include Dilitiazem, beta-blockers, Verapmil, Digoxin, procainamide, Quinidine, anticoagulants.

Ventricular tachycardia: Medications include Lidocaine, procainamide, bretylium.

Ventricular fibrillation: Defibrillation. Medication includes Epinephrine.

- Pericarditis: inflammation of the pericardium marked by chest pain, fever and friction rub.
- Cardiac tamponade: increased intrapericardial pressure impairs the filing of the heart during diastole. Due to vessel injury form such conditions as cancer, cardiac rupture, trauma (gunshot, stabbing), hemorrhage, central venous catheterization, chronic renal failure, TB, arthritis, SLE.
- Papillary muscle rupture: Tricuspid valve =Rupture of right ventricular papillary muscle causing tricuspid regurgitation and right ventricular failure and Mitral valve = transection of left ventricular papillary muscle causing mitral regurgitation.
- Chordae tendineae cordis rupture: cords connecting the two atrioventricular valves to the appropriate papillary muscles in the heart ventricles rupture causing acute, massive, cardiac insufficiency leading to congestive heart failure and an early death
- Myocardial wall rupture: A laceration or tearing of the walls of the ventricles, atria, interarterial or interventricular septum, papillary muscles or chordae tendineae. Free wall rupture of the myocardium is an important complication and major cause of death following acute transmural (ST segment elevation) myocardial infarction. Pathologic changes on a cellular level along with mechanical stressors weaken the myocardium post-infarction. Myocardial rupture rarely involves the left or right atrial walls. Risk factors for myocardial rupture include advanced age, female gender, prior hyper-tension, first myocardial infarction, late presentation, lack of collateral blood flow, and persisting chest pain and ST segment elevations. Thrombolytic therapy does not increase risk of rupture when given early in myocardial infarction, but late thrombolytic therapy may heighten risk. Primary percutaneous coronary intervention for acute myocardial infarction has reduced the incidence of myocardial rupture.
- Pulmonary embolus: A blockage of an artery in the lungs by fat, air, a blood clot, or tumor cells. Decreases myocardial oxygenation.
- Cerebrovascular accident: The death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery to the brain. A blood clot can form in any chamber of the heart when the heart beats irregularly, such as in atrial fibrillation. These clots usually stay attached to the inner lining of the heart but can break off, travel through the blood stream, form a plug (embolus) in a brain artery thus causing a stroke.
- Heart failure: A condition in which the heart can't pump enough blood throughout the body which may be a result of AMI. Right sided heart failure is the inability of the right side of the heart to adequately pump venous blood into the pulmonary circulation. This causes a back-up of fluid in the body, resulting in swelling and edema. Left sided heart failure is the inability of the left side of the heart to pump into the systemic circulation. Back-up behind the left ventricle causes accumulation of fluid in the lungs.
- Pulmonary edema: Fluid accumulation in the lungs after AMI because there is failure of the heart to remove fluid from the lung circulation. Symptoms include difficulty breathing, coughing up blood, excessive sweating, anxiety, and pale skin. A classic sign is production of pink frothy sputum.
- Cardiogenic shock: A decreased pumping ability of the heart that causes a shock like state (not enough

blood and oxygen reaching important organs in the body) as a direct result of AMI. Characterized by decreased urine output, altered mentation, and hypotension. Other clinical characteristics include jugular venous distension, cardiac gallop, and pulmonary edema.

- Cardiac arrest: Also called "sudden cardiac death" and is when the heart develops an arrhythmia that causes it to stop beating. This is different than an AMI where the heart usually continues to beat but blood flow to the heart is blocked.
- Death: Permanent termination of biological functions, one cause of which is an AMI.

D: **Table 1.** Drugs/Medications commonly used in AMI

Medication Category	Generic (Trade)	Dose	Purpose of use	Interfering factors
Analgesic	Morphine Sulfate (MS Contin)	30 mg PO q4-6 hrs 10 mg IV/SQ/IM q3-4 hrs	Reduces pain, decreases preload	Morphine: Alvimopen (Entereg), buproprion (Wellbutrin), MAOI's
Antiarrhythmics	Amiodarone (Cordarone, Pacerone)	150 mg/min IV for 10 min, 1mg/min for next 6 hrs, 0.5mg/min for next 18 hrs	Treat ventricular arrhythmias by dilating blood vessels and slowing electrical conduction from SA node thru accessory pathways	Amiodarone: grapefruit juice↓ BP
	Lidocaine (Xylocaine)	1-2 mg/kg IV Max dose: 300mg/hr	Suppress automaticity of ventricular cells by decreasing diastolic depolarization and increasing V-Fib threshold	Lidocaine: Diflucan in D%W, epinephrine, propranolol, tramadol. IM injection ↑ CPK serum values
Antiplatelet	Abciximab (Reopro)	0.25mg/kg IV bolus then 10mcg/min for 18-24 hrs	Prevent arterial/venous thrombi by suppressing platelet aggregation	
	Aspirin	300-325mg PO QD	Suppresses platelet aggregation	
	Clopidogrel (Plavix)	300mg PO –loading 75mg/day PO QD after loading dose	Suppresses platelet aggregation	Clopidogrel = NSAIDs, Warfarin may ↑bleeding
	Eptifibatide (Integrilin)	180mcg/kg IV bolus over 1-2 min then continuous infusion of 2mcg/kg/min for no more than 72 hrs	Suppresses platelet aggregation.	
	Tirofiban (Aggrastat)	0.4mcg/kg/min IV over 30 min then continuous IV infusion of 0.1mcg/kg/min for 48-108 hrs	Suppresses platelet aggregation	
Beta Blockers	Atenolol (Tenormin)	5mg IV q2 min x 3 5mg PO q6 hrs x 48 hrs, then 100mg PO BID	Decrease oxygen requirements of myocardium by inhibiting sympathetic stimulation and decreasing workload of heart	Beta blockers: Mibefradil, phenothiazines

(Table 1 continued on page 57.)

Table 1. (Continued)

Medication Category	Generic (Trade)	Dose	Purpose of use	Interfering factors
	Metoprolol (Lopressor)	100-450 PO QD or BID	Decreases workload	Beta blockers: Mibefradil, phenothiazines.
	Propranolol (Inderal)	180-240 mg PO QD in 3-4 Ö doses	Decreases workload	Beta blockers: Mibefradil, phenothiazines.
Calcium Channel Blockers	Amlodipine (Norvasc)	5-10mg PO QD	Dilates peripheral arteries/ arterioles by inhibiting calcium entry into cardiac smooth muscle cells, decreases workload of heart	Calcium channel blockers: Grapefruit juice ↓ BP. IV infusions of calcium.
	Diltiazem (Cardizem)	30-120mg PO TID or QID	Decreases workload	Calcium channel blockers: Grapefruit juice ↓ BP. IV infusions of calcium.
	Nicardipine (Cardene)	20mg PO TID	Decreases workload	Calcium channel blockers: Grapefruit juice ↓ BP. IV infusions of calcium.
	Nifedipine (Procardia)	10-30mg PO TID	Decreases workload	Calcium channel blockers: Grapefruit juice ↓ BP. IV infusions of calcium.
	Verapamil (Calan)	80-120mg PO TID	Decreases workload	Calcium channel blockers: Grapefruit juice ↓ BP. IV infusions of calcium.
Nitrates	Nitroglycerin (Nitrostat)	0.15-0.6mg x 3 doses, SL q5 min for 15 min	Dilates arterioles/veins, decreases preload/afterload and oxygen demand	NTG: Calcium channel blockers, Viagra, tizanidine, Zanaflex ↓ BP. NTG reduces thrombolytic effect of alteplase and anticoagulant effect of heparin.
Stool Softeners	Docusate Sodium (Colace)	50-200mg PO QD	Prevents straining from constipation and stimulation of vagus nerve to prevent ischemia and decreased preload	Stool softeners: Mineral oil.
Thrombolytics/ Fibrinolytics	Alteplase (t-PA, Activase)	10mg IV bolus over 2 min then 50mg for first hr, 20mg the second hr, and 20 mg the third hr	Converts plasminogen to fibrinolysin to dissolve blood clots after they are already formed.	

(Table 1 continued on page 58.)

Table 1. (Continued.)

Medication Category	Generic (Trade)	Dose	Purpose of use	Interfering factors
	Reteplase (Retavase)	10 units IV bolus over 2 min then repeat in 30 min	Dissolves blood clots	
	Streptokinase (Streptase)	250,000 units/30 min then 100,000 units/hr for next 24-72 hrs	Dissolves blood clots	Streptokinase: Abciximab (major bleeding), ASA, dipyridamole.
	Tenecteplase (TNKase)	30-50mg IV bolus over 5 seconds	Dissolves blood clots	
	Anistreplase (Eminase)	30 units IV over 2–5 min	Dissolves blood clots	
	Urokinase (Abbokinase, Kinlytic)	4400 units/kg loading dose then 4400 unit/kg/hr for 12 hrs	Dissolves blood clots	

E: Evidence Based Practice [47]:

Soluble TRAIL exhibits anti-inflammatory and anti-atherosclerotic activities with acute myocardial infarction (AMI). Serum levels of TRAIL were significantly decreased in patients with AMI at baseline (within 24 hours from admission) and showed a significant inverse correlation with a series of negative prognostic markers, such as CK, CK-MB and BNP. TRAIL serum levels progressively increased at discharge, but normalized only at 6-12 months after AMI. Of note, low TRAIL levels at the patient discharge were associated with increased incidence of cardiac death and heart failure in the 12-month follow-up, even after adjustment for demographic and clinical risk parameters (hazard ratio [HR] of 0.93 [95% CI, 0.89 to 0.97]; $p = 0.001$). TRAIL might represent an important predictor of cardiovascular events, independent of conventional risk markers.

1.4 ABC's of a Nursing Diagnosis

Topic= Nursing Diagnosis: Impaired gas exchange related to SOB × 2 weeks.

Out-patient clinical setting A 54 year old white male with a history of hypertension, hyperlipidemia, smoked 2 ppd × 40 years, wife currently being treated with chemotherapy for breast cancer in your out-patient department. His last chest x-ray was 3 years ago and it was "OK". His SOB becomes acute as he waits with his wife during her treatment. He goes by wheelchair to the Emergency Department and is prescribed stat ABGs, CBC, BMP, Troponin I, EKG, CT chest, Oxygen 2L nc, pulse ox, IV NS 100/hour.

A:

- Lack of oxygen to the tissues- complications with ventilation or perfusion
  - Caused from inadequate exchange of oxygen and carbon dioxide in the alveoli
  - Could be a cause of decreased heart activity where the heart is not delivering the blood that is required to the tissues leading the body to believe it is not receiving enough oxygen, so it increases the rate of breathing
- Allergies cause inflammation of the bronchi when histamine is released (causing itching and swelling) which obstructs air flow

 ISSN 1925-4040 E-ISSN 1925-4059

- Obesity interferes with adequate lung/diaphragm expansion causing decreased air flow

B:

- Monitor patients' level of consciousness to check for adequate perfusion of the brain
- Monitor blood pressure- an increase in blood pressure could indicate increased fluid buildup in the body's vasculature leading to heart failure
- Assess patients pulse oximetry readings- to see if tissue perfusion is adequate. Have supplemental oxygen available under physicians prescription to maintain pulse oximetry readings
- Assess for edema- a component of heart failure
- Assess ECG for dysrhythmias
- X-ray of chest to see if anything is causing shortness of breath like pneumonia, collapsed lung, pulmonary emboli, tumor
- Determine patients Arterial Blood Gas to determine ventilation and perfusion (tells you how much oxygen and carbon dioxide is in the blood)
- Assess lab results
- Assess circulation in peripheral arteries to be sure all areas of the body are receiving adequate oxygen supply through the blood
- Administer appropriate prescribed medications
- Monitor temperature for signs of fever- fever indications infection
- Assess respirations- for labored breathing that can cause accessory muscle weakness
- Evaluate pulmonary function tests, if prescribed- to determine how well the lungs transfer oxygen to the blood
- Review ONS PEP™ card [48] on dyspnea.
- Teach pursed lip breathing and relaxation techniques to reduce patients breathing patterns
- Monitor patients exercise- be sure patient is not over exerting themselves (complicates breathing patterns)
- Consult respiratory therapy if needed to give breathing treatments

C:

- Cancer of the lung – causes SOB due to tumor load and/or location. May be accompanied by superior vena cava syndrome
- Asthma- inflammation could cause decreased oxygen exchange
- COPD- including chronic bronchitis's or emphysema could make it harder to breath therefore causing decreased oxygen saturation
- Heart failure- if the heart is not producing an adequate blood supply to meet the bodies needs
- Accessory muscle of breathing weakness
- Anemia could result from the body not getting enough oxygen due to insufficient red blood cells
- Respiratory acidosis- the lungs can't remove all the carbon dioxide from the body if the patient is shallow breathing
- Pneumonia- an infection of the lungs causing inflammation, so obstructed blood flow

D:

- Oxygen therapy via nasal cannula
- Bronchodilators (e.g. Theophylline) to open up lung passages
- Corticosteroids to decrease inflammation and swelling
- Diuretics (e.g. furosemide) if heart failure
- Antianxiety (e.g. Ativan) to help patient relax and decrease demand for oxygen

E: Evidence based practice [49]:

Uric acid as an outcome predictor in patients admitted in the Emergency Department with acute dyspnea is unknown. Cumulative 24-month mortality rates were 28% in the first, 31% in the second, and 50% in the third tertile ($p <$

0.001). After adjustment in multivariable Cox proportional hazard analysis, uric acid predicted 24-month mortality independently of B-type natriuretic peptide (p=0.003). Therefore, uric acid, measured at Emergency Department admission or hospital discharge, is a powerful predictor of long-term outcome in dyspneic patients.

1.5 ABC's of a nursing problem

Topic = Problem: Vein selection for peripheral intravenous catheter (PIV)

A: Each vein consists of 3 layers: a lumen (which is much larger than the lumen of an artery) or tunica intima, then the tunica media surrounded by elastic and muscular fibers and finally the outer most part is the tunica adventitia that is surrounded by another layer of collagen fibers. Specifically the tunica intima consists of flat epithelial cells that provide a smooth surface that decreases resistance to blood flow. It also has endothelial cells that produce prostaglandins which inhibit platelet aggregation. Any changes to the tunica intima initiate an inflammatory response. The tunica media consists of smooth muscle and elastic tissue that can contract making the vein more difficult to penetrate after many venipunctures. It is sensitive to pressure and temperature changes as well. The tunica adventitia is made up of connective tissue and collagen tissue for support and sympathetic nerves that maintain venous pressure and nourish the vein. Valves are semilunar folds that occur at various points along a vein and assist in returning blood back to the heart. All veins increase in size the closer they are in proximity to the heart with the smallest veins located at the periphery of the body.

B:

- Identify patient and assess prescription for PIV.
- Assess for low platelet count, bullous skin diseases (i.e.: SLE, pemphigus) and latex allergies.
- If an arm is edematous then elevate the arm above the heart level and ace wrap it distal to proximal and wait 3 minutes. Then unwrap and apply tourniquet.
- Obese patient's veins can be more pronounced if you place the area in warm water, such as warm cloth wraps, for 3 minutes and also lower the extremity below the heart to increase vasodilation. Tapping the vein can increase vasodilation but can also cause temporary vasospasm.
- Hypotensive patient's and/or those with a low cardiac ejection fraction will have difficulty developing vasodilation and distention so expertise regarding anatomy is required.
- Apply the tourniquet smoothly 4-6 inches above the potential insertion site using a quick-release knot. Do not pinch the skin. If using a blood pressure cuff inflate it just above the patient's diastolic pressure and if needed raise it to systolic pressure.
- Assess the nearest distal pulse (i.e.: radial if placing an IV in the hand or lower arm) and a pulse should be present. If a pulse is not present release the tourniquet/BP cuff as it is too tight.
- While assessing for a vein do not leave the tourniquet on for longer than 2 minutes.
- Dark skinned patient's veins become more visible if the site is wiped with alcohol.
- Avoid large, distended veins in the elderly as these lack elasticity and will likely cause hematomas if punctured.
- Avoid bony prominences, flexible areas such as the wrist, areas with loss of motor/sensory function, arms with lymphedema, pre and post mastectomy arm side, arms with dialysis grafts/fistulas.
- Select the lowest point, most distal point, as a potential site.
- Palpate for soft supple vein.
- After locating a site release the tourniquet, prepare your equipment and supplies, reapply tourniquet, prepare site and initiate venipuncture.
- Document number of attempts, site, size/gauge, type and length of catheter, patient response and dressing type applied. Date and initial dressing.
- Apply moderate pressure to hematoma to stop bleeding then apply ice x 15 minutes, then apply heat for 30 minutes and keep area at heart level as much as possible. Have a diet that includes protein, vitamin C and

iron to help healing of tissue and vein.

C:

- Hematoma: caused by over distention of vein usually by too tight of a tourniquet or puncturing an old vessel that has lost elasticity.
- Ecchymosis: bruising caused by diseases, medications, increased age and/or too tight of a tourniquet. Assess for diseases such as cancer, especially leukemia, medications such as NSAIDs, aspirin, clopidogrel bisulfate (Plavix), enoxaparin sodium (Lovenox), warfarin sodium (Coumadin) heparin, and herbal and vitamin supplements (i.e.: feverfew, ginger, vitamin E). Ecchymosis requires heat for 30 minutes, area kept at heart level as much as possible and a diet that includes protein, vitamin C and iron for wound healing.

D: EMLA anesthetic cream, lidocaine/tetracaine patch or intradermal lidocaine or benzyl alcohol can be implemented to decrease venipuncture discomfort. Patient should be educated on these options prior to venipuncture.

E: Evidence based practice [50, 51].

This chapter discussed clinical thought process and needed information for proper vein selection.

Good veins for venepuncture should be straight, feel soft and bouncy and be cylindrical in shape.

The purpose of this article is to evaluate a new educational pedagogy for clinical teaching invented and developed by the primary author. The ABC's pedagogy is a systematic approach to clinical learning and evaluation for all clinical courses irrespective of novice or expert status. The first step in using the ABC's is to choose a topic. Then the A, B, C, D, E's are developed by the student and presented either in written or oral formats.

A = Anatomy, physiology, pathophysiology, signs, symptoms, cultural concerns, disparities, ethics. The student imparts knowledge on the topic in these above areas, including patient specific information. The professor/preceptor and other students can ask questions during the student's presentation. The student can draw pictures, show charts, etcetera, in order to help explain information and enhance learning. Many different teaching strategies are available using the ABCs.

B = Best care. This includes prioritized assessment, interventions and discharge care as well as laboratory and diagnostic tests, treatments, transportation issues, etcetera, reflective of current practice.

C = Complications. This is a prioritized list of actual or potential complications for which the nurse will perform an assessment. The assessment for each of the complications must be found in the "B" section and based on individualized care.

D = Drugs. This is a list of patient medications or drug categories associated with the topic. It includes prescribed, over the counter (OTC) medications, herbals, complementary and street drugs. If the topic is a drug itself, then this category can be used for mixture, precipitate, and drug interfering factors (see Table 2).

E = Evidence-based practice. One refereed article on the topic published within the last 5 years should be cited. The article should have a direct relationship to the patient and there should be evidence as to how the student includes this article in patient care. The article should also be critiqued when used by graduate students.

While using this pedagogy, the professor in pre-conference can ask for the top two patient issues and then have the A, B, C and D portions imparted by the student. Immediate feedback can be given. In post-conference the student presents any changes based on their care that day and adds the "E" (evidence-based practice) portion. As time in clinical progresses, students must apply the pedagogy to different topics to enhance learning. In other words, the same student can not present

hypertension for three weeks in a row. It is also imperative that with the ABCs there are clinically competent faculty and preceptors.

2 Review of literature

The most widely used model to educate nurses was developed in the 1930's with little change in today's environment [2] though today's curricula do call for focusing on increasing knowledge and skills of students [3, 4]. In order to progress in both the science and art of clinical nursing, there must be new approaches to teaching that translate theoretical knowledge to clinical practicum via critical thinking and quality clinical decision-making [5]. The standards for clinical decision-making include the principles of logic, peer-group discussion, dense description and repetition of format all of which are included in the ABC's pedagogy. Chu & Hsu [6] article reveals that the development of practical knowledge in nursing evolves from declarative (treatment and procedures), procedural (actual practice) and conditional (observations and treatments with direct patient contact) knowledge all of which are possible with the ABCs. Declarative knowledge can be found in the A and B parts of the ABCs, procedural in the B and C parts and conditional in parts B, C, D and E of the ABCs.

Today's nursing education includes generic, accelerated and graduate programs. With this many educational options, it would be prudent to have a pedagogy that has both breadth and depth, and one that can be used at all clinical levels [7]. In light of the nurse educator shortage and the challenge of maintaining quality education, it would also be practical to identify ways to work smarter [8, 9]. Based on faculty demands, exponential healthcare information and patient complexity, a systematic, comprehensive, easy, practical, flexible and immediate feedback pedagogy, referred to as the "ABC's", was invented for evaluating undergraduate and graduate students in clinical practice.

Clinical practice is significant for the professional development of graduate students [10, 11] because it enhances critical thinking [12] and problems solving skills [13], yet few evaluation methods are practical, effective and efficient. Generic features of a nurse practitioner program include the use of knowledge, critical thinking, professionalism, research skills and change management [14]. High quality clinical practice requires clinical reasoning and judgment based on knowledge and synthesis that can be obtained through evaluation [15]. The ABCs pedagogy allows the clinical professor/preceptor to determine and evaluate if knowledge is obtained, if clinical reasoning occurs and at what level, and to determine if clinical judgment and problem solving are satisfactory through what the student presents in the "B" or "Best Care" section. Critical thinking, also a part of clinical reasoning, is an essential nursing skill [16] and includes interpretation, analysis, evaluation, inference and explanation [17] and is social and dialogical [18].

The ABCs includes avenues for critical thinking including interpretation and analysis of laboratory data, evaluation of best care and individualized interventions, and inference and explanation of sequelae such as graft rejection. The pedagogy is also social and dialogical as the professor/preceptor has one-on-one time with the student to offer feedback, probe for further knowledge and synthesis, and mentor professionalism. This time also can be used for reflection [19] where the student can analyze their thinking, best care, drugs and evidence, which aids in quality care and self identification of strengths and weaknesses, all leading to better practice by the student. Preceptors have found this pedagogy useful in guiding students to learn, and at the same time, have found that the students help the preceptor with meeting the needs of the nursing unit. For example, after midterms, the preceptor suggests topics (i.e., new device being used) and then has the student present the ABCs during staff meetings or make a one page ABCs information sheet on the topic for display on the unit.

Learning nursing through an established culture and a team approach can ensure excellence in patient care and, over time, produce nurses that achieve expert status [20]. The ABCs are one way for professors/preceptors to develop students clinically and support the goals of nursing education [17, 21]. This pedagogy allows the student to be evaluated from novice, to advanced beginner, to competent, proficient and all the way through to expert. It is known that students do not learn

critical thinking skills or professionalism by discipline-specific content, but rather they learn by experiential practice [22]. These skills require practice and continuous evaluation and reflection as the skills vary during the years of nursing education, and the growth of critical thinking skills is heterogeneous rather than homogeneous [23, 24]. Hence, an educational, evaluative pedagogy must be able to be individualized because patterns of change vary depending on the level of critical thinking each student brings. The ABCs meets this need.

The literature [25] reveals that when students were able to learn at their own speed they had higher scores in conceptual knowledge and performance skills as well as lower scores in ignorance. The ABC's as a self paced but timed pedagogy may lead to the same outcomes though research needs to include these specific outcomes when further testing the ABC's.

The literature supports an evidence-based, focused, interactive teaching strategy as a mandatory competency and an effective way of improving knowledge [26]. Using evidence-based practice knowledge equips students with skills and fosters positive attitudes to sustain life-long learning [27]. The "E" of the ABCs enhances the student's knowledge and environment for professional learning, supports the value of best patient care and, at the graduate level, adds to the ability to critique research and to identify gaps for potential scientific inquiry.

A recent study [28] noted that evidence-based practice (EBP) is recognized as valuable to both students and preceptors, but is underutilized due to lack of time, resources and authority to change practice. The "E" part of the ABCs necessitates the use of EBP, placing the burdens of time and resources on the student. With the student obtaining the research article, the professor/preceptor has the article in hand and has the ability to evaluate the article as current and to evaluate the quality of the synopsis. This leaves the professor/preceptor with the ability to lead each student into areas of research that are mutually beneficial. The authority to change practice can be easily incorporated into the student's leadership role and the preceptors' committee role, as appropriate. This study also supports other studies regarding implementation of EBP into clinical as it increases relevance of EBP to clinical practice and increases understanding of issues associated with protocol development and implementation.

The challenge of creating a process for learning in education [29] is that the process must be adaptable to learning styles and individualized in pace, meet established standards [17, 21], be applicable to complex care issues, and be valued, recognized and supported by users (students, professors, preceptors, healthcare providers). The ABCs pedagogy meets these process requirements based on verbal and written feedback to the authors. The student's clinical learning experience is critical to nursing practice as well as the practice discipline itself.

In graduate clinical settings, students should be applying higher level knowledge, including EBP, and enhancing their own skill and artistry within practice [30] to lead to an outcome of effective problem solving. This is essential for the entire continuum of care from prevention to end-of-life. The application of nursing knowledge to clinical outcomes is well established [31-35]. The ABCs pedagogy is one avenue to apply knowledge towards effective problem solving for obtaining positive outcomes in best patient care.

The advantages of the ABCs pedagogy are numerous (see Table 2) and include increases in analysis (complex cognitive task that involves a mapping operation [52], explanation (increased ability to explain situations and concepts to individualize patient care, evaluation (assessing credibility of statements and logical strength of relationships among statements [52], inference (identifying and securing elements needed to draw reasonable conclusions and to form conjecture and hypotheses [52] and reflection (where the student can analyze their thinking). Most notably, it integrates book knowledge into clinical, promotes contextual learning, is easy to use, is applicable to levels of individualized students understanding, promotes and gains insight into critical thinking, promotes oral communication, is a way to gauge and evaluate growth, uses a systematic approach, and is student and faculty/preceptor centered and useful across all programs. For faculty, the greatest advantage is that the approach can be individualized and paced, and it becomes more and more advanced and refined with time. Due to the increased use of knowledge and synthesis [36], the ABCs lead to easy and

comprehensive student evaluation. The disadvantages are that it requires faculty/preceptors with a clinical knowledge base as immediate feedback and communication occurs, and students must be monitored so they do not use the same topic over and over again (sometimes a problem with undergraduates) or become fixated on the same concept (sometimes a problem with graduate students) which can detract from the breadth of knowledge. Overall, the ABCs are a way to address how information from a variety of sources is assimilated and synthesized. Richer knowledge can be created by the outcomes of synthesis from a consistent and guided format for learning which the ABCs pedagogy provides.

Table 2. Advantages through Clinical Observations Using ABC's Pedagogy

Areas within Nursing Discipline	Advantages Increased by ABC Usage
Research	Inference, research utilization
Professional	Professionalism, reflection, environment for professional learning
Care	Prevention, early detection, interpretation, explanation
Thinking process	Knowledge, problem solving, evaluation, critical thinking, clinical reasoning, analysis

Outcomes expected for the ABCs are the same as those for other clinical nursing pedagogies. Outcomes include enhanced clinical care based on individualized synthesis of information and knowledge, increased critical thinking and oral communication skills, empowerment, engagement with other healthcare providers [37] and the promotion of practitioners who will continue to use research [9]. Currently for graduate nursing students (see Figure 1) the data pool from course evaluations on the ABCs pedagogy is small (N=8), but shows increased clinical care, critical thinking and use of research. Data after graduation from online search engines reveals that 87.5% of all graduate students (N=8) continue to use or be active in publications of journal articles, books, chapters and presentations at the local, national and international levels. Undergraduate students' (n =37) clinical evaluations, that contained non-identifiable data, rated the pedagogy excellent (98%) and they continue to use the "E" in other clinical course discussions per discussions of this primary author with other clinical faculty.

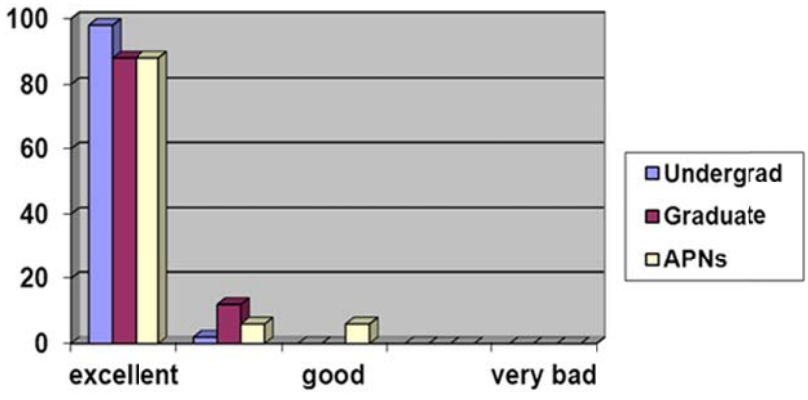

Figure 1. Evaluation of ABC's pedagogy by students and preceptors

Today there are a variety of methods to assess student learning and evaluate outcomes. These include reflective journals[38], critical thinking [39], competency based learning [40] and formative and summative evaluations [41]. The ABCs use reflection at times and critical thinking consistently; evaluation by students and professors/preceptors is ongoing. This

pedagogy has a high (> 8 out of 1-10 scale) outcome measure of satisfaction by students and faculty. All data had no personal identifiers.

What is needed besides a pedagogy that can be used throughout all clinical levels within nursing is one that actually prepares students to care for patients with the necessary resources and references [42] and within an environment of reality. The ABCs are specific to each individualized patient, student and clinical situation and are based in reality and easily understood by other professionals.

Communication of nurses with other healthcare providers must be in a language that is similar. The ABCs include all languages (diagnoses, signs, symptoms, problems etcetera) to make communication more effective and efficient. Faculty/preceptors also need the opportunity to evaluate individualized students' thinking and clinical judgment, which the ABCs provide [40]. This is especially important as students can enable other weaker students and with one-on-one oral ABCs presentation this enabling strategy becomes ineffective. The strategy of oral presentation of the ABCs by senior undergraduate and graduate students in post-conference gives the faculty the option of opening up the presentation to the other students thereby having learning occur for all at a higher level, as opposed to doing one-on-one presentations with faculty only for evaluation purposes. However, this pedagogy has its limits and the eventual one-on-one evaluation still needs to occur in the ABC process and is best accomplished at the beginning of clinical per the author's experiences. In this setting, the one-on-one is a safer environment for students, as the professor/preceptor is more likely to uncover misunderstandings or missed connections. For example, in "Best Care" (B of ABC's) the development of rationales and specificity for interventions such as "I & O q 1 hour related to sudden acute renal failure due to acute drug reaction to recent vancomycin administration, as evidenced by a serum creatinine value of 7.6 mg/dl" can be evaluated. Another concern of today's faculty in the clinical setting is the lack of time but the necessity for student feedback. With the ABCs there is immediate student feedback with oral presentations with minimal or no written work. This saves time overall for the professor, and the immediate feedback is noted as positive by the students. This pedagogy can also be used in telehealth clinical settings, which is an advantage. The downside is that clinically competent faculty/preceptors are needed to be able to implement the ABCs effectively.

The AACN [17] defines the parameter of the scholarship of teaching as inquiry that produces knowledge and places the focus of education on the learner. The ABCs include both of these parameters. The NLN [21] identifies three competencies related to scholarship and evidence-based practice: teaching strategies, ways to assess and evaluate student learning in the clinical setting and student development through dissemination of knowledge. The ABCs address all three of these competencies.

In summary, although the literature is not replete with rigorous research in staff [22] or student development there is a need to move forward with a change in pedagogy from the models of the 1930's based on learning needs and changes in environments. The development of new pedagogies for clinical teaching need to include knowledge, critical thinking and decision-making, as well as the ability to save time [43], while being effective to positive outcomes of learning and passing the state board National Council Licensure Examination (NCLEX). Although the literature states many areas to be considered in developing new pedagogies within education and rationales for the need for them in clinical nursing education specifically, there are no new pedagogies developed except for the ABCs in the last several years. The discipline of nursing must meet the needs of the profession if we are to maintain excellence in patient care.

3 Methods

3.1 Purpose

The purpose of this study is to evaluate a new educational pedagogy, termed ABC's, to aid in critical thinking for graduate and undergraduate students in clinical areas, and have that pedagogy understandable and easily communicable to healthcare providers of all professions. The ABC's educational pedagogy yields information specific to patient care settings and provides an ideal opportunity to discuss nursing diagnoses, issues and problems with students and to render immediate feedback. In the senior undergraduate year it replaces care plans and care maps, and can be initiated in written

format with progression to verbal format throughout the senior undergraduate year. The verbal presentation of the ABCs can be initiated immediately in graduate nursing programs.

3.2 Ethics

This study was exempt from review as it is a category #1 study where it is based on the collection of non-identifiable data and was conducted in commonly accepted educational settings and involved educational practices.

3.3 Selection

The population was a convenience sample of students who were in undergraduate and graduate clinical nursing courses in one university in the southeastern United States. All students had previous experience with care plan development in their curriculum but were naïve to the ABCs pedagogy. Staff nurses and advanced practice nurses who worked directly with the students or were their actual clinical preceptors volunteered for the study and had experience with care plans but were naive to the ABCs pedagogy. There were no subjects who refused to be in the study.

3.4 Validity assessment

The Likert scaling method is ordered and unidimentional, as is the concept of rating the ABCs pedagogy where the respondent chooses one option that best aligns with their view. A Likert scale typically has 4 to 7 labeled options, with 5 options being the most common. We had a 5-point labeled option Likert scale that also had the typical neutral value ("neither good nor bad way to learn"). The 5-point labeled option Likert scale included responses of 1 = excellent way to learn, 2 = very good way to learn, 3 = neither good nor bad way to learn, 4 = bad way to learn, 5 = very bad way to learn. We also scored the scale based on assigned numbers (i.e.: 1= excellent way to learn, 5 = very bad way to learn) so the range of scores was 1 thru 5. The 5-point labeled option Likert scale was not validated but it was an assumption of the study that the students and nurses had a working knowledge of such a scale as all students and nurses had at least one research course.

3.5 Study characteristics

This convenience descriptive study evaluated a new pedagogy for 37 undergraduates, 8 graduate students and 17 clinical preceptors/staff nurses in acute care settings in the southeastern United States. All students and nurses were given a handout describing the steps of the ABCDE (ABCs) pedagogy, inserviced for 15 minutes using 2 examples and a question and answer session followed. All were informed that 2-3 topics per patient were to be completed daily and the professors cell phone number given to all for any questions. Also the professor answered questions when making clinical rounds. Students presented their ABC's on their patients to their faculty, assigned staff nurse or preceptor and gained feedback and then presented them in post-conference with immediate faculty and fellow student feedback. All students and nurses were given the Likert scale at the end of the 15-week semester to evaluate the ABC's pedagogy. Completing the scale was voluntary.

4 Results

Based on course evaluations with non-identifiable data, students and nurse preceptors in hospitalized specialty units rated the ABC's pedagogy on a 1-5 Likert scale (1= "excellent way to learn" to 5 = "very bad way to learn"). Results (see Figure 1) for undergraduate students (N = 37) included 98% rated as excellent and 2% very good. For graduate students (N= 8) 88% rated as excellent and 12% very good. Staff nurses and advanced practice nurse preceptors (N =17) rated the format 88% excellent, 6% very good, and 6% neither good nor bad. The professor received 4 phone calls from students and was asked questions by nurses 3 times when making clinical rounds concerning the ABCs pedagogy. The questions were simple being content and process oriented. There was no significant change in state board National Council Licensure

Examination (NCLEX) scores for undergraduate students post graduation as there remains a >90% pass rate at our college of nursing.

5 Quantitative data synthesis

Results were combined for all undergraduate and graduate students and nurses who were in different acute care settings using the ABC's pedagogy. There was no missing data and no one chose to leave the study. Data was analyzed using Microsoft ® Excel 2007 which followed a self developed code book. All data was reviewed twice including the descriptive statistics.

6 Discussion

The ABCs pedagogy for use in clinical care is a way to evaluate undergraduate and graduate students' thinking, and to facilitate learning during clinical practicum. It offers a systematic approach, includes the benefit of real-time questions/answers between the professor/preceptor and students and incorporates evidence-based practice into individualized patient care. The listing of complications and assessment criteria also assists the students in the inclusion of prevention and early detection. Other advantages include the means of keeping up with the ever changing literature, research, knowledge and evaluation of complications of treatment and the ethical decisions associated with patient care. Preceptors have found this pedagogy extremely helpful because it keeps the preceptor and staff updated and assists with the needs of projects/concerns/problems at the unit level. By verbalizing the ABCs the professor can immediately evaluate the student's breadth and depth of knowledge, synthesis, as well as critical thinking. The depth of knowledge regarding current medications can also be assessed and evaluated. Further research needs to be carried out using this pedagogy, but preliminary data is extremely promising.

The ABCs are one way to better prepare nursing students in areas of communication, critical thinking, providing care in clinical experiences, discussion of ethical and professional issues, as well as affording one-on-one time with the clinical preceptor/professor and promoting exponential learning in a pre- and post-conference environment. These same areas of preparation are found in the gerontological clinical setting [44]. From an academic perspective, the ABCs are easy to implement in the clinical setting, provide immediate feedback and are supported by students and preceptors/professors. The ABCs enhance students' known clinical strengths and builds on learning at their pace and with their own style. If this pedagogy can be introduced into practice nationally, then there will be an avenue for better understanding and communication at the clinical setting and help in closing the theory-practice gap on EBP. The ABC pedagogy is groundwork for exponential growth in clinical education. The timing is right for implementation based on the need for the development and/or refinement of clinical strategies, clinical culture and student/faculty positive evaluations of the ABCs.

The ABCs needs further refinement and research measuring each individual repeatedly over time. It holds great promise as a teaching strategy and evaluation method whose importance lies in the fact that the heart and soul of nursing education is clinical practice.

The use of the ABCs pedagogy has several positive implications for practice. As an evaluation method of undergraduate students in medical-surgical areas and graduate nursing students during acute and critical care rotations, using a Likert 1-5 scale, it is well received and was found to elicit a wealth of information per the authors in a standardized and succinct format. The ABCs are versatile to a breadth and depth of topics, enhance clinical outcomes and are applicable to any subspecialty in patient care and to any setting. These authors have found many positive outcomes associated with the ABCs in teaching students (see Table 2). Although the implementation of this pedagogy included small numbers of total undergraduate students there was not any significant change in state nursing boards (NCLEX) scores, our schools' NCLEX scores remained high (> 90%).

7 Limitations

The major limitation is a small convenience sample in one state in the United States. However, further continuation of data collection is taking place now and preliminary analysis reveals high student, faculty and preceptor satisfaction. Other limitations include the use of a non-validated Likert questionnaire and the subjective evaluation of the pedagogy by only 3 nursing professors who may be a source of bias as one invented the ABC's pedagogy.

Conflict of interest statement

Each author certifies that she has no commercial associations that might pose a conflict of interest in connection with the submitted article.

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