Development of an Internet-based Substance Abuse Continuing Education Course for Practicing Registered Nurses.

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Abstract
Substance abuse continues to be a health care issue. Traditional baccalaureate nursing education does not provide an adequate amount of instruction in substance abuse issues. There is a need for an educational tool for substance abuse topics to fulfill the gap between undergraduate nursing education and clinical setting. Practicing nurses may need an intervention to increase their knowledge regarding substance abuse topics.

In order to understand curriculum differences between different schools of nursing data was collected from thirty four schools of nursing in the state of North Carolina. Based on the analysis of the collected data an Internet based continuing education course was created for registered nurses to fulfill the gap in knowledge regarding substance abuse issues.

A total of twenty one nurses participated in the course and pretest and posttest results were analyzed during the evaluation phase of this project. The evaluation of the project’s effectiveness was based on determining the progress participants made after taking this course. The pretest and posttest in the course were identical. The differences in pretest and posttest scores of course participants were tested using a paired t-test. The participants showed significant increase in knowledge after taking Substance Abuse Continuing Education Course for Registered Nurses. The mean score for the posttest (87.7) was statistically significantly higher (p < .01) compared to mean pre-test score of 68.0.

The project evaluation revealed a statistically significant increase in knowledge regarding substance abuse issues after taking the course. While designing this course an attempt was made to carry out a comprehensive evaluation of the topics related to substance abuse that may be of importance for the registered nurse and include those topics into the course.

Keywords: Substance abuse, Nursing education, Distance learning, Continuing nursing education, Substance abuse education, Nursing, Nursing education, Substance abuse.
Registered Nurses

1. Introduction
Substance abuse is a significant health care issue. It may lead to a considerable increase in health care costs as well as have substantial societal consequences. For instance, health care costs associated with prescription opioids abuse alone were $23.7 billion in 2007, while total societal costs were estimated at $55.7 billion (Birnbaum et al., 2011). Substance abuse may also have negative consequences for people who are affected by this disorder. This negative impact may be reflected in a reduced life expectancy and reduced productivity (Smyth, Jing, & Yih-Ing, 2006). In spite of the existence of effective treatments for substance abuse, substance abuse disorders often may be undiagnosed or undertreated (Banta & Montgomery, 2007).

Dealing with those who have substance abuse issues is a team effort. Nurses are critical members of the healthcare team and while many are employed in the mental health setting, nurses working in the medical-surgical, intensive care, oncology, and general medical fields must also work with patients with substance abuse problems. This structure assumes that nurses are educated and trained to recognize substance abuse and work with patients who have substance abuse problems. This assumption may not be valid as nursing programs typically devote very few hours to substance abuse and clinical training regarding substance abuse is offered in very few schools. Only a small number of nursing programs discuss legal, community teaching, and public health issues related to substance abuse (Howard, Walker, Walker, & Suchinsky, 1997).
2. Literature review

McLaughlin and colleagues (2000) report that even though nurses receive some formal training regarding substance abuse issues, in a practice setting nurses may be perceived by patients as lacking knowledge about substance abuse as well as lacking compassion and understanding in general when dealing with patients who have addictive disorders. Providing education and training in substance abuse may enable nurses to provide higher quality of care as well as being able to address risks associated with substance abuse (Peckover & Chidlaw, 2007).

Kelleher and Cotter (2009) surveyed 145 physicians and nurses from emergency room departments in three university teaching hospitals in Ireland. The study participants were asked to fill out a questionnaire to evaluate their knowledge and attitude toward drug addiction. The response rate was 46%. In general participants reported a high confidence level regarding their level of knowledge of alcohol abuse; conversely they reported a low level of confidence regarding their knowledge of other addictive substances. In that study the researchers found that health care providers have a knowledge deficit regarding interventions for substance abuse. Their recommendation was to organize educational workshops for emergency room personnel, as well as perform a review of undergraduate and graduate health care substance abuse education for healthcare providers. The researchers recognized the small size of the sample as a limitation and recommended a national study of the attitudes and knowledge level regarding substance abuse among emergency department nurses and physicians.

Continuing education may provide a feasible alternative and may fill the knowledge gap regarding substance abuse. In 1997 Graham and colleagues, using a pre/posttest control group design, found that nurses who underwent substance abuse training expressed a higher level of competence regarding the care of patients with substance abuse problems three months after the completion of the program. At the same time, nurses in the control group who participated in the workshop without a substance abuse component exhibited a decrease in their competence level regarding substance abuse issues within the three-month period. Both groups participated in a 3-day educational workshop, while nurses in the control group in addition to the workshop material received an extra six hours of chemical dependency content.

Continuing education may be provided by utilizing traditional methods such as lecture as well as distance learning or web-based instruction methods. Reinhold and colleagues (2010) evaluated the effectiveness of an internet based educational module regarding substance abuse and drug diversion. The content of the module included a voice narrated Power Point presentation devoted to the topics of drug diversion, controlled substances, federal regulations, and the pharmacist’s function in diversion recognition and prevention. The module was preceded with a 10-question pretest. After completion of the module students were asked to complete a post-test, which was identical to the pretest. They found that students enrolled in a web-based educational module about substance abuse showed a 20% median gain in their knowledge.

Hoffman and Heinemann (1987) surveyed 336 schools of nursing. The surveyed schools included 154 baccalaureate, 126 associate, and 56 diploma programs in the United States. The study revealed that most undergraduate nursing programs devote from one to five contact hours to substance abuse in the entire undergraduate nursing curriculum. The time devoted to substance abuse topics may be considered rather insignificant considering that on average undergraduate nursing curriculum consists of nine hundred contact hours.

The main focus of the universities is the provision of undergraduate and graduate education. Nevertheless, successful collaboration between an educational institution and healthcare facilities is possible. Universities may provide continuing education courses for practicing nurses who are not enrolled in a regular undergraduate or graduate curriculum. An example of one such program is Project SAEL (Substance Abuse...
Education Liaisons) organized by University of Texas Houston School of Nursing faculty (Marcus, Rickman, & Sobhan, 1999). During that project the nurses attended 18 workshops to fill the gap in their knowledge related to substance abuse issues; the project was considered a successful model that may be followed by other educational institutions and healthcare facilities. Substance abuse continuing education may be utilized in different healthcare settings. While psychiatric nurses, nurses employed in drug rehabilitation centers and nurses in acute setting will be the main beneficiaries of this type of education, nurses in the emergency department and primary care settings may gain essential knowledge applicable to their clinical settings.

One study describes an intervention designed to improve provider expertise in substance abuse area of interest, enhance provider communication with the client with substance abuse problems and to improve provider screening skills for substance abuse related problems (McCoy, Messiah, & Zhao, 2002). All groups in the above study showed significant improvement in their knowledge level when pretest and posttest results were compared. The study suggested that with increased knowledge about chronic drug use providers may provide better service to patients with substance abuse problem.

Often substance abuse coincides with domestic violence. Nurses may lack formal education to recognize that correlation. Yonaka and colleagues (2007) identified that nurses desire to learn screening techniques for cases of domestic violence.

Based on the literature review, we concluded that traditional nursing education at the baccalaureate level does not provide an adequate amount of instruction in substance abuse issues. Thus there is a need for an educational tool for substance abuse topics to fulfill the gap between undergraduate nursing education and clinical setting.

In summary, continuing education courses dedicated to substance abuse may provide adequate knowledge about substance abuse issues for practicing clinicians. Comparison of pretest and posttest scores after continuing education activities usually reveals improvement in provider’s knowledge level regarding substance abuse. Additionally computerized/web-based continuing education substance abuse courses may represent a realistic alternative to a traditional classroom environment. There is evidence that participants in computerized/web-based continuing education courses have improved knowledge levels after taking the course.

Thus we anticipated that a computerized/web-based continuing education course devoted to substance abuse issues may provide practicing clinicians with knowledge about substance abuse that may result in overall improvement of the care for patients.

3. Project Objectives

The objectives of this project were:

1. To collect data from nursing programs in the state of North Carolina on the hours and topics covered in baccalaureate and associate degree nursing programs on substance abuse.
2. To create a series of CEU modules on substance abuse with pre/posttests assessments. That would be achieved by using the data from the survey of schools of nursing to develop the content for the modules.
3. To include into modules the content on current substance abuse statistics, DEA regulations, evaluation for substance abuse, community resources, and available options for treatment and referral.
4. To make CEU modules interactive and user friendly. That would be achieved by hosting the modules on the internet based Blackboard platform. The modules would include utilization of user friendly software such as Macromedia based StudyMate by Respondus.
5. To measure the change in knowledge of course participants after completing the modules. That would be implemented by performing paired t tests to measure changes in the means of the grades for pretest and posttest.

6. To use the data obtained from surveying schools of nursing as well as the data from the participants to further improve the course.

4. Organizational setting

Western Carolina University is a public university located in Cullowhee, NC. Along with undergraduate and graduate educational programs, the university offers continuing education courses. Western Carolina University is approved provider of continuing nursing education by the North Carolina Nurses Association. The North Carolina Nursing Association is as accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation (Western Carolina University, 2011).

5. Population

The course was offered through the WCU Continuing Education Department (CED) and was available for the registered nurses and nursing faculty virtually anywhere with internet access. The course was marketed through the WCU continuing education department. One hundred forty-five nurses were contacted via email sent from WCU CED. The potential participants were also contacted via social networking, by word of mouth, and referrals from the previous course participants. The course was offered free of charge. A total of twenty one nurses participated in the course and pretest and posttest results were analyzed during the evaluation phase of this project.

6. IRB Approval

IRB approval for this project was obtained from both WCU IRB and Duke University IRB. The following was discussed during the IRB approval process:

Participation in the initial survey (phase one) of the schools of nursing would be strictly voluntary. The faculty members participating in the survey would not be remunerated or otherwise rewarded. The survey would be generated using Qualtrics software and results stored on a secure server. The survey results would be considered confidential. The account for Qualtrics would be secure and password protected.

Participation in the substance abuse CEU course (phase two) to be developed using the data from the initial survey of schools of nursing would be strictly voluntary. In the second phase the posttest and pretest would be administered using Qualtrics software. The course would be available to RNs in the United States who need to meet continuing education to meet their respective Board of Nursing continuing education requirements. The course participants would have to meet inclusion criteria, possessing a current RN license and being over 18 years of age. The course participants would not be remunerated. The pretest and posttest data would be considered confidential and securely stored on Qualtrics server. The account to access data on Qualtrics server would be secure and password protected.

7. Intervention and Methodology

7.1. Phase One

There is ample evidence suggesting that practicing nurses may need an intervention to increase their knowledge regarding substance abuse topics. Schools of nursing are utilizing a similar undergraduate curriculum but it is expected that there will be curriculum differences between particular schools. In order to
understand those differences we proceeded with data collection from programs schools of nursing in the state of North Carolina.

Data collection was implemented through the email survey software platform Qualtrics hosted at WCU. The email survey consisted of ten questions inquiring about four areas of substance abuse education:

1. Hours of instructions for substance abuse education in general.
2. Clinical hours for substance abuse related rotations.
3. Availability of the content regarding issues of domestic violence in relation to substance abuse.
4. Availability of the content related to DEA activities and regulations.

In addition, an open response question was included that inquired about faculty suggestions to improve substance abuse education.

In September 2011 the survey was emailed to seventy-four undergraduate nursing programs in the state of North Carolina. The contact information was obtained from North Carolina Board of Nursing website. We intended to send the survey only to psychiatric-mental health instructors who were involved directly into teaching substance abuse content in NC schools of nursing. However, information for the mental health/psychiatric nursing instructors was not available for 10 schools of nursing so at that time the survey was emailed to the dean/director in the school of nursing.

Out of 74 email recipients 34 participated in the survey. This represents a 45.9% response rate. This is consistent with the web based survey response rate of 44.2% achieved by Cobanoglu and colleagues (2001) while comparing mail/phone based surveys with web/email based ones. The survey data was imported to the Statistical Package for the Social Sciences, Version 19. The following questions were included into the survey:

**Question 1.** Hours of instructions for substance abuse education in general. Twenty (58.5%) of the respondents reported that they spent 6 or less hours on substance abuse content in psychiatric mental health curriculum, while three (8.8%) reported spending less than 3 hours. All of the respondents reported that they discussed alcohol abuse related content.

**Question 2.** Clinical hours for substance abuse related rotations. Thirteen (38.2%) of the respondents reported dedicating 6-8 hours for clinical rotation time for substance abuse topics. Six (17.6%) reported dedicating 9-12 hours for clinical rotation time for the same topics while seven (20.6%) reported spending more than 16 hours.

**Question 3.** Availability of the content regarding issues of domestic violence in relation to substance abuse. While eighteen (52.9%) of the respondents reported discussing the domestic violence issues in the context of substance abuse six (17.6%) of the respondents reported that even though they cover that content they would like to spend more time on it (Table 1).

**Question 4.** Availability of the content related to DEA activities and regulations. Thirteen (38.2%) of the respondents reported that they do not discuss content related to DEA activities and regulations. At the same time twelve (35.3%) discuss controlled substances schedules in their classes (Table 2).

Twenty-five of respondents (73.5%) mentioned that they included in classroom discussion at least some content related to prescription drug abuse. Eight (23.5%) of the respondents reported that non-prescription illegal substance abuse topics are not included in the psychiatric mental health curriculum. In the meantime eight (23.5%) respondents reported that they do not discuss substance abuse issues that may be specific to the state of North Carolina, such as Methamphetamine abuse or production. Five (14.7%) reported that they would like to increase the share of such content even though they already discuss it. One respondent chose the answer that discussion of such content should be done on a national or a global level.
In addition to the above results of the survey twenty-five responses were transcribed for the open ended question about suggestions to improve substance abuse education. Three emerging themes were identified after reviewing the answers for this question:

1. Insufficient classroom time.
2. Need for up-to-date content.
3. Lack of expertise while teaching and developing substance abuse content. This may be divided into two subthemes:
   a. lack of faculty expertise in substance abuse.
   b. lack of involvement of external non-nursing substance abuse experts.

7.2. Phase Two

After the results of the survey from phase one were analyzed, the draft design for a course with a series of modules on substance abuse was outlined. At the same time an internet search for continuing education courses devoted to substance abuse offered nationwide was implemented resulting in a list of 25 CEU websites.

The inclusion criteria to determine available nursing offering included:

1. Course offers CEU credit.
2. Course specifically intended for nursing continuing education.
3. It is a substance abuse course.
4. Outline of the course objectives is offered prior to taking the course.
5. Course has current information.
6. References available for the information in the course.

The topics discussed in those courses were reviewed in order to avoid duplication of common themes in the course for this project. The review of the courses revealed that issues of domestic violence in relation to substance abuse, legal issues, and DEA activities are seldom offered in online nursing CEU offerings. Only two courses had information about these topics.

One of the themes that emerged from the analysis of the answers from the nursing faculty survey was the lack of involvement of external non-nursing substance abuse experts. To address that concern we discussed the course content with three consultants from the WCU Social Work, Psychology and Criminal Justice department. The course content developed reflects the recommendations from the consultants. The content’s relevance to current nursing practice was maintained by utilizing the standards outlined by the World Health Organization (2011) for treatment and prevention of substance abuse.

The final topics included into the course content were chosen based on a review of the results of the NC schools of nursing faculty survey, discussions with the project consultants, and the latest nursing practice recommendations. The course content was divided into three modules:

1. Substance Abuse and Domestic Violence
2. DEA and Current Drug Abuse Trends
3. Recognition and Treatment of Substance Abuse

The continuing education course was constructed using the principles of Bloom’s taxonomy. The information presented in the course was relevant to the cognitive domain of the taxonomy. Cognitive domain includes categories of knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, Englehart, Furst, Hill, &Krathwohl, 1956). Most of the material presented in the course pertains to the advanced categories of Bloom’s taxonomy: application, analysis, synthesis and evaluation.
Online learning courses offers convenience to practicing RNs in regards to time and place flexibility and does not diminish the effectiveness of the learning process as evidenced by one study suggested that those individual and instructional factors do not significantly affect e-learning (Halawi, McCarthy, & Pires, 2009).

7.3. Phase Three

This phase started in March of 2012 when the course was officially open for the enrollment. After final review of the course, approval was obtained from WCU Division of Educational Outreach. The course was offered through the Continuing Education Department (CED) at WCU. The course was offered on the CourseSites.com, which is a free course hosting environment based on the Blackboard platform (Blackboard, 2012). The Blackboard platform provides a flexible learning environment that allows students to access course content from virtually anywhere an internet connection is present (Blackboard, 2012).

In order to make the content of the course more interactive StudyMate Author 2.0 software was utilized. StudyMate Author 2.0 has the capability to create Macromedia-Flash based activities, such as quizzes and games that may be incorporated into course content hosted on the Blackboard platforms ("StudyMate Author 2.0," 2011). Another noticeable feature of StudyMate Author 2.0 is the capability to create applications downloadable to small screen portable devices such as iPod™ or iPad™. Utilization of CourseSites.com and StudyMate Author 2.0 allowed for the creation of an interactive and stimulating learning environment for continuing education students.

The learners were awarded eight hours of approved nursing continuing education credits after taking the course. The number of the awarded hours was determined after three expert nurses took the course. They reported that on average they spent eight hours to review the course materials, complete all interactive activities in the course, and complete pretest and posttest. In order to receive CEU credit participants must take the pretest and posttest and score at least 70% on the posttest and complete a course evaluation.

8. Evaluation and Results

The evaluation of the project’s effectiveness was based on determining the progress participants made after taking this course. The pretest and posttest in the course were identical. The differences in pretest and posttest scores of CEU participants were tested using a pared t-test.

The participants showed significant increase in knowledge after taking Substance Abuse Continuing Education Course for Registered Nurses. The mean score for the posttest (87.7) was statistically significantly higher ($p<0.001$) compared to mean pre-test score of 68.0 (Table 3).

9. Discussion

The project evaluation revealed a statistically significant increase in knowledge regarding substance abuse issues after taking the course. The fact that course participants’ mean pretest score was at 68% may suggest that undergraduate nursing curricula do not provide adequate knowledge regarding substance abuse. This compares with the findings of the initial survey of the undergraduate nursing faculty. The fact that participation in the course resulted in an increased level of knowledge regarding substance abuse issues may be related to the high content validity of the course. While designing this course we attempted to carry out a comprehensive evaluation of the topics related to substance abuse that may be of importance for the registered nurses. We adopted several different approaches that may ensure the factual selection of the information covered in the content. The initial survey carried out among nursing faculty in the state of North Carolina revealed that the overwhelming majority of nursing programs spend 6 or less hours of didactic time on
substance abuse topics. This draws a parallel to the themes that emerged from the qualitative analysis of the survey’s open ended question: lack of classroom time and lack of expertise. Because of that finding we solicited input from consultants from non-nursing disciplines. We also carried out extensive review of the available CEU offerings with a substance abuse focus. We incorporated into the course modules discussing domestic violence and DEA activities based on the initial survey of the nursing faculty. The results of this project may have a high degree of generalizability: although the initial survey in phase one included only faculty from North Carolina the finding of the study may be relevant to substance abuse education in other states. In 2008 recommendations to revise the nursing undergraduate curriculum were introduced by the American Association of Colleges of Nursing and currently are adopted by the majority of undergraduate nursing programs (Glawe, 2011). Because of the similarity of the curricula among the nursing programs in different geographic locations we suggest that the results of this project may be generalized to the population of registered nurses nationwide.

10. Limitations
We would like to presume that the significant increase in the knowledge level of the participants is secondary to being exposed to the course content. We may speculate, however, that the non-proctored nature of the test may have played a role in this increase. It is possible that participants may have had access to supplemental sources such as search engines or online encyclopedias. It may be advisable to use a lock-down browser technology to prevent the participant from accessing other online sources while taking the tests for the course.

11. Sustainability and Implications for Nursing Practice
An innovation is sustainable when the methods and standards derived from the innovation become a norm for current practice (National Health Service, 2002). Innovations introduced in the second phase of this project relate to the creation of the continuing education course itself and may lead to a change in nursing practice. The results of the final testing revealed higher posttest scores compared to pretest. In addition, the paired t-test revealed a statistically significant difference between the means of pre and posttest scores. Registered nurses enrolled in this course increased their knowledge of the topics of substance abuse issues, which may result in overall improvement of the care for patients with a history of substance abuse.

Because of the successful character of this intervention the course may serve as a basis to create an elective course for nursing majors in undergraduate education. Since this course was offered for the first time various organizations expressed a desire to incorporate the Substance Abuse Continuing Education Course for Registered Nurses into the CEU course offerings for their staff. We are planning to continue to offer the course in the future through the Continuing and Professional Education Department at Western Carolina University (http://www.wcu.edu/45.asp). During that time we will continue to compile the data regarding performance in the course. When the CEU course is offered a number of times and there is consistent improvement in posttest scores, that data may be utilized to create a proposal to change current content of undergraduate nursing education regarding substance abuse topics.
Table 1. Discussion of domestic violence issues related to substance abuse

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<td>5.9</td>
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Table 2. Class discussion of DEA schedules for control substances

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Table 3. Paired samples statistics

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References


