Dissertations   UMSL Graduate Works

Nurse Practitioner Student Confidence and Competence in Common Women's Health Diagnostic Procedures

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Abstract

Problem: In areas with limited health resources, such as Guatemala, cost-effective and reliable methods for sexually transmitted infection and cervical cancer screenings are needed. The purpose of this Quality Improvement (QI) project was to develop standardized training in Vaginal Wet Mount (VWM) preparation and cervical cancer screening using Visual Inspection with Acetic Acid (VIA) for Nurse Practitioner students who traveled to Guatemala for a week-long global immersion experience.

Methods: This was a QI project with a prospective descriptive design utilizing a purposive sample of 10 University of Missouri-St. Louis Nurse Practitioner students who traveled to Guatemala on medical mission trip from January 13, 2020-January 18, 2020.

Results: A total of 10 Nurse Practitioner students scored their personal clinical confidence in performing women's health diagnostic procedures and were rated by the investigator for clinical competence when performing these skills. A significant positive correlation was observed between competence and confidence on the final clinic day ($r_p =$ 0.94, $p < .001$) with a 104% increase in confidence and a 38% increase in competence.

Implications for Practice: Standardized training in VWM and VIA may improve Nurse Practitioner students' confidence and competence in performing women's health diagnostic procedures.

In 2018, 570,000 new cases of cervical cancer were diagnosed worldwide and 311,00 women died from cervical cancer (Arbyn, 2020). Human Papillomavirus [HPV] is the Sexually Transmitted Infection [STI] responsible for 90% of cervical cancer (Centers for Disease Control and Prevention (CDC), 2019). In addition to cervical cancer, undiagnosed/untreated STIs can lead to cervicitis, pelvic inflammatory disease, and infertility (Frobenius & Bogan, 2015). It is the responsibility of healthcare providers to have the knowledge and skills necessary to screen and treat individuals from all socioeconomic backgrounds for STIs.

Globally, cervical cancer is the fourth most common cancer in women (Arbyn, 2020). In Guatemala, where over half of the population lives in poverty, cervical cancer is the most common type of cancer in women, ages 15 to 44 (Institut Català d'Oncologia, 2018). This statistic is noteworthy because 80% of cervical cancer deaths occur in less-developed regions. Vaccination and screening can reduce the morbidity and mortality associated with high-risk strains of HPV (CDC, 2019). Unfortunately, vaccination for HPV and HPV DNA testing are not currently available through public healthcare in Guatemala (Chary & Rohloff, 2014). As such, there is a need for practitioners skilled in screening for common signs of cervical dysplasia and STIs in this region.

Vaginitis is the most common women's health-related patient complaint in a primary care setting (Pizzorono, Murray, & Joiner-Bay, 2016). A wet mount of vaginal discharge can often identify common non-infectious and infectious causes of vaginitis such as candida, bacterial vaginosis, and trichomoniasis. The ability to obtain and interpret wet mount microscopy is an important skill for practitioners (Frobenius & Bogdan, 2015).

The clinical skills of obtaining and interpreting a Vaginal Wet Mount (VWM), as well as performing cervical cancer screening using Visual Inspection with Acetic Acid (VIA), are not currently incorporated in on-campus residency days for Nurse Practitioner (NP) students at the University of Missouri-St. Louis (UMSL). Experience must be gained via clinical residency opportunities, thus leaving a potential knowledge gap for students prior to graduation. Students participating in the Guatemala Intersession opportunity currently receive training in these skills by a Spanish-speaking women's health physician via a translator the night prior to working in the women's clinics. Though helpful, this training leaves limited opportunities to review clinical skills. There is also the potential for knowledge breakdown via the interpreter services.

The purpose of this Quality Improvement (QI) project was to develop standardized training in VWM preparation and cervical cancer screening using VIA for NP students in the United States traveling to Guatemala for a global immersion medical mission. The aim was to increase the confidence and competence of students when performing these procedures by at least 25% at the end of the global immersion experience. Outcome measures of interest were NP students' self-reported confidence scores and objective evaluation of competency scores of VWM preparation and VIA during the global immersion experience. The question to be answered by this project was:

> In U.S. NP students who staff a temporary medical clinic in a rural area of Guatemala for one week, how did a standardized training for VWM preparation for vaginitis screening and VIA for cervical cancer screening influence confidence and competence when performing these procedures?

Secondary data collected were students' NP track, gender, clinical residency experience, and number of speculum exams performed.

Review of the Literature

A comprehensive literature review was conducted using CINAHL, Medline and PubMed databases and the keywords 'cervical cancer', 'HPV', 'sexually transmitted infections', 'visual inspection', 'vaginitis', 'wet mount', 'low-income', 'screening', 'cost', 'Guatemala', 'students', "confidence", "competence", and 'treatment'. The search returned 208 peer-reviewed, scientific articles from 2009-2019. From this literature, twelve research articles were chosen. Research articles chosen focused on the VIA method of screening for cervical cancer, integrating wet mounts into the diagnosis of vaginitis, and improved clinical confidence and competence by nursing students. Articles excluded focused on a diagnosis based strictly upon lab analyses, hormonal impacts on vaginal flora, and non-pathogenic conditions of the vagina and cervix.

The literature identifies cost and timeliness as major benefits of VIA in low-income areas (Chary & Rohloff, 2014; Huy et al., 2018; Paul et al., 2013; Poli, Bidinger, & Gowrishankar, 2015; Quentin et al., 2011; Saleh, 2014). VIA is simple to perform after appropriate training and can provide immediate feedback regarding the presence of cervical dysplasia (Chary & Rohloff, 2014; Huy et al., 2018; Saleh, 2014). Though it is advisable to include laboratory co-testing for HPV and colposcopy whenever possible, these methods are often not financially or logistically feasible for many women worldwide (Huy et al., 2018; Poli, Bidinger, & Gowrishankar, 2015; Quentin et al., 2011).

A cross-sectional study by Bhattacharyya, Nath, and Dika (2015), found that VIA has a sensitivity of 89% compared to a pap smear which has a sensitivity of 52%, and a specificity of 87% versus 95% with a pap. This re-enforces the premise that VIA is a useful methodology for cervical cancer screening. Several research studies noted a major benefit of VIA is the immediate ability to identify cervical lesions based on their aceto-white appearance (Chary & Rohloff, 2014; Huy et al., 2018; Quentin et al., 2011; Saleh, 2014). If the lesions are small, they can be treated on-site with cryotherapy which can be effective in eliminating the dysplasia or slowing its' growth (Paul et al., 2013; Quentin et al., 2011; Saleh, 2014).

Wet mount microscopy is a skill that can be beneficial for practitioners working with female patients. Practitioners who can effectively analyze wet mount slides are often able to diagnosis and treat bacterial vaginosis, candida, and trichomoniasis during an office visit (Lowe, Neal, & Ryan-Wenger, 2009). A combination of wet-mount microscopy with laboratory testing is the preferred method of diagnosis in areas such as the United States, where it is cost-effective, however wet mounts are still an important component of vaginitis diagnosis management (Buyukbayrak et al., 2010). Appropriate assessment and treatment for vaginitis and STIs can improve patients' quality of life and reduce economic health burdens (Paz-Soldan et al., 2012).

A quantitative cross-sectional study by Panduragan, Abdullah, Hassan, and Mat (2011) found that clinical confidence is related to clinical competence. Undergraduate nursing students who received standard didactic training, but had limited opportunities to practice clinical skills were not confident in their clinical diagnostic or assessment abilities and had poor clinical performance. In fact, 90.5% of nursing students in this

study were not confident in their abilities to provide clinically competent care. Though

NP students participating in the Guatemala study abroad had more overall clinical

experience than the undergraduate students in this study, both groups were performing

new skills. The findings of this study highlight the importance of problem-based learning

in which students have the ability to practice new clinical skills with faculty or providers

present.

     A quantitative study by Merritt and Murphy (2019), found that NP students who

engaged in international medical opportunities, such as nurse-led clinics in Guatemala,

increased not only their clinical confidence but also their cultural and clinical

competence. After working in two rural Guatemalan clinics, participants were more

confident in their history taking and clinical assessment skills. In addition, 70% of

students scored in the exemplary or accomplished level of demonstrated clinical skills as

rated by faculty at the end of their clinic experience.

     Limitations of the literature reviewed include small sample sizes, inability to

follow-up with patients, publication date of studies, and use of more expensive diagnostic

techniques such as cytology, HPV co-testing, and other lab testing as primary study

components. Gaps in the literature include insufficient description of implementation of

these clinical skills in underserved areas including Guatemala specifically, as well as

overall benefits to practitioners worldwide who possess these skills compared to those

without training. Recommendations in the literature include implementing pap smears

with HPV co-testing if funds were available and providing HPV vaccinations (Chary &

Rohloff, 2014; Huy et al., 2018; Saleh, 2014).

The Plan Do Study Act (PDSA) is the framework that best supported this QI

project. The PDSA cycle outlines a pathway by which processes and outcomes can be

implemented, evaluated, and modified to achieve the best clinical results (Taylor et al.,

2014). Currently, UMSL NP students traveling to Guatemala do not have any formal

training on VWM collection and microscopy. Training for VIA is conducted in

Guatemala by a Spanish-speaking women's health physician with the assistance of a

translator. The PDSA process enabled focused action to develop an English language-

based VoiceThread training and to evaluate the value of this project. This framework

provided opportunities for improvement in order to have optimal results for students

delivering care and patients receiving care.

Method

Design

This was a QI project utilizing a prospective descriptive design. The intervention

was the viewing of a VoiceThread training in English, which described and demonstrated

how to obtain and interpret a VWM in addition to performing VIA. The outcome

measures of interest were NP students' self-reported confidence scores and objective

investigator evaluation of competency scores of VWM preparation and VIA during the

global immersion experience.

Students rated their confidence in performing VWM and VIA skills using a five-

point investigator-designed Likert scale, scoring no experience at 1 to highly confident at

5. Nine items were evaluated related to VWM and VIA including speculum exams,

diagnosis of common STIs and vaginitis, preparation and interpretation of wet mount

microscopy, and application and interpretation of acetic acid for cervical dysplasia.

Confidence ratings were completed four times by students: pre and post-viewing of a VoiceThread training, and after performing skills in the women's clinic on both initial and final days of the trip. The primary investigator rated each student's competence in performing the same procedures using a five-point Likert scale, scoring no competence at 1 to highly competent at 5 on the initial day (day 1) and final clinic day (day 4).

Setting

The project was implemented at two temporary women's clinics in Guatemala. NP students from UMSL traveled to two rural villages and worked in conjunction with Nursing Heart, Inc., a Non-governmental organization (NGO), to provide vaginitis, STI, and cervical cancer screenings. The total number of patients seen in the women's clinics from January 13, 2020 to January 18, 2020 was 111 women.

Sample

This project used a purposive sample of 10 NP students from UMSL who participated in the Guatemala study abroad from January 13, 2020 to January 18, 2020. Inclusion criteria were enrollment as a NP student in the Guatemala medical mission course. BSN students enrolled in the course and NP students not enrolled in the Guatemala medical mission were excluded from this project. Some students in this cohort completed a portion of their clinical residency hours prior to the trip and others had not yet started residency hours. One student was a practicing Family NP pursuing a doctoral degree. A unique identifier was created for each student to protect his/her identity when performing data evaluation. This identifier was a numerical combination of the student's birth date (four digits - month/day) and the student's home zip code, generating a nine-digit unique identifier.

Approval Processes

The project was submitted to and approved by the UMSL Institutional Review Board. Consent was given by Nursing Heart Inc., for collaboration with their practicing physician. Written consent for participation was obtained for all students participating in the project. Breach of confidentiality was a potential risk associated with study participation. Benefits of this project included improved clinical competencies and improved confidence by students when performing women's health screenings. An additional benefit was more comprehensive screenings for patients receiving care in the two women's health clinics in Guatemala. There were no known ethical concerns.

Procedures

The initial phase of this project was development of an educational teaching VoiceThread that included demonstrations of VWM and VIA, and was accessed at https://umsl.voicethread.com/share/13354228/. This information was presented to the investigator's committee for review prior to submission to the UMSL IRB. After IRB approval, the proposal was submitted to the UMSL Graduate School.

Prior to the start of the trip, beginning January 13, 2020, NP students were given a brochure describing the project. Students were emailed the informed written consent form, which was signed and returned prior to leaving for Guatemala. The VoiceThread intervention along with the survey tool were made available through UMSL student email to consenting students no later than January 6, 2020 with a completion date of January 10, 2020.

Students rated their clinical confidence in the skills of VWM microscopy and VIA skills prior to and after viewing the module using the investigator-designed Likert survey.

Students utilized the same survey to rate their confidence after spending one day in the women's clinics in Guatemala and again on the final day. The investigator utilized a version of the same tool to rate students' clinical competency on the initial and final clinic days. Hard copy survey sheets were collected and stored by faculty during the trip and returned to the student investigator after returning to the U.S.

Likert survey results were entered into a Microsoft Excel spreadsheet. Utilizing Intellectus Statistics, a data analysis of student and investigator survey results was completed. Paired samples t-tests and a Pearson correlation analysis were used for the primary outcome measures. Descriptive statistics were used for secondary data.

Data Collection/Analysis

Students signed written consent prior to participating in the project. Demographic data including students' program track and gender, number of residency hours and number of speculum exams performed were recorded at the start of the project. At the conclusion of the project, students reported the number of speculum exams performed in the Guatemalan clinics. Students rated their confidence in performing women's health procedures using the five-point investigator designed Likert scale. The primary investigator rated each student's competence in performing the same procedures related to VWM and VIA using an investigator-designed five-point Likert scale. A list of participants with their names and unique identifiers was stored on a USB flash drive in a separate file from that of the data collection file. The data collection file was coded using the unique identifier and saved in spreadsheet format and stored on a USB flash drive. Hard copies of the survey data were shredded after data were entered into the

spreadsheets. All data files were saved on a password-protected laptop computer where they will remain for a period of seven years, then be destroyed.

Paired t-tests were used to analyze the primary outcome measures of clinical confidence as assessed by the students and clinical competence as assessed by the investigator. A Pearson Correlation was used to analyze clinical competence and clinical confidence on the final day. Demographic data were summarized using descriptive statistics.

Results

The most frequently observed gender identity was female ($n = 8$, 80%). The most frequently observed NP Focus was Family ($n = 9$, 90%). One student was in the Adult/Gero NP Track ($n = 1$, 10%). Nine students were in the Family NP Track ($n = 9$, 90%). The average number of clinical hours completed prior to the Guatemala trip was 296.00 ($SD = 617.81$). The average number of prior speculum exams was 30.10 ($SD = 77.65$). The number of speculum exams performed in Guatemala had an average of 11.1 ($SD = 1.66$). The mean scores for initial confidence (M = 1.97), final day confidence (M = 4.02), initial clinical competence (M = 2.97), and final day competence (M = 4.11) were compared and percent increase is displayed in Figure 1 (Appendix A).

A two-tailed paired samples *t*-test was conducted to examine whether the mean difference of student confidence pre-test scores (M = 1.97, SD = 0.90) versus student confidence post-test scores (M = 2.91, SD = 0.88) was significant. The result was significant based on an alpha value of 0.05, $t(9) = -6.25$, $p < .001$, $d = 1.98$).

A two-tailed paired samples *t*-test was conducted to examine whether the mean difference of confidence day 1 (M = 3.63, SD = 0.72) and confidence final day (M =

4.02, SD = 0.67) was significant. The result was significant based on an alpha value of 0.05, $t(9) = -3.57$, $p = .006$, $d = 1.13$.

A two-tailed paired samples *t*-test was performed to determine whether the mean difference of competence day 1 (M = 2.97, SD = 0.39) and competence final day (M = 4.11, SD = 0.45) was significant. The result was significant based on an alpha value of 0.05, $t(9) = -13.54$, $p < .001$, $d = 4.28$).

A Pearson correlation analysis was conducted between confidence final day and competence final day. Figure 2 (Appendix B) presents the scatterplot of the correlation with a regression line that demonstrated the strength of the relationship. Alpha value was set at 0.05. A significant positive correlation was observed between confidence final day and competence final day ($r_p = 0.94$, $p < .001$).

Discussion

This QI project initiated a PDSA cycle to gather baseline information after implementation of a VoiceThread training for NP students traveling to Guatemala. All paired samples t-tests were significant, indicating gains pre to post. The Pearson correlation analysis showed a large effect size, meaning that as students' confidence increased, students' competence also increased. Students' self-evaluation of confidence was statistically significant from the initial test to the final day with an overall 104% increase in confidence. Mean scores for student competence increased 38%. This demonstrates that utilization of the VoiceThread training combined with clinical practice improved students' confidence and competence in performing women's health diagnostic procedures by greater than 25%.

The main limitation of this study was small sample. Ideally, this study should be replicated with a larger group of NP students from varying specialty tracks. Investigator bias was another potential limitation. Due to time constraints and workflow, it was decided that the primary investigator, who works in the women's health field, would score the students. In addition, gauging baseline student competence in women's health skills prior to training would be beneficial for future competency measurement.

Additional PDSA cycles should be conducted in order to streamline this approach to student teaching. Investigators should gauge student confidence and competence at baseline and then record scores throughout the clinical experience. In future cycles, more opportunities to practice skills in the women's clinic may be beneficial in regard to improved competency.

Conclusion

This QI project successfully improved NP students' self-confidence and clinical competence in performing women's health diagnostic procedures. Cervical cancer, vaginitis, and STIs are all major women's health problems worldwide. A standardized training module in VIA and VWM may be a beneficial addition to the curriculum for NP students participating in immersion medical trips that focus on women's health issues.

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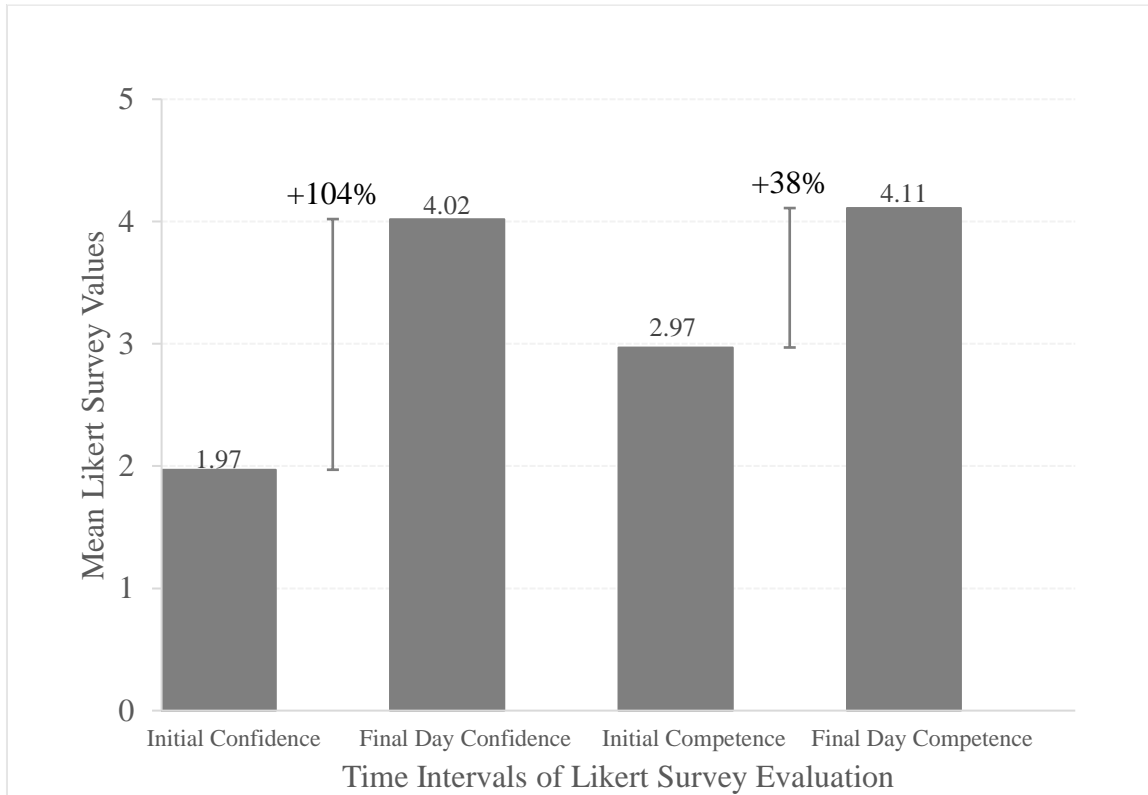
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Appendix A

Figure 1. Percent Increase in Mean Confidence and Competence Scores.

Appendix B

Figure 2. Scatterplot of Mean Final Day Confidence and Competence Scores with Regression Line Added.