An Evidence-Based Educational Strategy to Improve Influenza Vaccination Rates Among Hospital Nurses

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Sigma Theta Tau International Research Congress
P03 – Global Disease Prevention in Influenza Sunday
July 30, 2017, 2:30 PM to 3:15 PM
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INTRODUCTION

• Seasonal influenza, or the flu, impacts over 3 million people annually.

• Nosocomial infection and absenteeism are frequently associated with the flu.

• The CDC recommends flu vaccination for all eligible individuals, especially health care workers (HCWs).

• Interventions associated with increased HCW vaccination include educational programs and occupational health campaigns to address misconceptions regarding vaccine safety and efficacy.
Influenza

20th century influenza virus; Sixth leading cause of mortality in the USA.

Annual outbreaks result in 3-5 million severe cases; between 250,000 and 500,000 deaths

Adults between the ages of 25-64, unemployed and lower socio-economic status at 25% risk for the virus.

Influenza Vaccine

Vaccine comprised of antigens 3 or 4 virulent influenza virus strains

Develop antibodies 2 weeks

Safety

CDC & ACIP recommendation as #1 prevention for influenza

RNs and HCWs

HCW are at high risk of influenza exposure

Vaccination is primary defense for HCW

Rates are FAR below the goal of Healthy People 2020 90% recommendation

Consequences

Absenteeism

Increased cost of employee sick care

Cost of replacement

Short Staffing = Possible Decrease in Quality

Hofman, Ferracin, Marsh, & Dumas, (2006); Zhang, While, & Norman, (2011); Anikeeva, Mayer, & Rogers, (2009).
• Gap in research literature; utilizing a conceptual framework, such as the Health Belief Model, can guide health behavior changes.
• Behavior change and health promotion initiatives designed to prevent the spread of influenza in hospitals are more effective when based on behavioral theory.
• Studies that explored the challenges and barriers of vaccination rates among RNs and HCW result in significant improvements of rates from 40% to 87% using evidence-based interventions.
• Interventions included free on-site influenza vaccine clinics, education, incentives, and feedback sessions
• Effective vaccine campaigns result in a positive ROI

Hypothesis: A structured influenza vaccination educational program will improve influenza vaccination rates among an RN population in an acute care setting.

Project Question: How does an internal web-based educational program impact the RN influenza vaccination rate in an acute care setting as measured by vaccine uptake rate in RNs receiving than not receiving education?
PURPOSE

• Seasonal influenza impacts over 3 million people each year.
• Within the health sector, nosocomial infection and absenteeism are frequently associated with the flu.
• The Centers for Disease Control and Prevention (CDC) recommend flu vaccination for all eligible individuals, especially health care workers (HCWs).
• Interventions associated with increased HCW vaccination include educational programs and occupational health campaigns to address misconceptions regarding vaccine safety and efficacy.
**Present Goal:** Improve vaccine uptake by RNs through the use of a web-based educational module.

**Future Goal:** To improve the RN influenza vaccination rates in the project hospital to the 90% national goal.

- Develop and implement a web-based educational program (based on the Health Belief Model) that addresses common perceptions, beliefs and information about the influenza virus and influenza vaccination.

- Develop data collection tool to measure the influenza vaccination rates for RNs at IHNV.

- Measure the effectiveness of the education program through improvement in vaccination rates in a convenience sample population of RNs' at IHNV.

- Develop a plan for dissemination plan to report the program evaluation in order to inform the organization about the outcome and to inform of future studies.
CONCEPTUAL FRAMEWORK

Educational Program
- Serves as a Cue to Action
  - Addresses Flu Susceptibility
  - Addresses Flu Severity
  - Addresses Benefits of Vaccination

Kuhns & McEwen, (2011); Boston School of Public Health (n. d.);
Coe, Gatewood, Moczyemba, Good & Beckner, (2012)
## PROJECT SETTING

### Inspira Health Network
- Charitable nonprofit network
- 4 Hospitals
- Rural Southern NJ
- Magnet Designated
- DNV & ISO Accredited

### Inspira Health Network Vineland (IHNV)
- Primary project site
- Educational intervention
- RN surveyed at vaccine clinic

### Inspira Health Network Elmer (IHNE)
- A nearby campus
- Non-Equivalent Group for Comparison
- No Educational Intervention
- RNs surveyed at vaccine clinic

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Inspira Health Network (n. d.).
PROJECT DESIGN

DESIGN

- Quasi-experimental non-equivalent group design
- Convenience (non-randomized) samples
  - *Groups of participants are formed under circumstances (self-selection) that do not permit the researcher to control the assignment of the individuals to groups, therefore, the groups are pre-existing and non-equivalent.*

MEASUREMENT TOOL

- Anonymous paper survey (4 questions)
## METHODS: SAMPLE POPULATION

<table>
<thead>
<tr>
<th>Participants</th>
<th>Inclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Nurses at all levels ranging from executive to leadership to clinical</td>
<td>• All RNs employed at the IHNV and IHNE campuses</td>
</tr>
<tr>
<td></td>
<td>• Participate in Influenza Vaccination Campaign and Complete Study Tool</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exclusion Criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• RNs’ who are ineligible to receive vaccination</td>
<td>• RNs’ temporarily assigned to IHNV</td>
</tr>
<tr>
<td>• RNs’ who are non- IHNV employees</td>
<td>• RNs’ who received were previously vaccinated at a site other than IHNV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power analysis (<em>a priori</em>); Sample size of 80 participants for analysis</td>
<td>• &gt; 220 for analysis in aggregate with power = 0.95; large effect size (w=0.5)</td>
</tr>
<tr>
<td></td>
<td>• Sample size crucial for strong nonparametric testing</td>
</tr>
<tr>
<td></td>
<td>• Chi-square goodness-of- fit test</td>
</tr>
</tbody>
</table>

### METHODS: INTERVENTION OVERVIEW

| Web-based influenza virus and vaccination educational learning program |
| Voluntary participation in the intervention, a 15 minute education learning program |
| Based on knowledge gaps identified in literature review |
| Formatted in accordance with the principles of the HBM |
| Available during employee influenza vaccination campaign (Oct to Feb). |
Recruitment to Education

Recruited via Email Announcement
Flyers Posted
Included in Staff Meetings

Intervention Group
Receive Study Survey @ Time of Vaccination or Declination
Return Anonymous Surveys to Locked Drop Box

Comparison Group
No Education
Receive Study Survey @ Time of Vaccination or Declination
Return Anonymous Surveys to Locked Drop Box
METHODS: DATA COLLECTION

Demographics
- Nursing Role
- Nursing Department
- Educational Level

Vaccine & Education
- Prior Year Y/N
- Education Y/N
- This Year Y/N
- Seasonal Flu Y/N

Study Assignment
- Location
- Eligibility

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Data Collection Form:

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Evaluating the Effectiveness of an Educational Intervention on Influenza Vaccination

As Inspira Health Network nursing leader (who is also a Walden University Doctoral Nursing Student), conducting institutional review board (IRB) committee for maximizing research interests and participant safety (Walden University). Whether the primary investigator is an employee of Inspira Health Network, they have no jurisdiction or responsibility for the site where the research is conducted. Data is being collected from nurse subjects for the ongoing influenza vaccination campaign. The purpose of this study is to assess the impact of influenza vaccination education on vaccine acceptance. The study requests that you complete the following survey after you have reviewed the study materials and completed the consent declaration form. The form must be completed approximately 5 minutes to complete. You will not be compensated for your participation. Completion of this study's survey is voluntary and anonymous. Neither your name nor any identifying data will be collected or included on any report of the study. Your responses to the survey are strictly confidential. You can choose to stop completing the survey at any time without penalty or surveillance. There are no foreseeable risks associated with completing the survey. The results of this study may help develop further educational programs related to seasonal influenza prevention and education. After completing the survey, please return the completed survey to the Institutional Review Board (IRB) at Inspira Health Network. If you have questions regarding this study, please contact the primary investigator (Temi Agbaje, RN, MSN, ANP, CRNP) at temi.agbaje@inspira.org.

Please indicate your primary professional role:
- Nursing Executive (VP, Director, etc.)
- Clinical Nurse (nursing staff, etc.)

Please indicate your primary department:
- Critical Care or Step-down
- Medical/Surgical
- NICU/ICU
- Emergency Department
- Cancer Center
- GI Lab/Analysis
- Other (please indicate)

Please indicate your graduate educational level:
- Doctorate Prepared
- Graduate Prepared
- Bachelor’s Prepared
- Associate’s Prepared

1. Did you receive vaccine in the previous year?
   - Yes
   - No

2. Did you attend/complete participation in education?
   - Yes
   - No

3. Did you receive vaccine this year?
   - Yes
   - No

4. Have you had any illness in the past two years?
   - Yes
   - No
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METHODS: DATA ANALYSIS

Descriptive statistics

- Frequencies and measures of central tendency
  - Describe the sample population including role, education level, tenure and practice setting.

Chi-Square

- Goodness of fit
  - Tests Two Dichotomous Variables:
    1. Education: Y/N
    2. Vaccination: Y/N

Additional Analysis

- Compare vaccine acceptance rates at the two study sites (IHNV and IHNE)
- Compare participants who received the intervention education and those who did not (regardless of site).

Additional Analysis

- Assess for differences between different subgroups within the study population:
  - Nurse leaders vs. Clinical nurses
  - Nurses who had contracted influenza in the previous year vs. those who did not

Polit, (2010); Burns & Grove, (2009); National Center for Technology and Innovation, (n. d.)
RESULTS: VACCINE DECISION

Table 1. Analysis of Vaccine Rates (Education Status)

<table>
<thead>
<tr>
<th></th>
<th>Educated (IHNV)</th>
<th>Not Educated (IHNV &amp; IHNE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinated</td>
<td>72</td>
<td>86</td>
</tr>
<tr>
<td>Unvaccinated</td>
<td>7</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 2. Analysis of Vaccine Rates (Campus)

<table>
<thead>
<tr>
<th></th>
<th>IHNV</th>
<th>IHNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinated</td>
<td>94</td>
<td>64</td>
</tr>
<tr>
<td>Unvaccinated</td>
<td>22</td>
<td>12</td>
</tr>
</tbody>
</table>

Vaccine Rate Comparison

Educated vs. Non-Educated
$\chi^2 = 7.210$, $p = 0.007$
# Assumptions / Limitations

## Assumptions

(RT Anonymity & Self-Reporting)

- Assume Honesty RT:
  - Role
  - Eligibility
  - Status

## Strengths

- Anonymous & Brief Survey
- Face Validity for Tool
- Non-equivalent, off-site comparison group (minimize bias)

## Limitations

- Convenience Sample
- Non-Equivalent Groups
- Uncontrolled Time Between Exposure to Education & Recruitment
CONCLUSION

RNs who participated in the educational program were vaccinated at a significantly higher rate than those who did not.

Vaccination rates at the IHNE (comparison campus) were slightly higher than the IHNV (intervention campus).

The findings suggest the educational program influenced the individual vaccination choice; however, the impact did not infiltrate the entire organization.

The web-based educational intervention was a cost-effective intervention capable of potentially providing a positive return on investment.
IMPLICATIONS: SOCIAL CHANGE

- Improved Vaccine Knowledge
- Improved Vaccination Rate
- Decreased Nosocomial Transmission
- Decreased Transmission Among RNs & HCWs
- Improved Patient Safety
- Decreased Flu in Community
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❖ PPalmieri@wienergroup.com
❖ PPalmieri@crece.uss.edu.pe
❖ PPalmieri@twu.edu

Facebook:
❖ https://www.facebook.com/professor.palmieri
APPENDICES
RESULTS: RETURN ON INVESTMENT (ROI)

- National Estimates = $2.58 per $1 ROI
  - RT Decreased Absenteeism
  - RT Decreased Replacement Costs
  - RT Decreased Sick Care for Employees

Potential Revenue: $11,647

Less Expense: $5,157

ROI: $6,490
## Sample Demographics

<table>
<thead>
<tr>
<th></th>
<th>VINELAND</th>
<th>ELMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N</td>
<td>116</td>
<td>76</td>
</tr>
<tr>
<td>Completed Education</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td>Accepted Vaccination</td>
<td>94</td>
<td>64</td>
</tr>
<tr>
<td>Previous Flu (2 Years)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Previous Vaccine (Last Year)</td>
<td>98</td>
<td>55</td>
</tr>
<tr>
<td>Nursing Role</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical RNs</td>
<td>84</td>
<td>48</td>
</tr>
<tr>
<td>Non-Clinical Nurse</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Nurse Executive</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Nurse Leader</td>
<td>13</td>
<td>17</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Nursing Degree</th>
<th>VINELAND</th>
<th>ELMER</th>
</tr>
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<tbody>
<tr>
<td>Associate Degree</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>BSN</td>
<td>67</td>
<td>62</td>
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<tr>
<td>MSN</td>
<td>24</td>
<td>7</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Most Common Practice Settings</th>
<th>VINELAND</th>
<th>ELMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Care</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Maternal Child Health</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Medical Surgical</td>
<td>39</td>
<td>29</td>
</tr>
<tr>
<td>Surgical Services</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>
## Results: Vaccine Decision by Demographics

<table>
<thead>
<tr>
<th>Demographic Category</th>
<th>Vaccine: YES</th>
<th>Vaccine: NO</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vineland Campus</strong></td>
<td>94</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Elmer Campus</strong></td>
<td>64</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Previous Influenza (2 Years)</strong></td>
<td>10</td>
<td>1</td>
<td>$x^2=0.595$, p=0.441</td>
</tr>
<tr>
<td><strong>Previous Vaccine (Last Year)</strong></td>
<td>148</td>
<td>33</td>
<td>$x^2=14.465$, p=&lt;0.001</td>
</tr>
<tr>
<td><strong>Nursing Role</strong></td>
<td></td>
<td></td>
<td>$x^2=5.347$, p=0.148</td>
</tr>
<tr>
<td>Clinical Nurses</td>
<td>104</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Non-Clinical Nurse</td>
<td>4</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Nurse Executive</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Nurse Leader</td>
<td>2</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td><strong>Nursing Degree</strong></td>
<td></td>
<td></td>
<td>$x^2=1.655$, p=0.437</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>24</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>BSN</td>
<td>109</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>MSN</td>
<td>25</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Most Common Practice Settings</strong></td>
<td></td>
<td></td>
<td>$x^2=8.981$, p=0.344</td>
</tr>
<tr>
<td>Critical Care</td>
<td>23</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Emergency Department</td>
<td>18</td>
<td>5</td>
<td></td>
</tr>
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<td>2</td>
<td></td>
</tr>
<tr>
<td>Medical Surgical</td>
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<td>6</td>
<td></td>
</tr>
<tr>
<td>Surgical Services</td>
<td>18</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
### Expenses

<table>
<thead>
<tr>
<th>Description</th>
<th>Fixed Expenses</th>
<th>Variable Expenses</th>
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</thead>
<tbody>
<tr>
<td>HealthStream® annual fee</td>
<td>$2,500</td>
<td>0</td>
</tr>
<tr>
<td>Supplies for flyers and survey</td>
<td>0</td>
<td>$100</td>
</tr>
<tr>
<td>Lock Box for Survey</td>
<td>$50</td>
<td></td>
</tr>
<tr>
<td>Project Development (student’s own time)</td>
<td>$1200</td>
<td></td>
</tr>
<tr>
<td>Completion of education program (by RN population)</td>
<td>20 minutes * 145 RNs * $27.05 (average RN salary) = $1307</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$5007</strong></td>
<td><strong>$150</strong></td>
</tr>
</tbody>
</table>

#### Total Expenses

| Total Expenses | $5157 |

#### Revenue

- Vaccinating employees and reducing absenteeism can save employers $2.58/employee x 701 RN participants = $1,808.58
- Average cost of 1 flu-related geriatric hospital admission = $9,839

**Total Revenue (if one admission is avoided)**

**$11,647.58**
IMPLICATIONS: SOCIAL CHANGE

• Promoted health and wellness behaviors for RNs
• Heightened commitment to community through limiting influenza virus with vaccination.
• Advance practice nurses (APNs) have the expertise to develop and communicate important health messages that address an individual’s perception of susceptibility to influenza, the severity of the virus, and potential complications.
• APNs and clinical RNs are well positioned to influence health promotion practices with through educational programs, such as influenzas vaccination.
• Change in practice has the potential to not only change the vaccine behaviors or HCW, but also change vaccine related information provided to patients.
• Educational program provided information about the common misconceptions related to vaccine safety and efficacy which RNs can share with colleagues, patients and families.
• This program was not complicated and can be translated into a variety of health care and non-healthcare settings (such as schools or corporate offices)
REFERENCES


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