NURSING DIAGNOSES, INFLUENCE OF AN ELECTRONIC NURSING CARE PLAN WITH STANDARDIZED NURSING LANGUAGES ON CORRECTNESS, AGREEMENT, AND ACCURACY.

AN EXPERIMENTAL STUDY

Helen de Graaf-Waar, RN, MSc
Nursing Diagnoses, influence of an Electronic Nursing Care Plan with Standardized Nursing Languages on Correctness, Agreement, and Accuracy.

An experimental study

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Content

- Background
- Aim and research questions
- Research design
- Results
- Conclusion and limitations
- Discussion and recommendations
Background

Purpose Nursing Documentation

- Shared responsibility
- Representation nursing process

Standardized Nursing Languages

- Evidence in the literature on improvements of nursing documentation

NANDA-I classification

- Internationally implemented and recognized
- PES structure
Definitions

Accuracy of NDx

NDx with supporting cues or contributing factors
PES structure

Agreement on NDx

As in inter-rater reliability. Agreement between nurses mutual

Correctness of NDx

As in agreement with ‘golden standard’;
Correct NDx according to expert nurses or presented in the case.
Electronic Health Records and SNL

Combination of SNL and EHR improves diagnostic accuracy and thus patient outcomes

Cochrane review: no evidence that SNL improves patient outcomes

Bruylands et al (2013):
implementation of EHR, pre-post measurement:
accuracy not influenced by EHR

RCT, effects of Computer Aided Nursing diagnoses System
significant decrease in time needed
no significant improvement of accuracy
Aim and research questions

Aim

To test whether using EHR based nursing documentation including all elements of standardized NDx is of influence compared to using handwritten PES format nursing care plans.

Research Questions

What are the differences between groups in:
1. Correctness, for sets of NDx;
2. Agreement between nurses on sets of NDx;
3. Accuracy of NDx per single ND and per nurse;
Method

Design

Experimental design, pilot study

Setting:

Erasmus University Center, Rotterdam:
> 2500 nurses, > 45 wards

Convenience Sample

Inclusion criteria:
1. patient assessment at least 1/week
2. patient care planning at least 1/week
3. adult care
Method; instrumentation

Electronic Nursing Care Plan

- NANDA-I NDx, Individualization per patient
- List wise presentation: selection of NDx for specialty area
  alphabetically ordered
  Gordon’s Functional Health Patterns

Written cases

- 2 cases, orthopedic and cardiology
- guidelines by Lunney

Questionnaires

  i.a. education, working experience, PES and/or NDx in daily practice

Other

  manuals, Likert scale on readiness
<table>
<thead>
<tr>
<th>Results</th>
<th>Sample</th>
<th>EHR (n=15)</th>
<th>Free text (n=13)</th>
<th>p-value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender,</td>
<td>(n) M/F</td>
<td>2/13</td>
<td>1/12</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>mean (range)</td>
<td>32 (20-60)</td>
<td>35 (21-61)</td>
<td>.387</td>
</tr>
<tr>
<td>Years since graduation,</td>
<td>mean(range)</td>
<td>8,9 (-2-34)</td>
<td>4.7 (-1-20)</td>
<td>.413</td>
</tr>
<tr>
<td>Specialty area:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical</td>
<td></td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Internal medicine</td>
<td></td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Medical oncology</td>
<td></td>
<td>7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Surgical oncology</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Psychiatry</td>
<td></td>
<td>1</td>
<td>0</td>
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<tr>
<td>Education level:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RN, bachelor degree</td>
<td></td>
<td>10</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>RN</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Student nurse</td>
<td></td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Use of NDx and/or PES in practice</td>
<td>n (%)</td>
<td>11 (73%)</td>
<td>9 (69%)</td>
<td></td>
</tr>
<tr>
<td>Training on NDx and or clinical reasoning after initial education</td>
<td>(n %)</td>
<td>10 (67%)</td>
<td>7 (54%)</td>
<td></td>
</tr>
<tr>
<td>Use handbook (n %)</td>
<td>Case 1</td>
<td>5 (33%)</td>
<td>9 (70%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case 2</td>
<td>3 (20%)</td>
<td>10 (77%)</td>
<td></td>
</tr>
</tbody>
</table>
Data analysis

SPSS 21

Translation of free text NDx to NANDA-I NDx

Non-parametric statistics (Mann-Whitney U test).

Study Parameters:

Accuracy of NDx: Lunney’s scale for accuracy

Correctness of sets of NDx: Jaccard Index

Agreement on NDx: Percentage agreement.
## Results Correctness (1)

### Sets of NDx (Jaccard Index)

<table>
<thead>
<tr>
<th></th>
<th>EHR</th>
<th>Free text</th>
<th>Se</th>
<th>p-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>.21 (0-.38)</td>
<td>.25 (0-.33)</td>
<td>.854</td>
<td></td>
</tr>
<tr>
<td>Case 2</td>
<td>.20 (0-.38)</td>
<td>.25 ((0-.33)</td>
<td>.627</td>
<td></td>
</tr>
</tbody>
</table>
Results  Correctness (2)

Nr of NDx (n)

- Case 1
  - Total NDx
  - Correct NDx
  - Incorrect NDx

- Case 2
  - Total NDx
  - Correct NDx
  - Incorrect NDx

*p .029*

*p .006*
## Results Accuracy

<table>
<thead>
<tr>
<th></th>
<th>EHR (n=15)</th>
<th>Free text (n=13)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (range)</td>
<td>Median (range)</td>
<td></td>
</tr>
<tr>
<td>Case 1</td>
<td>2.43 (1.50-3.75)</td>
<td>3.00 (0.00-3.60)</td>
<td>.134</td>
</tr>
<tr>
<td>Case 2</td>
<td>2.75 (1.00-4.00)</td>
<td>2.25 (0.67-4.00)</td>
<td>.180</td>
</tr>
</tbody>
</table>

Inter rater reliability Lunney’s Scale for accuracy .64
Discussion

Nurse using the EHR defined more NDx

*Call on deductive reasoning skills?*

Agreement and accuracy levels are low

*Diagnostic process and reasoning skills?*

Wide variability in NDx

*Raw data trend in favor of correct NDx and close concepts*

Layers in cases not detected,

*Clinical reasoning skills?*

Limitations

Low inter-rater reliability Lunney’s scale

Proportion of NDx in cases

Low nr of NDx in the data, lack of Power
Conclusion

Influence of SNL? No clinical implications

Expectation that differences are relevant if power increases

Feasible design, include qualitative analysis

Recommendations

Future EHR developments focus on SNL

Develop knowledge on effects of SNL

Follow-up research, experimental and qualitative
Thank you for your attention

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### Intervention: Electronic Nursing Care Plan

#### NDx for this specialism

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Pain</td>
<td>Cognitive and emotional...</td>
</tr>
<tr>
<td>Acute Verwondheid</td>
<td>Cognitieve en emotionele...</td>
</tr>
<tr>
<td>Angst</td>
<td>Zelfbelevingspatroon</td>
</tr>
<tr>
<td>Beschadigd Monddhibtevisies</td>
<td>Voedings- en stofwisselingspatroon</td>
</tr>
<tr>
<td>Chronische Pijn</td>
<td>Cognitieve en emotionele...</td>
</tr>
<tr>
<td>Diarree</td>
<td>Uitscheidingspatroon</td>
</tr>
<tr>
<td>Droogheid Huidcellen</td>
<td>Voedings- en stofwisselingspatroon</td>
</tr>
<tr>
<td>Dreigende Dood</td>
<td>Waarden- en patroon</td>
</tr>
<tr>
<td>Gevaar voor vallen</td>
<td>Patroon van zelfbeleving</td>
</tr>
<tr>
<td>Gedwongen goed patroon</td>
<td>Seksualiteitspatroon</td>
</tr>
<tr>
<td>Gewond Voeten</td>
<td>Voedings- en stofwisselingspatroon</td>
</tr>
<tr>
<td>Gewijzigde geestelijke waarneming</td>
<td>Systeeminnige reactie en...</td>
</tr>
<tr>
<td>Gewijzigde geestelijke waarneming</td>
<td>Sensatiepatroon</td>
</tr>
<tr>
<td>Gewijzigde geestelijke waarneming</td>
<td>Voedingspatroon</td>
</tr>
<tr>
<td>Gewijzigde geestelijke waarneming</td>
<td>Zelfbelevingspatroon</td>
</tr>
<tr>
<td>Gewijzigde geestelijke waarneming</td>
<td>Stressediepatroon</td>
</tr>
</tbody>
</table>

#### Functional Health Patterns

- Hypothermie
- Incontinentie voor feces
- Infertiele individuele Coping
- Infecievoorraad
- Masleven
- Misselijkheid
- Mobieleliefkoest
- Moeilijkheid
- Moeilijkheid
- Voedings- en stofwisselingspatroon
- Stressverwerkingspatroon
- Wondpatroon van gezondheid
- Zelfbelevingspatroon
- Activiteitenpatroon
- Zelfbelevingspatroon
Other NDx also available

Select appropriate NDx
Electronic Nursing Care Plan

- Diagnoses label
- Definition
- Expected Outcome

- Defining Characteristics
- Related Factors
- Risk Factors
- Outcomes
- Interventions
References

(19) Lunney M editor. Critical thinking to achieve positive health outcomes, Nursing Case Studies and Analyses. 2nd ed. Ames, Iowa, USA: John Wiley and Sons; 2009.


