DEVELOPMENT AND EVALUATION OF A NURSE ANESTHETIST-DIRECTED POST-OPERATIVE NAUSEA AND VOMITING RISK STRATIFICATION TOOL FOR PATIENTS UNDERGOING LAPAROSCOPIC SURGERY IN AN AMBULATORY SURGERY CENTER.

A Quality Improvement Project

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Final DNP-Project III
DNP 8002

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Dr. Erika Bendetti, DNP, CRNA DNP Project Team Member
Introduction

- PONV Definition
- Overall incidence
- Pathophysiology-Neural System
Problem Description

- Debilitating for patients
- PONV delays timely discharge to home
- PONV lowers the efficiency of Ambulatory Surgical Centers (Maurice, 2015).
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AVAILABLE KNOWLEDGE

- The literature supports the use of PONV risk stratification with the Apfel

- The Apfel is one of five risk scoring systems found in evidence-based literature

- Easy to use
Rationale Theoretical Framework

Conceptual Theory

Weidenbach, nursing theorist and founder of the Prescriptive Theory Conceptual model

Also known as, “The Helping Art of Clinical Nursing” (Nursing-Theory.org).

This theory applies to implementation of the Apfel into clinical practice at ASCs and directs planned interventions towards a specific goal.

Photo Credit: http://currentnursing.com/nursing_theory/Ernestine_Wiedenbach.html
Evidence Based Model

Plan, Do, Study, Act Cycle

**PLAN**
- Propose change idea and how it will be tested
- Predict what will happen

**DO**
- Implement change idea
- Collect data
- Reflect on how well the plan was followed

**ACT**
- Share final reflections
- Conclude whether to adopt, adapt, or abandon change idea

**STUDY**
- Analyze data collected
- Compare results to predictions
- Capture learnings

PICOT Question

“In ambulatory surgical center patients undergoing laparoscopic surgery, does the APFEL Simplified Risk Score in the post-surgical setting increase patient comfort as evidenced by a decreased incidence of postoperative nausea and vomiting (PONV) and decrease length of time in the postoperative care unit, as compared to no risk scoring system applied?”
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PURPOSE

• DISCOVER BASELINE INCIDENCE OF PONV

• COMPARE TO INTERVENTION GROUP USING APFEL TOOL

• DISCOVER IMPLICATIONS TO NURSING PRACTICE
PURPOSE (cont.)

- DISCOVER AND DISSEMINATE new knowledge about clinical area
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Context

BASELINE GROUP = Chart Review of ALL laparoscopic cases

INTERVENTION GROUP = ambulatory surgery center patients undergoing laparoscopic surgery

Supportive leadership = granted access to EHR
Apfel Simplified Risk Score

• Highly predictive for scoring risk of PONV
• Simple and Easy to use
• Based on Four Risk Factors
Data Forms

Stanford Project Outcome Data

Clinical Trial of the Apfel Simplified Risk Score approved by Dr. Zalman, Medical Director

• (To be completed by the RN or Anesthesia Provider caring for patients of moderate or high risk of PONV on Apfel Score patient in the post-surgical phase after LAPAROSCOPIC surgery at a surgical center)

• **Circle One**
  • Patient scored for high risk of PONV (score of 4 on *APFEL*)
    • Yes   or     No
  • Patient scored moderate risk of PONV (score 3 on *APFEL*)
    • Yes   or     No
  • Patient required antiemetics in PACU
    • Yes   or     No
  • Patient experienced nausea / vomiting or both in PACU
    • Yes   or     No

• Recovery Start Time: __________
• Recovery Discharge Time: __________
### Risk Assessment and Treatment Form Based on Stanford Clinical Guideline: PDNV Prophylaxis Guidelines/Apfel Data Collection Form

Determine the number of risk factors for PDNV using the simplified risk score from Apfel.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative Opioids</td>
<td>1</td>
</tr>
<tr>
<td>Non-Smoker</td>
<td>1</td>
</tr>
<tr>
<td>Female Gender</td>
<td>1</td>
</tr>
<tr>
<td>History of PDNV/Motion Sickness</td>
<td>4</td>
</tr>
</tbody>
</table>

Risk Score = sum: 1, 2, 3, 4

#### Base Prophylaxis on Risk Score:

<table>
<thead>
<tr>
<th>Risk Score</th>
<th>Prevalence PDNV</th>
<th>Prophylaxis: No of Anti-emetics</th>
<th>Examples*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1%</td>
<td>0</td>
<td>Ondansetron 4 mg, Dexamethasone 4mg, Scopolamine patch</td>
</tr>
<tr>
<td>1</td>
<td>20%</td>
<td>1</td>
<td>Ondansetron 4 mg, Dexamethasone 4mg</td>
</tr>
<tr>
<td>2</td>
<td>39%</td>
<td>2</td>
<td>Ondansetron 4 mg, Dexamethasone 4mg, Propofol infusion</td>
</tr>
<tr>
<td>3</td>
<td>60%</td>
<td>3</td>
<td>Ondansetron 4 mg, Dexamethasone 4mg, Propofol infusion, Scopolamine patch</td>
</tr>
<tr>
<td>4</td>
<td>78%</td>
<td>4</td>
<td>Ondansetron 4 mg, Dexamethasone 4mg, Propofol infusion, Scopolamine patch</td>
</tr>
</tbody>
</table>

* Combinations should be with drugs that have a different mechanism of action. Consider strategies to reduce PDNV baseline risk such as regional anesthesia instead of general anesthesia, adequate hydration, prepared for induction and maintenance, minimize the use of nitrous oxide and volatile anesthetics. Please do not order an agent for treatment in PACU that has been used for prophylaxis. References for this guideline available upon request.

Clinical Trial of the Apfel Simplified Risk Score approved by Dr. Zulman, Medical Director

Data Form by Klia Hargrove-Lopez, DNP Student Wilmington University

Circle One or Complete Data Below. To be completed by the RN or Anesthesia Provider caring for patients of moderate or high risk of PDNV on Apfel Score patient in the post-surgical phase after LAPAROSCOPIC surgery at a surgical center.

**Data Collection Questions & Codes (Participant Code Number=______)**

Q1. Gender ——— M=male, F=female, O=Other
Q2. Age ——— (numerical age)
Q3. Patient scored for high risk of PDNV (score of 4 on APFEL) Yes or No
Q4. Patient scored moderate risk of PDNV (score 3 on APFEL) Yes or No
Q5. Patient required anti-emetics in PACU Yes or No
Q6. Patient experienced nausea/vomiting or both in PACU Yes or No
Specific Aims/ Rationale

- Risk Assessment Score initiated preoperatively and completed in PACU
- Lower Patient baseline risk score
- Follow Stanford Medicine’s CLINICAL GUIDELINES
- Increase satisfaction
- Increase comfort
- Timely discharge to home
- Fulfill DNP ESSENTIALS
## Data Analysis

### t-Test: Two-Sample Assuming Unequal Variances

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Apfel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>94.25</td>
<td>80.32143</td>
</tr>
<tr>
<td>Variance</td>
<td>2300.5806</td>
<td>463.3373</td>
</tr>
<tr>
<td>Observations</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>Hypothesized Mean Diff</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>1.481085</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.072855</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.68023</td>
<td></td>
</tr>
</tbody>
</table>

### F-Test Two-Sample for Variances

<table>
<thead>
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<th>Control</th>
<th>Apfel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>94.25</td>
<td>80.32142857</td>
</tr>
<tr>
<td>Variance</td>
<td>2300.580645</td>
<td>463.3373016</td>
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<tr>
<td>Observations</td>
<td>32</td>
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<tr>
<td>df</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>F</td>
<td>4.965239443</td>
<td></td>
</tr>
<tr>
<td>P(F&lt;=f) one-tail</td>
<td>3.21195E-05</td>
<td></td>
</tr>
<tr>
<td>F Critical one-tail</td>
<td>1.878172507</td>
<td></td>
</tr>
</tbody>
</table>

Since the F Critical value is lower than the F - unequal variance is present, thus the t-Test: Two-Sample Assuming Unequal variance is used for the analysis.
RESULTS

Demographics

Recovery Time

Demographics

Recovery Time

PONV Apfel, 94.25

PONV NON-Apfel, 80.32
AACN’s DNP Essentials

American Association of Colleges of Nursing

Photo credit: https://www.aacnnursing.org/
DNP Essential I
Scientific Underpinnings for Practice

Ernestine Weidenbach’s Prescriptive Theory (WPT)

WPT demonstrates the cause and effect relationship that is essential to nursing practice
Strategic Movement to combat PONV-using Stanford Clinical Guidelines (SCG)

Involves multiple disciplines and APN leadership
Research and discovery of New Knowledge

PONV incidence is lowered by Risk Stratification using the Apfel according to consensus guidelines
DNP Essential IV
Information Systems/ Technology

Care Technology for the improvement and transformation of Health care
Institutional decision making by applying what is in the literature to change policy
DNP Essential VI
Interprofessional Collaboration for Improving Patient & Population Health Incomes

1. Medical Doctors
2. Surgeons
3. Nursing Leaders
4. Leadership for supplies
5. Medical Billing
6. Statistician
7. Editor
8. Project Team Member & Chair
The foundation of this Clinical Prevention and Risk screening of PONV contributes to health promotion and disease prevention.
DNP Essential VIII
Advanced Nursing Practice

Understanding the complex needs of patients before, during, and after surgery is essential to practice.
ETHICAL CONSIDERATIONS

- NIH CERTIFICATE

- QUALITY IMPROVEMENT PROJECT = NO CONSENT REQUIRED

- UNETHICAL TO WITHHOLD ANTIEMETICS in BASELINE GROUP
## BUDGET

<table>
<thead>
<tr>
<th>Income</th>
<th>Per Unit</th>
<th>Year One</th>
<th>Year Two</th>
<th>Year Three</th>
<th>Cost Savings Income</th>
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</thead>
<tbody>
<tr>
<td>Grant Funds</td>
<td></td>
<td>$30,000.00</td>
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<tr>
<td>Cost Savings from PONY presentation in Nurse Overtime Rate per hour 290 cases based on projected 2 hr earlier discharge from PACU to home</td>
<td></td>
<td>$45.00</td>
<td>$18,000.00</td>
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</tr>
<tr>
<td>Cost Savings from PONY presentation in Certified Nurse Anesthetist x 355 cases, based on 2 hour projected earlier discharge to home</td>
<td></td>
<td>$18.00</td>
<td>$18,000.00</td>
<td>$18,000.00</td>
<td>$18,000.00</td>
</tr>
<tr>
<td>Total savings to surgery center/income</td>
<td></td>
<td>$63.00</td>
<td>$36,000.00</td>
<td>$36,000.00</td>
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</table>

### Expenses

**Salaries**

<table>
<thead>
<tr>
<th></th>
<th>Per Unit</th>
<th>Year One</th>
<th>Year Two</th>
<th>Year Three</th>
<th>Cost Savings Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator</td>
<td>$7,000.00</td>
<td>$7,000.00</td>
<td>$7,000.00</td>
<td>$7,000.00</td>
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<tr>
<td>Project Team Member</td>
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<td>$6,000.00</td>
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<td>$0.00</td>
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<tr>
<td>Subtotal</td>
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<td>$13,000.00</td>
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<td>$0.00</td>
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</table>

**Startup Costs**

<table>
<thead>
<tr>
<th>Cost</th>
<th>Per Unit</th>
<th>Year One</th>
<th>Year Two</th>
<th>Year Three</th>
<th>Cost Savings Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical Analysis - Two Tailed T-test Consulting from brestastatclrn.com</td>
<td></td>
<td>$500.00</td>
<td>$500.00</td>
<td>$500.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Medications: Zofran, Daraprim, Scopolamine</td>
<td></td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Printer &amp; Ink</td>
<td></td>
<td>$500.00</td>
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<td>$0.00</td>
</tr>
<tr>
<td>Flash Drive or password protected data</td>
<td></td>
<td>$200.00</td>
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</tr>
<tr>
<td>Microsoft Office software (amazon.com $100 per year)</td>
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<td>$100.00</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Telephone (cell phone) $100.00/month</td>
<td></td>
<td>$100.00</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>PONY Risk Stratification Quick Reference Pocket Guide (1000)</td>
<td></td>
<td>$600.00</td>
<td>$600.00</td>
<td>$600.00</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>TOTAL EXPENSES</strong></td>
<td></td>
<td>$3,195.00</td>
<td>$3,195.00</td>
<td>$3,195.00</td>
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</table>

### Operating Expenses

<table>
<thead>
<tr>
<th>Cost</th>
<th>Per Unit</th>
<th>Year One</th>
<th>Year Two</th>
<th>Year Three</th>
<th>Cost Savings Income</th>
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</thead>
<tbody>
<tr>
<td>Salaries: Grant Program Manager (1.0 8.0 FTE)</td>
<td></td>
<td>$18.58</td>
<td>$7,800.00</td>
<td>$7,800.00</td>
<td>$15.63</td>
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<tr>
<td>APN Leadership/Principal Investigator (0.2 8.0 FTE)</td>
<td></td>
<td>$23.33</td>
<td>$9,000.00</td>
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<tr>
<td>Clinical Project Team Member (per 1.0 8.0 FTE)</td>
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<td>$20.83</td>
<td>$8,000.00</td>
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</tr>
<tr>
<td>Cost to use Vellamated Tool</td>
<td></td>
<td>$400.00</td>
<td>$400.00</td>
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</tr>
<tr>
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<td></td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Medications: Zofran x 12 8.0 FTE, Daraprim 5 x 6.0 FTE, Scopolamine x 12 8.0 FTE, $100 per year</td>
<td></td>
<td>$18.81</td>
<td>$3,000.00</td>
<td>$3,000.00</td>
<td>$15.63</td>
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<tr>
<td>Flash Drive or password protected data</td>
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<td>$100.00</td>
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</tr>
<tr>
<td>Telephone (cell phone) $100.00/month</td>
<td></td>
<td>$100.00</td>
<td>$100.00</td>
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<tr>
<td>PONY Risk Stratification Quick Reference Pocket Guide (1000)</td>
<td></td>
<td>$16.66</td>
<td>$16.66</td>
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</tr>
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</table>

**TOTAL OPERATING EXPENSES**

<table>
<thead>
<tr>
<th></th>
<th>Per Unit</th>
<th>Year One</th>
<th>Year Two</th>
<th>Year Three</th>
<th>Cost Savings Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$27,400.00</td>
<td>$27,400.00</td>
<td>$27,400.00</td>
<td>$27,400.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>
Data Analysis

Statistically Analyzed Data with a Two-Tailed T test

PONV Incidence

• 7.1% in intervention group

• 9.4 in baseline group
Implications for Nursing Practice

Leadership to incorporate evidence-based practice guidelines

EBP→New knowledge = patient outcomes will improve.
Limitations

1. Key outcome measure of time to discharge was influenced by external factors.

2. Time to implement

3. Baseline GROUP received antiemetics
Plan for Sustainability

1. Ensure meaningful project
2. Formed Strong Partnerships
Conclusions & Closing

• The APFEL TOOL alone does not impact clinical outcomes

• ANTIEMETICS must be used to impact PONV incidence

• NEW KNOWLEDGE WAS GAINED &
• DNP ESSENTIALS WERE FULFILLED
Acknowledgements

• OCTOBER = BREAST CANCER AWARENESS MONTH!

• CCU PAULA HARGROVE FOUNDATION. We SUPPORT BREAST CANCER WARRIORS.

• CONTACT US!
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ACKNOWLEDGEMENTS

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• STANFORD UNIVERSITY
• ATLANTICARE SURGERY CENTER
• FAMILY
References


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