

Digital Evaluation Pedagogy for On-line, Simulation or Face-to-Face Clinicals

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ABSTRACT

Purpose: A new digital health clinical evaluation pedagogy has been developed and tested in nursing, called the ABCDE's, that aids in student learning and is advantageous in the implementation of delivering care. If we are to progress in both the science and art of clinical nursing and meet the demands of the Covid-19 online clinical teaching environment we must have new approaches to teaching and evaluation that translate theoretical knowledge to clinical practicum via clinical thinking.

Explanation: After a clinical topic is chosen (eg: diagnosis, medication, issue) an oral and/or written ABCDE pedagogy includes; A: Anatomy & physiology, B: Best care, C: Complications, D: Drugs, E: Evidence based practice.

Summary: The ABCDEs are one way to better prepare nursing students in areas of communication, critical thinking, providing care in intensive clinical experiences (on-line, face-to-face, simulation), discussion of ethical and professional issues, as well as afford one-on-one time with the clinical preceptor/professor and exponential learning in a pre- and/or post-conference environment.

Clinical relevance: The ABCDE approach for use in clinical care is a way to evaluate students thinking and facilitate learning during clinical practicum, either on-line, face-to-face or in the simulation environment using an oral and/or digital platform. It offers a systematic approach, includes availability of asking questions on the professor's, preceptor's, and student's part and is a way to include evidence-based practice into individualized patient care.

Keywords

Clinical, Digital, Care plans, Simulation. Covid.

Introduction

There is a need for clinical evaluation methods in today's increased online curriculum in nursing and healthcare due to the Covid-19 academic environment. The new innovative digital health pedagogy, acronym ABCDE, evaluates information, synthesis, critical thinking, individualized care planning, and oral and/or written communication of nursing students and becomes the foundation in the implementation of the delivery of care to patients. The pedagogy is adaptable to online and face-to-face

clinical, including simulation, and is applicable to all healthcare professionals. This article focuses on the use of the ABCDE pedagogy in nursing.

Evaluation of nursing student knowledge, synthesis and critical thinking in the clinical area is essential for faculty as there is a growing body of research, high patient acuity, limited time, required higher-order thinking, a faculty shortage [1,2] and a change in the teaching environment due to Covid-19. A new evaluation pedagogical approach has been designed and tested that organizes information in a systematic fashion based on a selected topic and can be presented in both verbal or written formats [3,4]. A selected

topic can be a sign or symptom such as chemotherapy induced nausea and vomiting (Table 1), condition, medication such as docusate sodium (Table 2), medical diagnosis, nursing diagnosis such as Acute confusion related to renal disease as evidenced by hypertension, problem such as occlusion alarm on IV pump (Table 3), or issue (i.e.: ethical, legal, treatment choice).

Purpose

The most widely used model to educate nurses was developed in the 1930's with little change in today's environment [5]. If we are to progress in both the science and art of clinical nursing and meet the demands of Covid-19 online clinical teaching environment we must have new approaches to teaching and

Topic (Sign/Symptom) = Chemotherapy Induced Nausea & Vomiting (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 (ie: chemotherapy) 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 hemocult 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, 32 mg orally 30-minutes prior to chemotherapy and during 2-hour chemotherapy treatment.

- Half life is 2-3 hours.
- Alternative could be 5-HT3 medication granisetron HCL (Kytril®), palonosetron (Aloxi®).
- 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.

E: Latest research = New tool, Multinational Association of Supportive Care in Cancer (MASCC) has developed an 8-item scale (Yes/No and 2 questions with visual analog scales) to assess acute and delayed nausea and vomiting (Molassiotis et al., 2007). My patient scored high on both visual scales. Critique includes reliability Cronbach's alpha coefficient 0.77 (N=87), content and face validity and factor analysis showed 3 defined factors of vomiting, acute nausea and delayed nausea. Populations were from UK and USA so results not generalized. My patient filled out questionnaire and verbalized no problems with comprehension and said it was easy to use. I am learning how to score and use the tool results now and will share those with my classmates.

Table 1: ABC's of a sign/symptom

Topic (Medication) = docusate sodium, dioctyl sulfosuccinate, (Colace®)

Anatomy and Physiology:

- 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 as this is an OTC medication.
- Liquid form used off label to soften ear wax.

Best Care:

- Given mostly patients on narcotic analgesics.
- Do NOT give if nausea, vomiting, signs of acute abdomen, allergic to docusate or dehydrated (make sure elderly can drink 6-8 glasses liquid per day for medication to work efficiently).
- Expect results in 24-48 hours with proper hydration (6-8 glasses liquid/day).
- Adverse reactions = cramps, skin rashes, throat irritation. Assess color, consistency, amount of stool, abdominal distention, bowel sounds x 4 quadrants.
- With long-term dependence assess electrolyte imbalances; serum Na⁺, Cl⁻, K⁺.
- If cardiac patient teach to avoid Valsalva maneuver.
- Consider sennoside or Senna glycoside (Senna™) instead of docusate sodium in hospitalized cancer, renal and heart failure patients and elderly who do not have intake of 6-8 glasses liquid per day.

Complications:

- Dependency on medication and electrolyte depletion.

Drugs:

- 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 this increases absorption of Colace.

Evidence-Based Care:

- One randomized controlled study (Singer, Sauris, & Viccellio, 2000) found docusate sodium superior as a cerumenolytic (a wax softening agent).
- One study (McRorie, Daggy, Morel, Diersing, Miner & Robinson, 1998) found psyllium superior to docusate sodium for treating chronic constipation. This study was funded by a company in the USA.
- One review article (Fakheri & Volpicelli, 2019) reveals that multiple randomized controlled trials show no efficacy of docusate over placebo.

Table 2: ABC's of a medication.

Topic (Nursing diagnosis) = Acute confusion related to renal disease as evidenced by hypertension.

- **Anatomy & physiology:** Renal artery stenosis releasing hormones to retain sodium and water; blood pressure goes up. Also, renal arteries can narrow from atherosclerosis adding to confusion.
- **Best care:** Sx/Sy: H/A, confusion, vision blurry, pink urine, nosebleed.
 - Assess BP every 30 minutes x 2, then hourly x2, then every 2 hours x 2, then every 4 hours.
 - Side rails up x 3 and patient rounds every 30 minutes x 2, then hourly.
 - Assess laboratory values of serum creatinine and blood urea nitrogen.
 - I&O every 8 hours.
 - Renal diet.
 - Neurological assessment with hand grips and leg movement every hour x2, then every 4 hours.
 - Possible medical treatments = ACEI, ARBs, angioplasty, stenting, bypass renal artery by surgery, CT, MRA, CO2 angiography.
- **Complications:** Renal failure, stroke.
- **Drugs:** ACEI or ARBs & if patient taking them.
- **Evidence based practice:** Contrast enhanced magnetic resonance angiography (MRA) NOT to be used in known renal disease as gadolinium causes nephrogenic systemic fibrosis (Sam et al, 2003).

Atherosclerosis accounts for 90% of renal-artery stenosis (Safian & Textor,2001).

Table 3: ABC's of a nursing diagnosis.

evaluation that translate theoretical knowledge to clinical practicum via clinical thinking.

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 that can be used at all clinical levels [6] as well as in multiple settings and between disciplines in healthcare. 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 [7,8].

Based on faculty demands, exponential information and patient complexity a systematic, easy, flexible and immediate feedback approach was needed for evaluating students in clinical practice (on-line or face to face) and the simulation environment.

This article will focus on a new pedagogy for clinical teaching of undergraduate nurses (digital format) though it has also been used successfully in graduate education (oral format).

The ABC's pedagogy is a systematic approach to clinical learning and evaluation at both the undergraduate and the graduate levels for all clinical courses irrespective of novice or expert status. To use the ABCs pedagogy, you first choose a topic, then the A, B, C, D, E's are student developed and presented either in written or oral formats.

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

B = Best care. This includes prioritized assessment, interventions

and discharge care as well as laboratory and diagnostic tests, treatments, transportation issues, consultations.

C = Complications. A prioritized list of actual or potential complications for which the nurse will perform an assessment. The assessment for the complications must be found in the "B" section and be individualized.

D = Drugs. This is a list of patient medications or drug categories associated with the topic. Includes prescribed, over the counter (OTC), 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 (Table 2).

E = Evidence-based practice. At least one article on the topic within the last 5 years, if applicable, that has a direct relationship to the patient and evidence as to how the student includes this article in patient care. The article should also be critiqued at the graduate level.

Review of Literature

Clinical practice is significant for the professional development of nursing students [9] because it enhances critical thinking and problem-solving skills [10], yet few evaluation methods are practical, effective and efficient. Generic features of a nursing program include the use of knowledge, critical thinking, professionalism, research skills and change management [11]. High quality clinical practice requires clinical reasoning and judgment based on knowledge and synthesis that can be obtained through evaluation. The ABCDE approach 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 [12], includes interpretation, analysis, evaluation, inference, and explanation [13] and is social and dialogical [14].

The ABCDE approach includes avenues for critical thinking including interpretation and analysis of laboratory data, evaluation of best care and individualized interventions, and inference and explanation of sequalae. The pedagogical approach 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 can also be used for reflection [15] 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.

Learning nursing through an established culture and a team approach can ensure excellence in patient care and over time produces nurses that achieve expert status [16]. This approach allows the student to be evaluated from novice, to advanced beginner, competent, proficient, and through to expert. It is known that students do not learn critical thinking skills or professionalism by discipline-specific content, but rather learn by experiential practice [17]. These skills require practice and continuous evaluation and reflection as the skills vary during the years of education and the growth of critical thinking skills is heterogeneous rather than homogeneous [18]. Hence, an educational evaluative approach must be able to be individualized because patterns of change vary depending on the level of critical thinking each student brings. The ABCDE approach meets this need.

The literature supports an evidence-based focused interactive teaching strategy as a mandatory competency and an effective way of improving knowledge [19]. Using evidence-based practice knowledge equips students with skills and fosters positive attitudes to sustain life-long learning [20]. The “E” of the ABCDE approach enhances the student’s knowledge and environment for professional learning, supports the value to do the best for the patient, and for graduate nurses adds to the ability to critique research and to identify gaps for potential research.

A study by Morris & Maynard [21] 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 ABCDE approach necessitates the use of EBP placing the burdens of time and resources on the student. With the student obtaining a research article the professor/preceptor has the article in hand/on-line and it is current and synopsisized. 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 [22], and in particular in nursing education [23], is that the process must be adaptable to learning styles and individualized in pace, meet established standards (i.e. AACN, NLN), be applicable to complex care issues, and be valued, recognized and supported by users in today’s teaching environment (students, professors, preceptors, healthcare providers). The ABCDE pedagogy meets these process requirements. The student’s clinical learning experience is critical to nursing practice as well as the discipline.

In some clinical settings students should be applying higher level knowledge, including EBP, and enhance their own skill and artistry within practice [24] 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 [25-30].

The advantages of the ABCDE approach is that 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 and digital communication, is a way to gauge and evaluate growth, is a systematic approach and is student and faculty/preceptor centered and useful across all types of clinical (simulation, face-to-face, on-line), programs and disciplines. For faculty the greatest advantage is that the approach can be used with on-line teaching, individualized and paced and it becomes more and more advanced and refined with time.

Due to the increased use of knowledge and synthesis [31] the ABCDE leads 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 breadth of knowledge. The student keeps a digital list of all ABCDE topics to have available to all clinical faculty throughout their program. Overall, the ABCDEs are a way to address how information from a variety of sources is assimilated and synthesized. A richer knowledge can be created by the outcomes of synthesis from a consistent and guided format for learning.

Outcomes expected for the ABCDEs are the same as those for other clinical nursing pedagogies. Outcomes include increased clinical care based on individualized synthesis of information and knowledge, increased critical thinking, oral and written communication skills, empowerment, engagement with other healthcare providers [32] and the promotion of nurses who will continue to use research [8]. Today there are a variety of methods to assess student learning and evaluate outcomes such as reflective journals [33], critical thinking [34], competency-based learning [35] and formative and summative evaluations [36]. The ABCDEs uses reflection at times, critical thinking consistently and evaluation by students and professors/preceptors is ongoing.

What is needed besides a pedagogy that we can use throughout all clinical levels and settings within nursing is one that actually prepares students to care for patients with the necessary resources and references [37] and within an environment of reality. The ABCDEs are specific to each individualized patient, student and clinical situation and are useable and effective in today's Covid-19 on-line teaching environment.

Communication of nurses with other healthcare providers must be in a language that is similar. The ABCDEs includes all languages (diagnoses, signs, symptoms, problems, research) to make communication more effective and efficient. Faculty/preceptors also need the opportunity to view individualized students thinking and clinical judgment [38,39] which the ABCDE's provides. This is especially important as students can enable other weaker students and with the one-on-one oral ABCDEs this strategy becomes ineffective. The strategy of oral presentation of the ABCDEs by students in pre- and/or post-conferences 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 or digital write-ups for evaluation purposes. However, this pedagogy has its limits and the eventual one-on-one evaluation needs to occur in the ABCDE process. In particular, 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 ABCDEs) you can evaluate the development of rationales and specificity for interventions such as "I & O every 1 hour due to sudden acute renal failure, serum creatinine 9.6, as evidenced by acute drug reaction to cisplatin chemotherapy".

Another concern in today's faculty clinical schedule is lack of time, necessity of online clinical and the need for student feedback. With the ABCDEs you have immediate student feedback with oral/written 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. The downside is that you need clinically competent faculty/preceptors to be able to implement the ABCDE's.

The American Association of Colleges of Nurses (AACN) [13] defines the parameter of the scholarship of teaching as inquiry that produces knowledge and places the focus of education on the learner. The ABCDEs includes both these parameters. The National League for Nursing (NLN) [40] identifies competences related to scholarship and evidence-based practice that includes teaching strategies, ways to assess and evaluate student learning in the clinical setting and student development through dissemination of knowledge. The ABCDEs encompasses all these competencies.

Summary

The ABCDE's pedagogical approach for use in clinical care is a way to evaluate students thinking and facilitate learning during clinical practicum, either on-line, face-to-face or in the simulation environment. It offers a systematic approach, includes availability

of asking questions on the professor's/preceptor's/student's part and is a way to include evidence-based practice into individualized patient care. The listing of complications and assessment criteria assists the student in prevention and early detection, which is particularly essential to nursing care. Advantages of this pedagogy for nurses are 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 on the unit level. By verbalizing and writing the ABCDE's 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.

Conclusions

The ABCDE pedagogy is one way to better prepare nursing students in the areas of communication, critical thinking, providing care in intensive clinical experiences (on-line, face-to-face, simulation), discussion of ethical and professional issues, as well as afford one-on-one time with the clinical preceptor/professor and exponential learning in a pre- and/or post-conference environment [41]. From an academic perspective the ABCDEs are easy to implement in the clinical setting, provides immediate feedback and is supported by students and preceptors/professors. It enhances students' known clinical strengths and builds on learning at their pace and with their own style. Introducing this pedagogy into clinical practice will provide an avenue for better understanding, evaluation, and communication at the clinical setting and help close the theory-practice gap on EBP. The ABCDE pedagogy is groundwork for exponential growth in clinical education in all disciplines. The timing is right for implementation based on need for development and/or refinement of clinical strategies, clinical culture, and student/faculty positive evaluations of the ABCDEs [40].

The ABCDE approach may need further refinement and can be enhanced by additional research measuring each individual repeatedly over time. It holds great promise as a teaching strategy and tool whose importance lies in the fact that the heart and soul of nursing education is clinical practice.

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