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The Use of Simulation and Experiential Learning to Practice Prenatal Care Management within a Doctor of Nursing Practice Program

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THE USE OF SIMULATION AND EXPERIENTIAL LEARNING TO PRACTICE PRENATAL CARE MANAGEMENT WITHIN A DOCTOR OF NURSING PRACTICE PROGRAM

by

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Abstract

Background: Many barriers have been identified that affect patient-provider gestational weight gain (GWG) counseling, including lack of time, insufficient training, concern about the sensitivity of the topic, and the provider perception that the advice is ineffective (Ronnberg et al., 2015; Stotland et al., 2010). Simulation-based learning (SBL) is an evidence-based clinical education strategy that mimics real-life situations as a high-quality interactive experience that complements clinical experiences to develop entry into practice competency (SSH, 2015).

Aims: The purpose of this project was to implement an educational program that incorporated a combined teaching method of a didactic module and a standardized patient (SP) simulation regarding the topic of prenatal care in the primary care setting.

Methods: The educational intervention consisted of a two-part lecture, simulated SP clinical scenario of excessive GWG during prenatal management, and debriefing.

Results: The participants' mean knowledge score increased significantly from pre-intervention (5.75 ± 1.57) to post-intervention (8.88 ± 1.03), $t(15) = 7.68$, $p<.0001$. Mean overall simulation satisfaction scores were (21.45 ± 2.732) out of a possible 25 points. Mean overall self-confidence scores were (34.12 ± 3.364) out of a possible 40 points.

Conclusion: Participants reported increased confidence in their performance of prenatal assessment and a high level of satisfaction and self-confidence with the simulation experience.

Key words: Simulation; satisfaction; self-confidence; prenatal care; gestational weight gain

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Prenatal health care providers are responsible for assessing the initial health status of their pregnant patients, as well as educating these women about the 2009 IOM recommended guidelines about appropriate healthy weight gain during pregnancy (IOM & NRC, 2009). Although the 2009 IOM guidelines are available, the recent prevalence of excess GWG relative to the IOM guidelines has been reported at around 50% (Phelan et al., 2011). According to the CDC (2016), only 32% of women who gave birth to full-term, singleton infants in the United States in 2015 were within the IOM recommended range for GWG; 48% gained more weight and 20% gained less weight than recommended.

Problem Statement

Previous studies suggest that current patient-provider communication regarding inappropriate weight gain during pregnancy is inadequate in the prenatal care setting and that this could account for the continued high prevalence of inappropriate GWG among pregnant women in the United States (Malta et al., 2016; McDonald et al., 2011; Phelan et al., 2011). In their descriptive prospective observational study, de Jersey, Nicholson, Callaway, and Daniels (2012) found that at 16 weeks, 47% of study participants were unsure of their recommended weight gain, and 62% of the women reported that the health professionals caring for them during this pregnancy ‘never’ or ‘rarely’ offered advice about how much weight to gain. Many barriers have been identified that affect patient-provider communication, including lack of time, insufficient training, concern about the sensitivity of the topic, and the provider perception that the advice is ineffective (Ronnberg, Ostlund, Fadl, Gottvall, & Nilsson, 2015; Stotland et al., 2010).

Review of Literature

Clinical education in nursing aims to integrate theoretical knowledge learned from books and through didactic instruction for use in real-life experiences to help students develop practical knowledge and improve problem-solving skills. Simulation-based learning (SBL) is an evidence-based clinical education strategy that mimics real-life situations as a high-quality guided and interactive experience that complements clinical practice experiences to develop entry into practice competency (SSH, 2015). The National Council of State Boards of Nursing (NCSBN) innovative, multi-site, longitudinal, study explored the role and outcomes of simulation in pre-licensure clinical nursing education in the United States and found that simulation can be substituted for up to 50 percent of traditional clinical experiences (Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries, 2014). SBL is a teaching strategy, but also can be used as a competence assessment tool. Using simulation for assessment allows educators to measure more than knowledge level as it is performance-based and has the advantages of being standardized for all learners. Outcomes of knowledge acquisition/retention, self-confidence, and clinical performance are common measureable program outcomes of SBL (Lewis et al., 2017).

With realistic clinical scenarios, SBL interventions in nursing provide the opportunity for novice as well as experienced nurses to foster critical thinking and clinical reasoning skills as well as develop effective non-technical skills, and practice communication skills and interpersonal relationships training (SSH, 2015). Standardized Patient (SP) SBL utilizes a mid-level fidelity simulation with an actor who participates in the simulation as the patient or family member. SPs can be professional actors, students, faculty, or volunteers that receive special training to simulate symptoms or problems that a real patient might have. SPs are lay people who are trained to portray a patient with a specific condition to promote realism in a standardized

manner. SPs are now almost ubiquitous in modern medical education programs and are based in theories of healthcare education including experiential learning, deliberate practice, and situated learning (Cleland, Abe, & Rethans, 2009). SBL offers opportunity to make and learn from mistakes, allows for immediate feedback, and uses the teaching concept of experiential learning (Issenberg, McGaghie, Petrusa, Lee Gordon, & Scalese, 2005).

Theoretical Framework

Kolb (1984) created the Theory of Experiential Learning, which presents a model for learning that includes four stages, or essential components: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Figure 1). Concrete experience is the engagement of the learner in activities and observable behaviors, such as lectures and text readings. Reflective observation involves self-evaluation that associates expected to actual outcomes, such as journals, discussion, and debriefing. Abstract conceptualization involves knowledge and logic demonstrated by papers, projects, and group work. Active experimentation involves the application of knowledge to a situation to plan interventions, which can be accomplished through case studies or simulations. Learning as an integrated process with each of the four stages being mutually supportive. It is possible to enter the cycle at any stage and follow through the sequence. However, effective learning only occurs when a learner can execute all four stages of the model (Kolb, 1984).

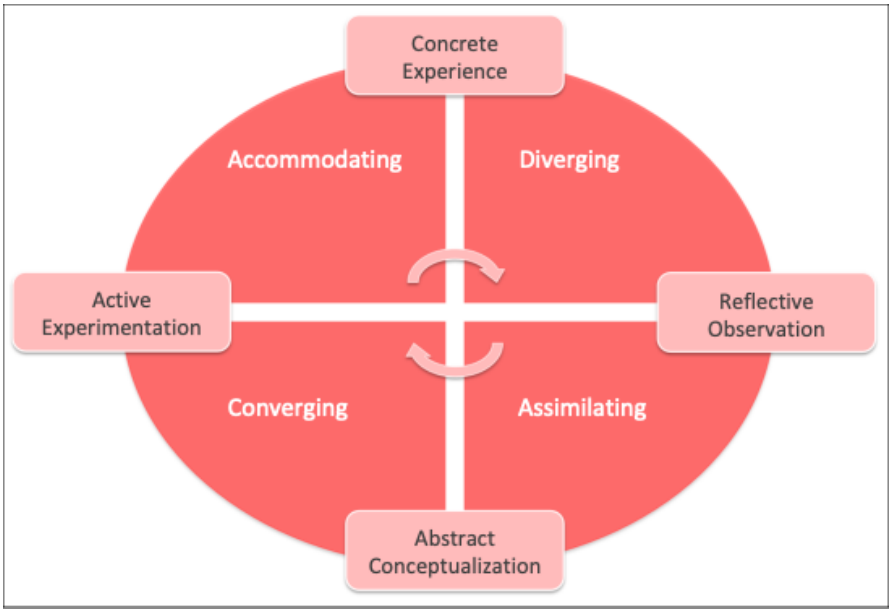

Figure 1. Model of Experiential Learning (Kolb, 1984).

Setting

The prenatal educational program was conducted at a public university located in a large metropolitan area in the Midwestern United States. This program was provided to all family and adult/gerontology primary care nursing practice students in their third year of study in a DNP program (N=16). The didactic module component of the program was provided to the program participants through an in-person format. A standardized patient (SP) simulation activity then took place in the school of nursing simulation lab.

Purpose

The purpose of this project was to implement an educational program which incorporated combined teaching methods of a didactic module, interactive team-based learning experience, and a standardized patient simulation regarding the topic of prenatal care for family and adult/ gerontology primary care doctor of nursing practice students. Two specific aims were addressed by this quality improvement project. The first aim was to determine the students' ability to apply knowledge attained from the didactic module of the program to perform early prenatal risk

assessments and provide comprehensive prenatal education during a simulated clinical scenario with a standardized patient. The second aim was to improve participants' self-confidence and satisfaction when performing a simulated prenatal visit with a standardized patient.

Two short-term goals for this project include (a) increasing the participants' self-confidence in his/her ability to care for a prenatal patient in the primary care setting and (b) determining the participants' ability to properly identify excessive GWG in a simulated clinical scenario, and then address this clinical issue through GWG education counseling.

Intervention

Participants received two 15-minute in-person lectures with content regarding providing prenatal care in the primary care setting. Participants had the opportunity to apply the information through the SP simulation. The SP simulation included a pre-briefing delivered by the graduate student project leader to discuss the SP's scenario, and a door chart with physical assessment parameters. The door chart included a summary of the clinical scenario, which contained the SP's chief complaint, demographic information, and vital signs. The participants were paired with an SP of whom the participants did not meet until entering the examination room. SPs were trained together prior to the scenario and were given a script to follow during the simulated clinical scenario. All SPs received training by the graduate student project leader at the same time to ensure internal validity.

The SPs were also provided with cue cards to ensure consistency between simulations. The cue cards included positive or negative affirmation of the subjective and objective data, which all matched the script provided to each SP. If a participant asked a question that could be answered by a cue card, the SP presented the cue card to the participant. If the participant asked a question that was unrelated to the simulation, the SP was instructed to answer that the subjective

or objective data requested was within defined limits. The participants were provided the opportunity to order laboratory tests and receive results to determine the next phase of care.

After the simulation concluded, the participants moved to a quiet and private area in the next room and had 20 minutes to write a note in Subjective-Objective-Assessment-Plan (SOAP) format. Participants also completed the prenatal knowledge post-test and the NLN Student Satisfaction and Self-Confidence in learning tool (NLN 2019). Finally, the student project leader held a 10-minute group debriefing session with all participants. The content and program objectives led the content covered during this debriefing session, and any questions or concerns the participants has were answered. This quality improvement program approved by the university's Institutional Review Board (IRB) as a quality improvement project (Non-Human Subjects Research).

Participants

Participants included a convenience sample of 16 family and adult/gerontology primary care doctor of nursing practice students in their third year of a doctoral program with an advanced practice registered nurse curriculum.

Data Collection

FERPA procedures were followed for all data collection. All participant data was de-identified to maintain confidentiality. Each participant was assigned a unique identifier to maintain anonymity throughout the project. The graduate student project leader maintained confidentiality of all collected participant information which was stored at the institution in a locked cabinet.

Measurement

Participant demographics, including age, gender, and racial/ethnic background were collected during the pretest portion of the program. Five 4-point Likert-type items (1=strongly disagree to 4=strongly agree) were included to determine the participants' baseline confidence level in their ability to provide prenatal care in the primary care setting and in meeting the program objectives. Ten multiple-choice knowledge questions based on the ACOG recommendations of necessary prenatal care management were included to determine the participants' ability to meet the program's content (educational) objectives. The post-test included the same five 4-point Likert-type questions, and ten knowledge questions.

Along with the post-test, the Student Satisfaction and Self-Confidence in Learning tool created by the National League of Nursing (NLN) was administered. The survey is a 13-item tool intended to measure participant satisfaction with the simulation component of the program and self-confidence in overall learning. Both subscales contain a 5-point Likert-type scale, with a higher score demonstrating increased satisfaction and/or self-confidence. Participants completed five questions measuring participant satisfaction and eight items measuring self-confidence in learning. The instrument has previously reported reliability coefficients for the satisfaction subscale of 0.94 and 0.87 for self-confidence (NLN, 2019). Permission to use this tool was obtained from the NLN.

Results

Data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 24. All 16 participants were female. The participants' age ranged from 23 years to 48 years, with a mean age of 30.8 ± 6.8 years. The participants' years of experience as a registered nurse ranged

from 3 years to 15 years, with a mean of 5.8 ± 2.9 years (Table 1). Half of the participants (50.0%) had ≤ 4 years of experience.

Table 1

Sociodemographic Characteristics

Variable (in years)	N	Mean	SD	Minimum	Maximum	Range
Age	16	30.8	6.8	23.0	48.0	25.0
Experience as RN	16	5.8	2.9	3.0	15.0	12.0

Knowledge Test

A paired sample t-test (two-tailed) was conducted to evaluate the impact of the educational intervention consisting of a didactic module and a SP simulated clinical scenario on participants' mean knowledge score. The pre-intervention knowledge scores ranged from 3/10 to 9/10, while post-intervention scores ranged from 7/10 to 10/10 correct. The participants' mean knowledge score increased significantly from pre-intervention (5.75 ± 1.57) to post-intervention (8.88 ± 1.03), $t(15) = -7.68$, $p<.0001$ (two-tailed). The mean increase in knowledge scores was 3.13 with a 95% confidence interval ranging from -3.99 to -2.26. The magnitude of effect was moderate ($\eta^2 = .78$).

Table 2

Paired T-test Comparison of Pre- and Post-education Mean Knowledge Scores

Score	Mean ± SD	*t*	*df*	*p*	η^2
	5.75 ± 1.57	-7.679	15	<.0001	.78

Pre-education	
Post-education	8.88 ± 1.03

Note. N=16. Score is based on a possible 10. Eta squared (η^2) indicates a moderate magnitude of effect.

NLN Student Satisfaction and Self-Confidence in Learning

Posttest means were calculated for the Student Satisfaction and Self-confidence in Learning Tool (Figures 2 and 3). The mean student satisfaction with current learning score was (21.56 ± 2.73) out of a total 25. The mean student self-confidence in learning score was (34.12 ± 3.36) out of a total 40. The scores indicate that the students were satisfied with the simulation learning experience and gained confidence for providing prenatal care in primary care settings.

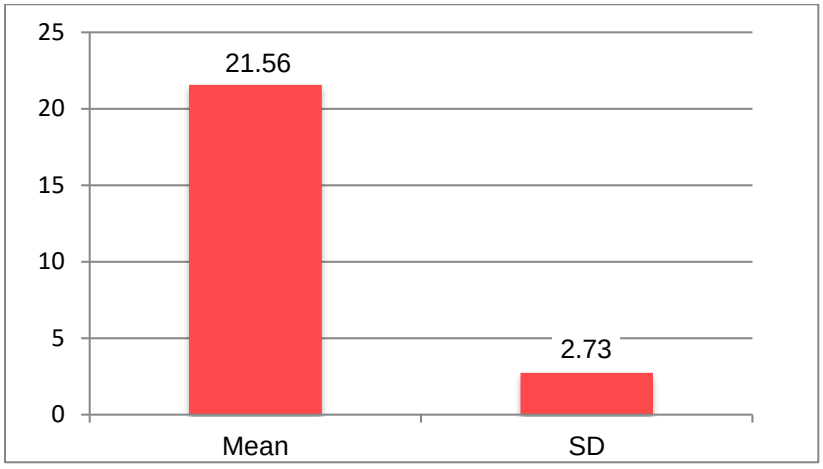

Figure 2. NLN Student Satisfaction with Current Learning.

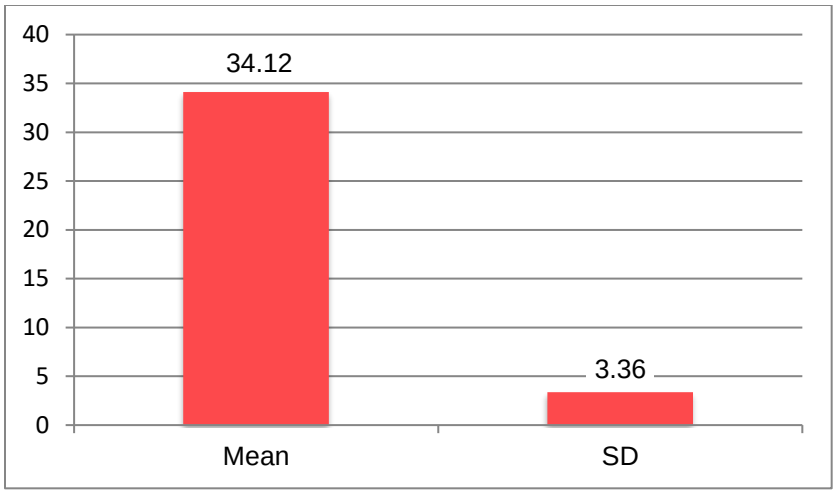

Figure 3. NLN Student Self-confidence in Learning.

Discussion

The majority of participants reported that simulation, as a teaching method, was helpful and effective. The simulation evaluated in this project improved prenatal care management knowledge. Similarly, Bowers (2017) found that experiential learning through the use of standardized patients in a simulated clinical scenario was effective method for improving short-term knowledge recall. Satisfaction and self-confidence were also positively impacted.

Feasibility and Sustainability

The time required to implement the simulation program and evaluate the outcomes during the class period was sufficient. The educational flow of the program was conducive to learning. This was a well-accepted form of learning. Delivery of the didactic module of this intervention was recorded via the institution's learning management system and made available for use with future DNP cohorts after this project has concluded. All supporting documents regarding the clinical simulation scenario have been shared with the program director. Simulation labs at the institution are adequately equipped to reproduce this intervention.

Limitations

The sample (N=16) was small and was obtained through convenience sampling. The results of this program included limited evaluation of decision-making, clinical judgment, and skill acquisition. A final limitation is that this program measured short-term recall of the content included in the knowledge questions and not sustained retention of the information.

Recommendations

Future simulation experiences should include repeated measures of self-confidence using the same instrument. Also, further assessment of sustained knowledge retention should be completed with a lengthened time interval between the didactic module and the evaluation.

Implications for Future Practice

Faculty can use simulation as an adjunct to clinical to practice patient care management. Simulation can prepare future providers to practice addressing a sensitive topic such as weight gain during pregnancy in a safe environment before a real patient encounter. This educational program promoted confidence in essential communication skills, which has the potential to increase the overall patient receipt GWG counseling.

Conclusion

A realistic scenario was developed and clear expectations were discussed successfully with the participants at the beginning of the program and during the simulation pre-briefing session. The simulation experience was evaluated with a standardized tool and participants were debriefed post-simulation, which successfully integrated all four stages of Kolb's Theory of Experiential Learning to promote knowledge attainment. Participants reported increased confidence in their performance of prenatal assessment and high level of satisfaction and self-confidence with the simulation experience.

References

Bowers, R., Tunney, R., Kelly, K., Mills, B., Trotta, K., Wheeless, C. N., & Drew, R. (2017). Impact of standardized simulated patients on first-year pharmacy students' knowledge retention of insulin injection technique and counseling skills. *American Journal of Pharmaceutical Education, 81*(6), 113. https://doi.org/10.5688/ajpe816113.

Centers for Disease Control and Prevention (CDC). (2016). QuickStats: Gestational weight gain among women with full-term, singleton births, compared with recommendations - 48 states and the District of Columbia, 2015. (2016). *MMWR. Morbidity and Mortality Weekly Report, 65*(40), 1121. https://doi.org/10.15585/mmwr.mm6540a10.

Cleland, J. A., Abe, K., & Rethans, J.-J. (2009). The use of simulated patients in medical education: AMEE Guide No 42. *Medical Teacher, 31*(6), 477–486.

de Jersey, S. J., Nicholson, J. M., Callaway, L. K., & Daniels, L. A. (2012). A prospective study of pregnancy weight gain in Australian women. *Australian & New Zealand Journal of Obstetrics & Gynaecology, 52*(6), 545-551. http://doi.org/10.1111/ajo.12013.

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN National Simulation Study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S3-S40. https://doi.org/10.1016/S2155-8256(15)30062-4.

Institute of Medicine, & National Research Council Committee to Reexamine IOM Pregnancy Weight Guidelines. (2009). The National Academies collection: Reports funded by National Institutes of Health (pp. 1-315) in K.M. Rasmussen, A.L. Yaktine (Eds.), *Weight gain during pregnancy: Reexamining the guidelines*. Washington, D.C.: National Academies Press (US) National Academy of Sciences.

Issenberg, S. B., McGaghie, W. C., Petrusa, E. R., Lee Gordon, D., & Scalese, R. J. (2005). Features and uses of high-fidelity medical simulations that lead to effective learning: A BEME systematic review. *Medical Teacher, 27*(1), 10–28. https://doi.org/10.1080/01421590500046924.

Kolb, D. A. (1984). *Experiential Learning: Experience as the source of learning and development.* Upper Saddle River, NJ: Prentice-Hall.

Lewis, K. L., Bohnert, C. A., Gammon, W. L., Hölzer, H., Lyman, L., Smith, C., … Gliva-McConvey, G. (2017). The Association of Standardized Patient Educators (ASPE) Standards of Best Practice (SOBP). *Advances in Simulation 2*(10), 1-8. https://doi-org.echo.louisville.edu/10.1186/s41077-017-0043-4.

Malta, M. B., de Barros Leite Carvalhaes, M. A., Takito, M. Y., Pamplona Tonete, V. L., Barros, A. D., Garcia de Lima Parada, C. M., & Benício, M. D. (2016). Educational intervention regarding diet and physical activity for pregnant women: Changes in knowledge and practices among health professionals. *BMC Pregnancy & Childbirth*, *16*(175), 1-9. https://doi.org/10.1186/s12884-016-0957-1.

McDonald, S. D., Pullenayegum, E., Taylor, V. H., Lutsiv, O., Bracken, K., Good, C., & ... Sword, W. (2011). Despite 2009 guidelines, few women report being counseled correctly about weight gain during pregnancy. *American Journal of Obstetrics and Gynecology*, *205*(4), 333.e1-6. https://doi.org/10.1016/j.ajog.2011.05.039.

National League for Nursing (NLN). (2019). Simulation Innovation Resource Center (SIRC) glossary. Retrieved from https://sirc.nln.org/mod/glossary/view.php?id=183&mode=letter&hook=S&sortkey=&sortorder=.

Phelan, S., Phipps, M. G., Abrams, B., Darroch, F., Schaffner, A., & Wing, R. R. (2011). Practitioner advice and gestational weight gain. *Journal of Women's Health, 20,* 585-591. https://doi.org/10.1089/jwh.2010.2316.

Ronnberg, A., Ostlund, I., Fadl, H., Gottvall, T., & Nilsson, K. (2015). Intervention during pregnancy to reduce excessive gestational weight gain: A randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, *122,* 537-544. https://doi.org/10.1111/1471-0528.13131.

Society for Simulation in Healthcare (SSH). (2015). About simulation. Retrieved from http://www.ssih.org/About-Simulation.

Stotland, N. E., Gilbert, P., Bogetz, A., Harper, C. C., Abrams, B., & Gerbert, B. (2010). Preventing excessive weight gain in pregnancy: How do prenatal care providers approach counseling? *Journal of Women's Health*, *19*, 807–814. https://doi.org/10.1089/jwh.2009.1462.