Clinical Stream

Research on nurse practitioner diagnostic reasoning

Alison Pirret
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Alison Pirret (NP, BA, MA, PGCert, PhD)
Introduction

Nurse practitioners introduced to:

- Increase patients’ access to healthcare
- Improve patient outcomes
- Provide a sustainable solution to workforce shortages
Nurse practitioners

- Expert nurses
- Clinically focused Master’s degree
- Minimum 4 years in area of practice
- Passed Nursing Council of NZ nurse practitioner assessment
Nurse practitioners

- Combine advanced nursing practice & skills from medicine
  - Assess
  - Diagnose
  - Order diagnostic tests
  - Prescribe
Advanced Practice Nurse Outcomes 1990-2008: A Systematic Review

- US NPs and doctors
- Systematic review of patient outcomes
- Similar in:
  - Patient satisfaction
  - Management of chronic conditions
  - ED or urgent care visits for chronic conditions
  - Length of hospital stay
  - Patient mortality
Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors
Sue Horrocks, Elizabeth Anderson, Chris Salisbury

- UK primary health care NPs and doctors
- Pt satisfaction with care at first point of contact
  - Pts more satisfied with care by NP
- NPs completed more investigations
- Consultations longer
- More advice on self care
- Communicated better
- Most studies were acute minor illnesses
PATIENT PERSPECTIVES

An overview of patients’ preference for, and satisfaction with, care provided by general practitioners and nurse practitioners

Miranda GH Laurant, Rosella PMG Hermens, Jozé CC Braspenninck, Reinier P Akkermans, Bonnie Sibbald and Richard PTM Grol

doi: 10.1111/j.1365-2702.2008.02288.x

- Netherlands NP and GPs
- Satisfied with care by NPs for education and chronic conditions
- Preferred GP for medical aspects of care
- NPs had Bachelor degrees & 2 yrs experience
- Patients referred to NP by GP
- NPs followed guidelines
Comparable in:
- health status
- medical resource consumption
- Compliance to guidelines
- NPs more likely to ask patients to reattend

Master’s prepared

Focused on common conditions

No prescribing required GP
Comparing nurse practitioners to doctors

- Similar outcomes to doctors in minor illnesses/injuries and chronic conditions
- Predominantly general practice
- Variance in academic & registration requirements
- No data on how they compare in complex cases
NZ study research question

How does nurse practitioner diagnostic reasoning compare to that of registrars?
Research subquestions

1. How does nurse practitioner diagnostic reasoning abilities compare to that of registrars?

2. What diagnostic reasoning style do nurse practitioners use in the diagnostic reasoning process?

3. What maxims guide nurse practitioner diagnostic reasoning?
Terms

Diagnostic reasoning

- the cognitive process involving data collection, identification of diagnoses and problems, and the formulation of an action plan

Diagnoses – labelling a disease

Problem – abnormal finding or problem needing intervention
Diagnostic reasoning theory

Heuristics

Gut feeling

Pattern Recognition

Intuitive reasoning

Fast
Reliant on experience

Analytic reasoning

Slow
Deliberate
Reliant on education

Hypothetico-deductive reasoning
Rationale

'Substituting doctors with nurses may amount to robbing an impoverished Peter to pay a much better off Paul.'

See Back to Back, page 140
practice. If medicine is to have a strong role in future health workforces then largely it will be at the front door of health care facilities interpreting patient complaints, planning care and referring to NP and other health profession-led intervention clinics.

If the key role of the doctor in 2025 is to be a health professional who has a largely cognitive function and is primary and generalist care-oriented, is there really a scope for meaningful workforce substitution in the primary health care setting? Certainly, there are no data to show
The role and effectiveness of a nurse practitioner led critical care outreach service

Alison M. Pirret a, b, ✉
Intuition dominant mode of thinking in nursing

- Insufficient knowledge and using intuition & experience to make prescribing decisions

- Intuition to make strong but wrong decisions

- Nurses with analytic style put out more emergency calls
  - Parker, CG. (2014). Decision making model used by medical-surgical nurses to activate rapid response team. *MEDSURG Nursing, 23* (3),.
NPs and intuition

- Limited literature

- Use intuition to search for red flags
  Kosowski & Roberts (2003). When protocols are not enough: Intuitive decision making by novice nurse practitioners. Journal of Holistic Nursing 21 (1), 52-72

- Followed by more objective approach
Mixed Methods

• Computerised complex case scenario using think aloud – real case
• Web-based questionnaire
  - Intuitive analytic reasoning instrument
  - Maxims questionnaire
• Demographic data sheet

Diagnostic reasoning abilities
Trigger analytic processing
Diagnostic reasoning style
Maxims to guide diagnostic reasoning
Expert panel

- Assessed complexity of case scenario
- Determined correct diagnoses, problems and actions
- Determined logical/illogical and rational/irrational maxims

Multiple diagnoses within a single case
Participant selection

- Power analysis 30 NPs and 30 registrars
- Purposeful sampling
- 15.7% difference between junior and senior registrars in complex cases
- Expected difference between NPs and registrars
  - MD > 1.0 for diagnoses
  - MD > 1.3 for action plan

Ilgen et al, 2011
Ethical Considerations

- Consultation process
  - NPAC-NZ, NPNZ, NZNO, WORKFORCE DHB
- Massey University Human Ethics Committee
- Informed consent
- Confidentiality agreement
Å SPPS 19
Å Case scenario data transcribed verbatim, coded & categorised (Elstein et al. 1993)
Å Qualitative data quantitised
RESULTS
Nurse practitioners versus doctors diagnostic reasoning in a complex case presentation to an acute tertiary hospital: A comparative study

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\textsuperscript{c}College of Health, Massey University, New Zealand
30 nurse practitioners
16 registrars

Inclusion criteria

North & South Island

Metropolitan
Provincial
Rural

Data collected Feb 2011 - March 2012
# Specialties

<table>
<thead>
<tr>
<th>Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary health care/general practice</td>
</tr>
<tr>
<td>Respiratory</td>
</tr>
<tr>
<td>Cardiology</td>
</tr>
<tr>
<td>Emergency care</td>
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<tr>
<td>Older adult</td>
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<tr>
<td>Palliative care</td>
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</tbody>
</table>

- **Largest group**: Primary health care/general practice
- **Smallest group**: Palliative care
NP demographics

- Male (♂) = 3
- Female (♀) = 23
- RN = 27

2.2 yrs NP experience (95% CI: 1.6-2.8)

28.2 yrs RN experience (95% CI: 25.6-30.8)

17 years RN specialty experience (95% CI: 14.1-20.0)

97% Clinical Masters
Registrar demographics

- Male = 7
- Female = 9

- 3.4 yrs registrar experience (95% CI: 2.06-4.78)
- 2.9 yrs HO experience (95% CI 2.18-3.57)
- 13 (81.25%) completed part 1 exams

- 4 previous registrar programmes
- 1 previously a specialist
Diagnostic reasoning abilities
<table>
<thead>
<tr>
<th>CORRECT DIAGNOSES</th>
<th>NP</th>
<th>Registrar</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>30 (100%)</td>
<td>15 (93.8%)</td>
<td>FET p=0.35</td>
</tr>
<tr>
<td>? COPD</td>
<td>7 (41.2%)</td>
<td></td>
<td>FET p=0.005*</td>
</tr>
<tr>
<td>Gastric bleeding</td>
<td></td>
<td>7 (48.6%)</td>
<td></td>
</tr>
<tr>
<td>? gastric ulcer</td>
<td>10 (62.5%)</td>
<td>7 (48.6%)</td>
<td></td>
</tr>
<tr>
<td>Reasonably well controlled Type II DM</td>
<td>18 (60.0%)</td>
<td>6 (37.5%)</td>
<td></td>
</tr>
<tr>
<td>Well controlled hyperlipidaemia</td>
<td>17 (56.7%)</td>
<td>10 (62.5%)</td>
<td></td>
</tr>
<tr>
<td>? lower respiratory tract infection</td>
<td>11 (36.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>? lung cancer</td>
<td>8 (26.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>? pleural effusion</td>
<td>4 (13.3%)</td>
<td>10 (62.5%)</td>
<td>FET p=0.002*</td>
</tr>
<tr>
<td>? pulmonary embolus</td>
<td>4 (13.3%)</td>
<td>10 (62.5%)</td>
<td>FET p=0.002*</td>
</tr>
</tbody>
</table>

NP $M=5.47$
Reg $M=6.19$
No difference between groups (95% CI: -1.8-0.3, $p=0.17$)

Correlation between nos of yrs NZ NP prescribing & nos of correct diagnoses $r_s=0.37$, $p=.04$
Correct problem

*poor adherence to medications*

NP (n=16, 53.3%)

Registrars (n=9, 56.3%)

$\chi^2=0.00, \ p=1.0$
<table>
<thead>
<tr>
<th>CORRECT ACTION PLAN</th>
<th>NP</th>
<th>Registrar</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review need for increased anti-hypertensive therapy</td>
<td>17 (56.7%)</td>
<td>7 (43.8%)</td>
<td>$\chi^2=0.28, p=0.60$</td>
</tr>
<tr>
<td>Refer hospital for specialist team review and/or hospital admission</td>
<td>17 (56.7%)</td>
<td>9 (56.3%)</td>
<td>$\chi^2=0.00, p=1.0$</td>
</tr>
<tr>
<td>Diabetes referral/education</td>
<td></td>
<td></td>
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<tr>
<td>Lung function tests</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stop diclofenac</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sputum culture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change antibiotic to include macrolide</td>
<td></td>
<td>8 (50.0%)</td>
<td>$\chi^2=0.62, p=0.44$</td>
</tr>
<tr>
<td>Stop aspirin</td>
<td>8 (26.7%)</td>
<td>3 (18.8%)</td>
<td>$FET p=0.72$</td>
</tr>
<tr>
<td>Gastroscopy</td>
<td>7 (23.3%)</td>
<td>9 (56.3%)</td>
<td>$\chi^2=3.64, p=0.06$</td>
</tr>
<tr>
<td>Proton pump inhibitor</td>
<td>5 (16.7%)</td>
<td>4 (25.0%)</td>
<td>$FET p=0.70$</td>
</tr>
<tr>
<td>Test for H-Pylori</td>
<td>3 (10.0%)</td>
<td>0</td>
<td>$FET p=0.54$</td>
</tr>
<tr>
<td>CT/CTPA</td>
<td>1 (3.3%)</td>
<td>6 (37.50)</td>
<td>$FET p=0.01^*$</td>
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</tbody>
</table>

NP $M=4.3$
Registrar $M=4.1$
No difference between groups
(95% CI: -1.23-1.58, $p=0.80$)
Action - Discussed with consultant

Â Registrars (n=1, 6.3%)

Â Nurse practitioners (n=22, 73.3%)

- Prescribing authority (FET p=1.0)
- Familiarity with scenario (FET p=0.20)
- Specialty area ($\chi^2=8.01, p=.33$)
- Diagnostic reasoning abilities (95% CI: -4.4-0.75, $p=0.16$)

Consultant not necessarily on same premises
Diagnostic reasoning abilities
(Correct diagnoses, problems & actions)

NP $M = 10.30$
Registrar $M = 10.88$
No difference between groups
(95% CI: -2.68 -1.53), $p = .97$

Diagnostic reasoning abilities and time
NP group $r_s = .53$, $p < .001$
Registrar group $r_s = .70$, $p < .001$
Case scenario reflecting practice

- 19 (63%) NP would see case regularly
- 11 (69%) registrars would
- NP specialty differences existed
  - PHC & older adult most familiar
  - EC & palliative care least familiar
- No effect on NP diagnostic reasoning abilities ($\chi^2=6.57, p=0.25$)
Diagnostic reasoning style
Nurse practitioners incorporate more intuitive processing

Nurse practitioner $M=160.83$
Registrar $M=157.18$

No difference between groups
(95% CI: -0.2 - 7.5, $p=0.06$)
Maxims used to guide diagnostic reasoning
### Seven Maxims used often or almost always by NPs

<table>
<thead>
<tr>
<th>Maxim</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never worry alone, get a consultation</td>
<td></td>
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<tr>
<td>If what you are doing is working, keep doing it. If what you are doing is not working, stop doing it.</td>
<td></td>
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<tr>
<td>Follow up everything</td>
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<tr>
<td>Consider multiple separate diseases of the patient when the result of the history and physical examination are atypical of any one condition</td>
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</tr>
<tr>
<td>Treat the patient not the x-ray</td>
<td></td>
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<tr>
<td>Don’t order a test unless you know what you are going to do with the result</td>
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</tr>
<tr>
<td>Common things occur commonly</td>
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</tbody>
</table>

**Registrars - Real disease declares itself (n=9, 56.5%)**

**Overall no difference between 2 groups**

MD = 0.5, 95% CI: -1.7 - 0.6, p = 0.38
Study limitations

- Computerised case scenario
- May differ in normal practice
- Single case
- Self reporting in questionnaires
- Registrar group small
- Study underpowered but limited impact on study
  - Diagnoses $MD=0.72$
  - Actions $MD=0.18$
  - Diagnoses, problems and actions $MD=0.57$
Conclusion

Å NP’s diagnostic reasoning compares favourably to registrars

Å NPs have academic preparation and clinical expertise to:
   ÿ perform role they were introduced to do

Å Research using multiple complex cases needed