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A lesson involving nursing management of diabetes care: Incorporating simulation in didactic instruction to prepare students for entry-level practice

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Abstract

Background

Diabetes is a global health problem requiring nursing students demonstrate a thorough understanding for NCLEX® and entry-level practice, although clinical opportunities are increasingly limited, especially for Associate Degree Programs.

Method

A Simulation-based Education was incorporated in a didactic lesson to improve diabetes nursing care. Knowledge, confidence, application and relevance were measured using Wilcoxon signed-rank, Chi-square and Kruskal-Wallis analyses.

Results

Student (n=46, 85% female) perceived knowledge of glycemic management (post > pre, $p < 0.0001$), confidence administering insulin (post > pre, $p < 0.0001$), and clinical relevance improved. Confidence increased among three cohorts per Kruskal Wallis H test ($x^2 = 7.76$, $p = 0.021$). Increased confidence correlated with relevance ($x^2 = 30.965$, $p = 0.009$) and prior understanding of therapy ($x^2 = 26.538$, $p = 0.033$).

Conclusion

Reinforcing didactic content through simulation enhanced student mastery of diabetes nursing care. Additional pedagogical strategies are warranted for NCLEX® preparation and entry-level practice.

Key Words: *diabetes, glycemic management, pedagogy, nursing student, simulation-based learning, NCLEX®*

Background

Diabetes remains a global health problem, with an estimated 34.2 million individuals diagnosed in the U.S. alone, or 13 percent of all adults (Centers for Disease Control and Prevention [CDC], 2020). Spending for diabetes and its sequelae far outpace other diagnoses, increasing from $188 billion in 2012 to $237 billion by 2017 (estimated total direct costs, American Diabetes Association [ADA], 2018). It is essential for nursing students to thoroughly understand the diagnosis, treatment and management of diabetes care to prepare for NCLEX® and entry-level practice, although clinical exposure and acute care opportunities are increasingly lacking (Gore et al., 2018; Moxley & Waller, 2019). For more than a decade, the American Association of Colleges of Nursing (AACN) has considered limited clinical sites a barrier to quality nursing education (AACN, 2008). Dynamic changes have occurred in nursing education due to technology (Benner et al., 2010) and limited clinical experiences. The lack of adequate clinical exposure may impact confidence (Flott & Linden, 2016), application of content, clinical judgement (Tanner, 2006) and ultimately, patient safety (Tella et al., 2014). Contemporary pre-licensure nursing programs feature various curricular and exit-degree options. These include, accelerated baccalaureate or Master's-Entry-to-Practice programs that typically allocate a shorter timeframe to complete requisite requirements, pre-Master's essentials and research projects in addition to pre-licensure nursing courses. Robust pedagogical strategies using innovative methodology and technology (Murray et al., 2015) are essential in nursing curricula to reinforce clinical judgment for NCLEX® preparation and entry-level practice.

Simulation-based Education (SBE)

Simulation-based Education (SBE) is a valid and reliable pedagogical strategy to expand nursing practice (Kim et al., 2016) and effective to reinforce clinical concepts (Murray et al.,

2015). The benefits of SBE are unique to nursing students because clinical skills and decision-making may be directly applied to practice (Kim et al., 2016) through clinical scenarios in a safe setting. When up to 50% of traditional nursing student clinical experiences were replaced by simulation, no difference was observed in clinical competency or comprehensive nursing knowledge according a study conducted by the National Council of State Boards of Nursing ([NCSBN], Hayden et al., 2014). Moreover, the use of high fidelity simulation in undergraduate nursing student curricula was found to be beneficial in improving the learning of patient safety (Tella et al., 2014) as well as safe medication administration, and response to unsafe practices (Aggar and Dawson, 2014). Using a Simulation-based Education (SBE) in a didactic lesson, we designed a pedagogical strategy to more thoroughly understand nursing student perception of knowledge, confidence, application and relevance of the nursing care for individuals with diabetes in three Master's Entry to Practice student cohorts. This pedagogical strategy aimed to answer the question, does the implementation of SBE as part of a didactic lesson improve students' perceived knowledge of glycemic management, confidence administering insulin, clinical relevance and application of diabetes nursing care? Therefore, the purpose of this study was to more thoroughly understand nursing student perception of knowledge, confidence, application and relevance of nursing care for individuals with diabetes by incorporating a Simulation-based Education (SBE) into a didactic lesson.

Methods

Design and Participants

Using a prospective pre and post observational study design, a convenience sample of nursing students (n=46) from three subsequent cohorts of a medical-surgical nursing course in a Master's Entry to Practice Program were recruited as study participants. Inclusion criteria were

1) prelicensure nursing students who were enrolled in the medical-surgical nursing course; 2) successful completion of pharmacology in that program. The only exclusion criteria was a lack of willingness to complete the survey before and after a didactic lesson. Participants consented to study involvement by completing the survey. All feedback was anonymous. All procedures were approved by the university institutional review board.

Pedagogical Strategy

The pedagogical strategy involved a didactic lesson, which incorporated simulation, clinical skills and four learning domains. The domains included knowledge, confidence, application and relevance of the nursing care for individuals with diabetes (Table 1).

Table 1. Relationship between Learning Domains and Pre- and Post-Survey Assessment

	Knowledge	**Confidence**	**Application**	**Relevance**
Pre-Didactic Lesson Survey Question	3. How well do you understand the importance of glycemic control? 4. How well do you understand insulin therapy's ability to impact short & long-term glucose level changes?	1. How confident are you currently in your knowledge of implementation of insulin therapy to diabetic patients clinically? 2. Why did you rate your level of confidence as such?	4. How well do you understand insulin therapy's ability to impact short & long-term glucose level changes?	3. How well do you understand the importance of glycemic control?
Post-Didactic Lesson Survey Question	2. How well do you now understand the importance of glycemic control?	1. How confident are you now in your knowledge of implementation of insulin therapy to diabetic patients clinically?	3. How often do you *anticipate* implementing insulin therapy in clinical practice?	4. Did you find this information clinically relevant?

The didactic lesson followed these steps: pre-lesson survey, simulation and skill practice, and a debriefing with a post-lesson survey. These steps provided structure to the lesson, specifically, the domain of knowledge. Participant perception of these four domains was assessed before and after the lesson by completing a survey. Study participation was optional for all participants. The survey was part of a routine didactic lesson and those who chose to participate completed a survey before the didactic lesson and after the lesson. Each survey had four questions to be answered according to a 5-point Likert scale (Table 2).

Table 2. Descriptive Summary for Feedback from the Survey

Pre-Lesson Survey Questions	**1st Quarter**	**median**	**mean**	**SD**	**3rd Quarter**	**3 and above Likert score percentage**
Q1 How confident are you currently in your knowledge of implementation of insulin therapy to diabetic patients clinically? *1. no confidence* *2. slight confidence* *3. moderate confidence* *4. high confidence* *5. complete confidence*	1	2	2.11	1.01	3	36%
Q2 Why did you rate your level of confidence as such? *1. I have not learned about insulin or diabetes at this point in the program* *2. I have learned about insulin and diabetes in the classroom setting only* *3. I have clinical experience with insulin and diabetic patients, however, it is limited* *4. I have adequate clinical experience and have managed insulin therapy appropriately* *5. I have expertise clinical experience and have managed insulin therapy appropriately*	1	2	1.98	0.76	2	29%

Q3 How well do you understand the importance of glycemic control? *1. I do not understand its importance* *2. I slightly understand its importance* *3. I moderately understand its importance* *4. I strongly understand its importance* *5. I completely understand its importance*	2	3	2.86	1.11	4	58%
Q4 How well do you understand insulin therapy's ability to impact short & long-term glucose level changes? *1. I do not understand* *2. I slightly understand* *3. I moderately understand* *4. I strongly understand* *5. I completely understand*	2	3	3.59	1.01	3	53%
Post-Lesson Survey Questions	**1st Quarter**	**median**	**mean**	**SD**	**3rd Quarter**	**3 and above Likert score percentage**
Q1 How confident are you *now* in your knowledge of implementation of insulin therapy to diabetic patients clinically? *1. no confidence* *2. slight confidence* *3. moderate confidence* *4. high confidence* *5. complete confidence*	3	4	3.59	0.76	4	91%
Q2 How well do you *now* understand the importance of glycemic control? *1. I do not understand its importance* *2. I slightly understand its importance* *3. I moderately understand its importance* *4. I strongly understand its importance*	4	4	4.07	0.73	5	98%

5. I completely understand its importance						
Q3. How often do you *anticipate* implementing insulin therapy in clinical practice? *1. I do not understand* *2. I slightly understand* *3. I moderately understand* *4. I strongly understand* *5. I completely understand*	4	4	3.98	0.79	5	96%
Q4 Did you find this information clinically relevant? *1. no* *2. a little* *3. somewhat* *4. very* *5. completely*	4	5	4.52	0.73	5	98%

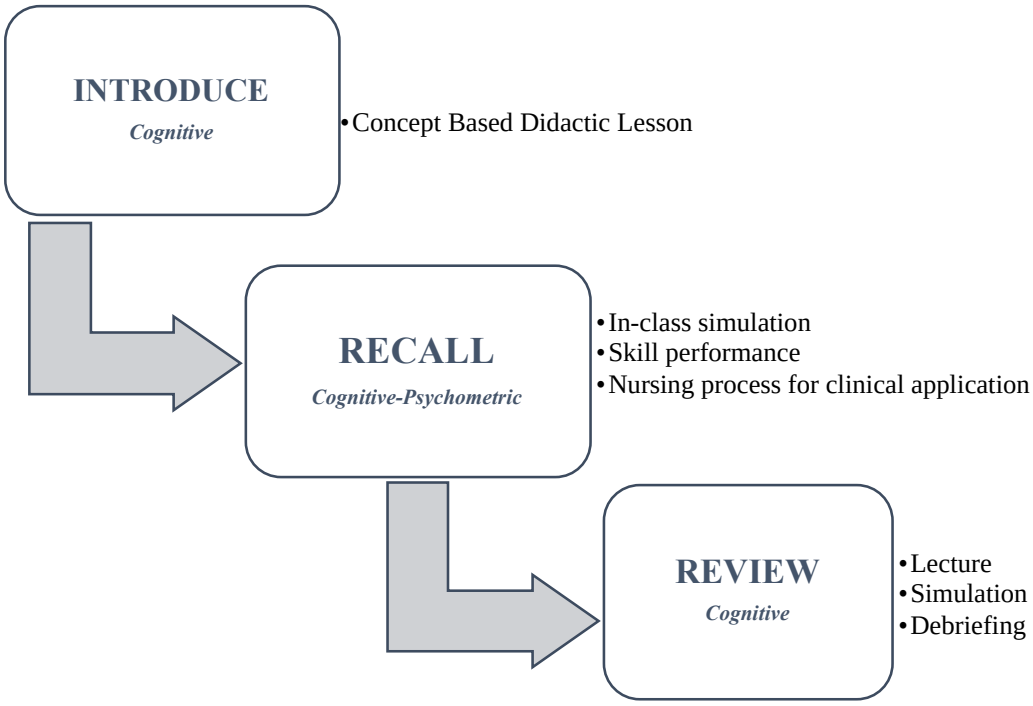
Description of Survey

The pre-lesson survey had four questions to be answered using a 5-point Likert survey to include: 1) How confident are you currently in your knowledge of implementation of insulin therapy to diabetic patients clinically? 2) Why did you rate your level of confidence as such? 3) How well do you understand the importance of glycemic control? 4) How well do you understand insulin therapy's ability to impact short & long-term glucose level changes? (Table 2). The post-lesson survey also included four questions to be answered according to a 5-point Likert scale: 1) How confident are you *now* in your knowledge of implementation of insulin therapy to diabetic patients clinically? 2) How well do you *now* understand the importance of glycemic control? 3) How often do you *anticipate* implementing insulin therapy in clinical practice? 4) Did you find this information clinically relevant? The pre-lesson survey questions were slightly different than the post-lesson survey questions as two pre-lesson and post-lesson survey questions pertained to knowledge, and two questions pertained to confidence. Whereas, the questions pertaining to application and relevance were not as closely aligned. Survey

feedback was anonymous. All procedures were approved by the university institutional review board.

During the first stage of the lesson, content involving diabetes nursing care was presented to participants, recalled during the simulation and reviewed during the debriefing. The theory by Brown and colleagues (2014) used *introduce/recall/review* methodology (Figure 1) as a basis for reinforcing concepts.

Figure 1. Dimensions of Introduce/Recall/Review Scaffolding (Brown et al., 2014)



Concepts were then applied in a clinical context during the simulation. For example, management of diabetes through the administration of insulin; participants reviewed the skill of insulin administration and then practiced the technique. Next, a simulation vignette integrating lesson content reinforced knowledge which was also reviewed during the debriefing. During the

debriefing, participants practiced clinical *reflection*, which enhances learning according to Brown et al. (2014).

Simulation Based Experience Scenario

The simulation scenario incorporated participants in the roles of nurse and client for the following objectives: 1) provide a realistic visual aid and interaction for participants in the nursing role. 2) provide a realistic clinical experience 3) practice the skill of administering insulin 4) apply clinical application to improve critical thinking and clinical judgment 5) stimulate questions to educate participants by reinforcing didactic content, in simulation and debriefing. Participant 1 assumed the role of the nurse to administration and educate the client about the medication. Participant 2 was in the role of client to contribute to simulation fidelity; real-time interaction and to reinforce content by responding to questions.

Simulation scenario:

Ms. D is a 43-year old female client with a 24-year history of type 2 diabetes. She was admitted to a sub-acute in-patient unit with a HbA1c of 9.4%. Upon admission, she presented with a non-healing diabetic foot ulcer (DFU) and has an allergy to penicillin. Her plan of care included stabilizing her glycemic control educating her regarding the use of prescribed insulin to prevent further complications such as amputation. She is scheduled to receive Lantus and Novolog insulin at 7:00am this morning and questions the nurse about rotating injection sites when administering insulin.

Supplies for the simulation included; a glucometer, lancets and test strips, alcohol wipes and gauze, patient tray and food, insulin vials and syringes (U-100 syringe and U-100 insulin), injection skins, medication administration record, clock, and evaluation forms for observers.

Medication Administration and Patient Education

During the simulation, participant 1 initially assessed the glucose level (all participants had practiced using the glucometer), measured the glycemic index and reviewed the order for insulin dosage according to sliding scale and patient allergies. Participant 1 reviewed the medication to be administered; insulin type (short and long-acting insulin), site rotation. and

dosage with the instructor. Participant 1 then reviewed insulin with participant 2, the second nurse. Participant 1 reviewed the six rights and performed three medication checks then administered Novolog insulin as ordered based on the 7am glucose level. Participant 1 also performed patient education, including a medication review, side effects, site rotation, and dietary guidelines according to the ADA.

During the simulation, participant 2 reviewed with participant 1 the type of medication, duration of action and timing of administration with meals and sliding scale dose. In addition, the rationale for rotating injection sites including most recent site, signs and symptoms of hypoglycemia and treatment. Following the debriefing, the participants developed a care plan to incorporate the nursing process to apply didactic lesson content. Beginning with a history and physical examination information from the scenario, nursing diagnoses were developed that were aimed at managing diabetes care. These included lifestyle interventions: nutrition, exercise and routing health screening; review of medications and related information (consistent with administration), dietary consult and review of risk factors and DFU management. Strategies for ongoing evaluation and follow-up were discussed with the instructor.

Data Analysis

Data are presented as the first quartile, median, mean, standard deviation and third quartile. A Shapiro-Wilk test was applied to each outcome variable prior to further analysis. The majority of outcomes do not represent a normal distribution. Wilcoxon signed-rank test was used to compare pre- and post-survey differences. Correlation coefficients were then determined to evaluate relationships between each of the variables. Chi-Square test was employed to measure the correlation between variables to identify the relationship between change in the level of confidence with, implementation plans, opinions on the information, and/or prior knowledge of

insulin therapy. A nonparametric analysis of variance involving Kruskal Wallis was used to determine if the increase in confidence was homogenous across all three quarters. The reliability/internal consistency of the pre-lesson survey questions was estimated using Cronbach's alpha. P-values < 0.05 were considered statistically significant. Data were analyzed using SAS 9.4 (SAS Institute Inc., Carry, NC, USA) and R version 3.6.1 (R Foundation for Statistical Computing).

Results

A total of 46 students (85% female, 18 to 45 years) from three separate cohorts were study participants and completed the survey. Wilcoxon tests were used to measure the effects of the treatment on participant confidence and knowledge of glycemic management, due to the measurement scale utilized to evaluate the data and a lack of normality in the data (one-sided). Following the lesson, non-parametric test outcomes revealed improvements in knowledge or understanding of the material, participant confidence, and ability to administer insulin; application.

Participant confidence was higher after the lesson than before the lesson ($V = 17$, $p < 0.0001$). In response to the pre-lesson survey question to ask participants how confident they were in their knowledge of implementation of insulin therapy clinically, 36% of participants indicated their confidence level was moderate, high or completely confident (Table 2). Thus, the majority were less than moderately confident, and the reasoning cited for this response as shown in their response to the next question was primarily due to only learning about insulin and diabetes in the classroom setting (Table 2). The other questions pertained to relevance and application of knowledge for diabetes nursing care. Relevance of glycemic management ($V = 8$, $p < 0.001$) was also found to be higher after the lesson than before it. According to our results,

prior to the lesson about 58% of participants understood the importance of maintaining adequate glycemic control (Table 2). Participants understanding of the importance of glycemic control improved after the lesson ($V=7$, $p < 0.0001$).

In terms of applying this knowledge, prior to the lesson, 53% of the participants expressed understanding of insulin therapy's ability to impact short & long-term glucose level changes. Following the lesson, 96% of participants answered that they were more prepared to apply insulin therapy in a clinical setting (Table 2). Furthermore, Kruskal Wallis chi-squared test analyses outcomes suggest the treatment effectiveness may vary from class to class, as a mean difference in confidence was observed that was non-homogenous across all three quarters before the lesson ($x^2=8.3$, $p = 0.016$) and after the lesson ($x^2=7.76$, $p = 0.021$). The rating from moderate to high for the learning domains (Knowledge, Confidence, Application and Relevance) from pre-lesson to post-lesson increased significantly (Table 3). For instance, 36% rated confidence as moderate-high on pre-survey and 91% rated confidence as moderate-high on Post-survey.

Chi-squared tests were employed to determine if the outcomes were linked to other measures. Participant understanding (knowledge) was found to be correlated with prior understanding of insulin therapy ($x^2 = 26.538$, p-value = 0.033). Chi-square tests also indicated an increase in participant confidence that was significantly correlated with opinions on the clinical relevance of glycemic management ($x^2 = 30.965$, p-value = 0.009). Based on the Cronbach's alpha values; pre-lesson survey questions ($\alpha = 0.82$) and post-lesson survey questions ($\alpha = 0.71$), there is good interrelatedness between test questions. In addition, the questions do not measure the same underlying concept since in both cases α is less than 9. Many methodologists recommend an acceptable α coefficient is between 0.7 and 0.9 (Tavakol & Dennick, 2011). To

ensure the adequacy of the sample size of the study, a power analysis was done. With medium effect size (d=0.55), the test's power was 0.959 for the paired test.

Discussion

A significant improvement in knowledge, confidence, relevance and application was found in all participants from the incorporation of simulation into a didactic lesson. These findings may have implications for patient safety. The benefit of improving pedagogical instruction has been demonstrated by using simulation (Kardong-Edgren et al., 2018) in addition to didactic instruction, but the pedagogical strategy utilized in this analysis has not been previously demonstrated in the literature to our knowledge. In recent years, Certified Diabetes Educators have increased their emphasis on skill demonstration and participants' self-monitoring of glucose when considering different approaches to patient education, whereas, the provision of lectures has been less emphasized (Funnell et al., 2006).

Although all the student participants had at least a baccalaureate level education, few of them had a nursing degree or had worked in healthcare. The increase in knowledge of glycemic management and insulin administration was likely due to the didactic lesson, as demonstrated from the survey results. Of interest, twelve of 46 participants indicated they had not previously learned about insulin as nearly 25% choose option 1 to a pre-lesson question; *I have not learned about insulin or diabetes at this point in the program*. although all had previously taken a pharmacology course.

Besides the didactic lesson, skill performance, application during simulation and the debriefing likely benefitted learning. Brown et al. (2014) believes student learning is more effective when it occurs over a varied duration of time rather than attempting to learn more quickly, although it may *seem* more difficult. Moreover, a key aspect of incorporating simulation

(with debriefing) involved *clinical reflection*, a strategy Brown considers a valuable component of learning. Debriefing enhances the impact of SBE by reflecting on the simulation experience and reviewing clinical skill performance during the debriefing session (Cheng et al., 2016). Similarly, structured debriefings were also considered to enhance learning in the findings of a recent systematic review and meta-analysis performed by Lee and colleagues (2020) who evaluated debriefing methods and learning outcomes in simulation in nursing education. Perhaps most important, however, was the participant perspective indicating their knowledge of diabetes management improved from the lesson.

A relationship has not been established between knowledge and confidence in healthcare (Shinnick & Woo, 2014). We found each of these domains improved following the lesson, which was consistent with previous studies following the use of simulation (Jeffries & Rizzolo, 2006; Kardong-Edgren et al., 2009; Shinnick & Woo, 2014; 2012). Our study was the first to evaluate if student's perception of their knowledge improved following a didactic lesson that incorporated an SBE. With respect to patient safety, the knowledge and skill level of nurses are considered more important than confidence (Shinnick & Woo, 2014).

Knowledge and Prior Understanding

Knowledge of glycemic management was correlated with prior understanding of insulin therapy, since all students had completed a pharmacology course. While knowledge and skill performance are essential for safe nursing practice, improved confidence and perceived relevance may have implications for enhancing motivation, thereby impacting future learning, NCLEX® preparation, and ultimately practice. In our study, however, increased participant confidence was not correlated with the clinical relevance of glycemic management.

Knowledge and Relevance

An interesting finding was the increased understanding of the importance of glycemic management or relevance, which was higher after the lesson than before, suggesting student participants' perception of knowledge may have influenced relevance in addition to influencing confidence. Improved relevance of the importance of diabetes management may have also increased with more knowledge, thereby improving confidence. As students mature through their experience in the program, their confidence may also increase.

Confidence

Student participants' confidence improved across all three cohorts following the lesson, but this feedback may have been due to specific variables within each class, such as number of participants per cohort or delivery style of the instructor, although all three cohorts were taught by the same instructor. Skill sessions and experience during simulation may have had a slight influence on confidence since the participants had practiced the skill of insulin administration. According to Hilton and Pollard (2005), participant comfort improves after several skill attempts and all participants had the opportunity to practice, prior to simulation which may have improved their confidence. Negative clinical experiences have been found to impact participant self-confidence (Flott & Linden, 2016) and it is also possible that participants perceived the didactic environment as less stressful than either the laboratory or a clinical setting. A less stressful environment may facilitate learning. To prevent the benefit of simulation and debriefing from being undermined, Kardong-Edgren (2018) emphasizes the importance of the simulation environment as safe, nonthreatening and confidential for participants to practice and learn from mistakes.

Confidence and Relevance

The relationship between increased confidence and relevance of glycemic management may be due to the direct application of lesson content with the integration of skills and the pedagogy of simulation, which would once again suggest the benefit of such strategies to reinforce clinical judgment (Kardong-Edgren et al., 2018). Students often experience long periods of waiting for an instructor to administer medication in the clinical setting, so learning depends on instructor availability, an opportunity to thoroughly review medications prior to administration, skills or ability, and clinical resources (Benner et al., 2010). Simulation is a valid pedagogy when compared to the clinical setting for nursing student learning (Hayden et al., 2014; Kardong-Edgren et al., 2018), a finding that was recently substantiated by Randolph & Ridenour (2015) who observed that the events occurring in simulation were consistent with those of the clinical setting. Student confidence has been found to impact student performance in either setting (Kardong-Edgren et al.), however, and as previously mentioned may have influenced student feedback in our findings.

Application

Since application overlapped with knowledge and relevance, application-specific questions were previously discussed relative to those domains. Additionally, content was applied by incorporating it into the nursing process following simulation, and during the reflection portion of the debriefing. Considering the importance of diabetes as a current societal health problem, nursing students' ability to apply content specific to diabetes nursing care is essential, not only for nursing interventions but client-specific education aimed at health promotion. Diabetes self-management involves a client's entire lifestyle habits including such criteria as: developing knowledge, skills, psychological or social resources leading to the management of their condition, healthy lifestyle habits, recognition of signs of deteriorating health status, action

plans if relapse or exacerbation occurs, knowledge of and access to available resources, developing skills to adhere to a treatment plan, ability to communicate effectively with health professionals, and establishing a support network (Galdas et al., 2014). According to Burden (2017), caring for an individual with diabetes is complex, in fact, expertise is required to apply diabetes-related nursing care as most newly diagnosed type 1 diabetes patients manage their insulin themselves – often giving their first injection in which they require adept nursing advice until confident with injections.

Limitations

The lesson was administered during a didactic lesson in a master's Program, the content of which was not unique for a medical surgical course in the program in a nursing curriculum. Students had the option to participate however, study participation may be influenced by enrollment in the program.

Conclusions

Diabetes is a significant health problem requiring nursing students to demonstrate an adept understanding of the management of individuals with diabetes upon entry-level practice. A pedagogical strategy utilizing a simulation vignette involving the application of skills, was implemented in a didactic lesson in a master's exit degree program. Student perception of change in knowledge, confidence, and the application and relevance of diabetes nursing care was significantly improved following the intervention. Future studies exploring additional pedagogical strategies to prepare nursing students for entry-level clinical practice and NCLEX® are currently warranted.

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References

Aggar, C. & Dawson, S. (2014). Evaluation of student nurses' perception of preparedness for oral medication administration in clinical practice: A collaborative study. *Nurse Education Today*, *34*(6), 899–903.

American Association of Colleges of Nursing (2008). Clinical essentials 99: The essential clinical resources for nursing's academic mission. http://www.aacnnursing.org/NewsInformation/Publications.

American Diabetes Association. (2018, May). Economic costs of diabetes in the US in 2017. *Diabetes Care*. *41*(5), 917-928.

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation*. San Francisco, CA: Jossey-Bass.

Brown P.C, Roediger, H. L., & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. Cambridge, MA: Belknap Press of Harvard University Press.

Burden, M. (2017). Supporting patients to self-manage their diabetes in the community. *British Journal of Community Nursing*, *22*(3), 120-122.

Centers for Disease Control and Prevention. (2020). Centers for Disease Control and Prevention. National diabetes statistics report. Atlanta, GA: https://www.cdc.gov/diabetes/data/statistics/statistics-report.html

Cheng, A., Morse, K. J., Rudolph, J., Arab, A. A., Runnacles, J., & Eppich, W. (2016). Learner centered debriefing for health care simulation education: Lessons for faculty

development. *Journal of the Society for Simulation in Healthcare, 11*(1), 32–40. https://doi.org/10.1097/SIH.0000000000000136

Flott, E. A. & Linden, L. (2016). The clinical learning environment in nursing education: a concept analysis. *Journal of Advanced Nursing 72*(3), 501–513. doi: 10.1111/jan.12861

Funnell, M. M., Anderson, R. M., Nwankwo, R., Gillard, M. L., Butler, P. M., Fitzgerald, J. T., & Two Feathers, J. (2009). A study of certified diabetes educators. *Diabetes Educator, 32*, 359-372.

Galdas P, Fell J, Bower P, Kidd L, Blickem C, McPherson K, Hunt K, Gilbody S, & Richardson G. (2015). The effectiveness of self-management support interventions for men with long term conditions: a systematic review and meta-analysis. *BMJ Open 5*(3), e006620.

Gore, T., Lutz, R., Bernard, O., & Hernandez, I. F. (2018). Home health simulation: Helping students meet the changing healthcare needs. *Journal of Nursing Education and Practice 9*(1), 27-31. https://doi10.5430/jnep.v9n1p27.

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.

Hilton, P. A., & Pollard, C. L. (2005). Enhancing the effectiveness of the teaching and learning of core clinical skills. *Nurse Education in Practice*, *5*(5), 289-295.

Jeffries, P. R., & Rizzolo, M. A. (2006). *Designing and implementing models for the innovative use of simulation to teach nursing care of ill adults and children: A national, multi-site, multi-method study*. New York, NY: National League for Nursing.

Kardong-Edgren, S., Gore, T., Waxman, K. T., & Willhaus, J. K. (2018, April). Sharing student performance information in simulation: A debate. *Clinical Simulation in Nursing, 17*, 58-62. https://doi.org/10.1016/j.ecns.2017.12.003.

Kardong-Edgren, S., Lungstrom, N., & Bendel, R. (2009). VitalSim® versus SimMan®: A comparison of BSN student test scores, knowledge retention, and satisfaction. *Clinical Simulation in Nursing*, *5*(3), e105-e111. http://dx.doi.org/10.1016/j.ecns.2009.01.007.

Kim, J., Park, J., Shin, S. (2016). Effectiveness of simulation-based nursing education depending on fidelity: A meta-analysis. *BMC Medical Education*, *16*(152), 1-8. https://doi:10.1186/s12909016-0672-7

Lee, J., Lee, H., Kim, S., Choi, M., Ko, I. S., Bae, J., & Kim, S. H. (2020). Debriefing methods and learning outcomes in simulation nursing education: A systematic review and meta-analysis. *Nurse Education Today 87,* 104345. https://doi.org/10.1016/j.nedt.2020.104345.

Moxley, E. & Waller, M. (2019). Alternative strategies for providing clinical experiences in a family nursing course. *Teaching and Learning in Nursing*, *14*, 173-178. https://doi10.1016/j.teln.2019.02.005

Murray, S., Laurent, K., & Gontarz, J. (2015). Evaluation of a concept-based curriculum: a tool and process. *Teaching and Learning in Nursing, 10*(4), 169-175.

Randolph & Ridenour (2015). Comparing simulated nursing performance to actual practice. Journal of Nursing Regulation, 6(1), 33-38.

Shinnick, M. A., & Woo, M. A. (2014). Does nursing student self-efficacy correlate With knowledge when using human patient simulation? *Clinical Simulation in Nursing, 1*0(2), e71-e79. http://dx.doi.org/10.1016/j.ecns.2013.07.006.

Tanner, C. A. (2006). Thinking like a nurse: A research-based model of clinical judgment in nursing. *Journal of Nursing Education*, *45*(6), 204-211.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education 2*, 53.

Tella, S., Liukka, M., Jamookeeah, D., Smith, N.J., Partanen, P., Turunen, H. (2014). What do nursing students learn about patient safety? An integrative literature review. *Journal of Nursing Education 53*(1), 7-13. https://doi:10.3928/01484834-20131209-04.