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Reading and Interpreting Research Evidence for CNS Practice

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Survey Says :

- This presentation was inspired by your responses to the recent survey of members-
  - N=63
  - How to read and interpret research papers
  - Qual and Quant Research – 46.4%
  - Qual - 10.7%
- Reading and interpreting require a working knowledge of how research is conducted and how results are presented. Does the manuscript make sense in terms of methods used to address the research question?

Do RNs read, understand, or translate research evidence into practice? (Hendricks & Cope, 2017)

- 105 Registered Nurses (RNs) from one hospital (seven wards) in were invited to complete a survey of 12 questions (11 questions were yes/no or rating questions and one was open-ended) about how they understood and used nursing research in their practice
- 95/105 RNs completed the survey (90% response rate)
- Findings:
  - **96% RNs read research articles** even though 63% had not taken a research course
  - 30% of RNS found articles easy to read
  - 70% of RNs found the language too hard and wanted a simpler language
  - 96% of RNs identified that they would read more articles if simpler language was used and apply what they read (93%)
  - 43% of RNs identified language of research as a barrier to using research in practice
  - Even though 90% of nurses used what they read in research in their practice, **only 1% understood what they read**
- Plain language recommended so research evidence could be read, understood, and translated into practice
- This language would help with understanding as the interpretation of statistics would be translated in the writing of the article ie., "significance of 0.05 would be '95 times out of 100, this will occur" (p. 44)

What RNs identified as problematic with reading and using research (Hines et al., 2022)

- Discomfort with statistics-math was "another language"
- Discomfort with data analysis
- Statistics often excluded the 'human element' of people (p. 10).
- …. Research language contributed to nurses' difficulty in reading, understanding, connecting to practice, and it influenced nurses reading strategies (how they read and what they read).
- Important points raised by researchers about nurses learning about research
  - research methods courses train student to conduct research not use research
  - research methods courses may not stress the value in understanding the methods and results sections of an article
  - research methods courses may not help staff acquire the skill of research language
  - good reading and appraisal strategies are critical to using research

OMG?!?!?!

1. Why is this important???

2. How can we move past these blocks???

Research education and training are core to CNS practice in all domains

- Skills for evaluating and conducting research are the same skills required for undertaking quality improvement initiatives and for tracking inservice deliveries etc.
- CNSs often consult on the cases that are not 'average' (the Mean)
- People cannot be regressed to the 'mean'
- CNSs artfully apply research findings to people who are not average and may be in the tails of the population curve. This is a strength of CNS education and training in a specialty area

Research Competencies:

(Advance Practice Nursing (APN)-A Pan-Canadian Framework-2019-Canadian Nurses Association)

- Advanced practice nurses are committed to generating, synthesizing, critiquing and applying research evidence. They are able to:
  - Identify and implement research-based innovations for improving client care, organizations or systems
  - Identify, appraise and apply research, practice guidelines and current best practice
  - Identify, conduct and support research — as either primary investigator or collaborator with other members of the health-care team or community — that enhances or benefits nursing practice, client outcomes and health-care delivery
  - Evaluate current practice at individual and system levels in light of research findings
  - Collect data on, and evaluate the outcomes of, APN on client outcomes, the nursing profession and the health-care system or health-care delivery
  - Formally appraise research by participating in scoping or systematic reviews of literature for the development of best practice or clinical practice guidelines
  - Facilitate evidence-informed practice by acting as knowledge brokers for clinical nurses, other health-care providers and other stakeholders whose services impact the key determinants of health

Reading research involves reading the whole article and developing an understanding key components

a) The type of study ie., quantitative, qualitative, or mixed methods?
b) The location or setting where the study took place
c) Key concepts or variables (intervention/independent, dependent, or controlled) being studied?
d) Framework or theory used
e) Research Design/Method
f) Population and Sample
g) Data sources
h) Data analysis: Statistical tests used or thematic/content analysis
i) Findings
j) Effect sizes/statistical significance
k) Strengths or Weaknesses/Limitations
l) Conclusions

(Polit & Tantano Beck, 2017, p. 100)

(Ingham-Broomfield, 2014, p. 108)

Process	Considerations when critiquing a research article
1. Title	Is the title clear and accurate ie does it describe the research?
2. Author	What are the author's qualifications and current position?
3. Date	When was the research undertaken? When was it published? Is it a recent piece of work? Is it relevant to present practice? NB. This is not always easy to establish with online articles.
4. Journal	Does the journal deal in nursing research? Are the members of the editorial board from a wide range of academia and practice? Who is the target audience? Broad or specific?
5. Abstract/Summary	Does the abstract clearly outline the problem, the hypothesis/research question, aims and objectives, methodology, results, conclusions and recommendations? Are you clear about what is being investigated?
6. Identifying the problem	Is the problem and/or purpose of the study clearly identified? Is there a rationale for the study?
7. Formulation of research questions (qualitative design) or hypotheses (experimental design).	Are the aims and objectives clearly stated? How many research questions/hypotheses? Is too much being attempted? Does the hypothesis follow logically from the original problem? Do the aims and/or questions/s follow logically from the original problem?
8. Literature search	Is there an unbiased discussion of related research? Does the researcher demonstrate insight into the subject under study? Is there an appropriate timescale for the literature cited? Does the search identify whether a theoretical framework has been used? Is the search a collection of quotes or does it critically appraise previous studies?
9. Methodology	
Design	Is the study described adequately? Can you identify what type of study is used, eg descriptive, experimental, quasi-experimental?
Tools	Are the reasons for the choice of instrument given eg questionnaire, observation, interview, patient records, diaries? Is the advantage/limitation of the tool used discussed?
Sample	Is the sample representative of the population under study? Have the characteristics of the sample been considered eg size, culture, gender? How appropriate is the method of sample selection?
Ethics	Has informed consent been given? Is confidentiality and anonymity assured? Was the right not to participate explained? Was dignity upheld? Were the subjects free from harm? Was ethics committee approval sought?
Reliability and validity	Has the study considered the issue of reliability and validity? Is the research methodology biased?
10. Pilot study	Has a pilot study been completed? What modifications were made and why?
11. Main study	
Results	Are the raw figures and percentages or dialogue provided in the text? Are they visually presented eg graphs, bar charts, scatter grams, extracts of dialogue? Is the rationale provided for the inclusion or omission of statistical testing? Is the probability of the result by chance included?
Discussion/ Recommendations	Is the discussion of the results understandable? Are the recommendations self-evident after reading the rest of the paper? Are the recommendations able to be implemented? Has the researcher acknowledged their limitations?
Conclusions	Are their suggestions for further research? Do the conclusions relate logically to the results? Are there any distortions attempted to 'fit' preconceived ideas? Are the aims, questions or hypothesis posed earlier addressed? What omissions have been made and has the researcher referred to these?

How is reading research connected to using research or evidence? (Hendricks & Cope, 2017)

- 64% of nurses did not have a research course in their educational preparation, but 96% read a research article
- 56% of RNs identified that the language used in research articles does not preclude them from using what they learned in practice; 41% of RNs stated that the language does prevent them from using what they learned in the research in practice
- Findings that may be useful in clinical to improve practice, quality, or safety may not be implemented
- Or what the researchers to not identify is that the findings may be implemented incorrectly
- Researchers identify "gap between 'academic speak' and 'nurse speak'" (p. 47)
- Identify the need for language that is plain, readable, and understandable

Reading and Interpreting Research

Reading Research (Ingham-Broomfield, 2014; Polit & Tatano Beck, 2014, p. 66)

- Reading is the first step to critiquing research
- Read different styles of research articles frequently, know the format of articles
- Read the article several times
  - Skim first for key points, highlight, write out questions
  - Second time-read actively-verify understanding, ask for help, contact researchers, use a textbook to look up terms, find the story of the article
  - Then translate or summarize the key points of the article into a report

Critiquing and Interpreting Research

- Critiquing: appraisal of the study in terms of its strengths and weaknesses (Polit & Tatano Beck, 2017, p. 101) and the ability to apply to practice (Ingham-Broomfield, 2014)
- Models or guidelines to critique (Polit & Tatano Beck, 2014)
- Interpreting: Interpretation of the results are presented by researchers in discussion section of paper; readers must use model or guidelines to critically analyze results; facilitates understanding and involves evaluation of the study objectives, background (evidence), limitations, and methods (Polit & Tatano Beck, 2014, p. 249)

Does the manuscript report on a 'good question'? (Polit & Tatano Beck, 2014; 2017)

- For example:
  - In a population of acute inpatient adult mental health patients, what is the effect of supported discharge in comparison to usual care?

And/Or

- 2. In a population of acute inpatient adult mental health patients how is discharged experienced?

- Is the question purpose described in the problem statement or question and does it fit with the method? Questions can be developed for identification, description, exploration, explanation, prediction, or control (Polit & Tatano Beck, 2017)

Type of Question	PIO Question Template (Questions Without an Explicit Comparison)	PICO Question Template (Questions With an Explicit Comparison)
Therapy/treatment/ intervention	In _____ (Population), what is the effect of _____ (Intervention) on _____ (Outcome)?	In _____ (Population), what is the effect of _____ (Intervention), in comparison to _____ (Comparative/ alternative intervention), on _____ (Outcome)?
Diagnosis/assessment	For _____ (Population), does _____ (Identifying tool/ procedure) yield accurate and appropriate diagnostic/assessment information about _____ (Outcome)?	For _____ (Population), does _____ (Identifying tool/ procedure) yield more accurate or more appropriate diagnostic/ assessment information than _____ (Comparative tool/ procedure) about _____ (Outcome)?
Prognosis	In _____ (Population), does _____ (Influence/exposure to disease or condition) increase the risk of _____ (Outcome)?	In _____ (Population), does _____ (Influence/exposure to disease or condition), relative to _____ (Comparative disease/ condition OR absence of the disease/ condition) increase the risk of _____ (Outcome)?
Etiology/harm	In _____ (Population), does _____ (Influence/exposure/ characteristic) increase the risk of _____ (Outcome)?	In _____ (Population), does _____ (Influence/exposure/ characteristic) compared to _____ (Comparative influence/ exposure OR lack of influence or exposure) increase the risk of _____ (Outcome)?
Description (prevalence/incidence) DON'T DO	In _____ (Population), how prevalent is _____ (Outcome)?	*Explicit comparisons are not typical, except to compare different populations.*
Meaning or process **DON'T DO**	What is it like for _____ (Population) to	*Explicit comparisons are not typical in these types of*

Interpretation Guidelines (Discussion of Results)

Quantitative (Polit & Tatano Beck, 2014, p. 261)

- Study limitations and effect on credibility of results? Biases, threats to validity?
- Types of evidence to support interpretation, other explanations, interpretation using findings from other studies?
- Were alternative explanations presented or considered?
- Were differences between practical and statistical significance presented?
- Did the conclusions make sense and include only what the researchers presented?
- Were implications/recommendations for clinical practice and future research identified?
- Were there implications not included?

Qualitative (Polit & Tatano Beck, 2014, p. 334)

- Is quality of data, evaluation, and methods to improve described?
- How was study trustworthiness upheld or could have been strengthened?
- Were the realities of participants' described in enough detail to seem authentic?
- How is the study validity, integrity, rigor and trustworthiness reflected in the data quality?
- Are study limitations and impact on credibility and interpretation identified? Were other study findings discussed?
- Were implications for clinical practice and future research identified from the study findings?

Research Question Shapes the Design/Method

Quantitative Research Designs include

Intervention Research

- Experimental: involves an independent variable which is controlled (manipulated) under different conditions to which subjects are randomly assigned to treatment
- Quasi-experimental: similar to experimental but subjects are not randomly assigned to the treatment
- Non-experimental: data is collected without an intervention

Comparison Groups

- Cross-Sectional: Collection of data at one point in time and compared to another time point
- Longitudinal: collection of data at different points in time

- Research questions that ask about effect, relationships, measurable, comparisons, cause and effect

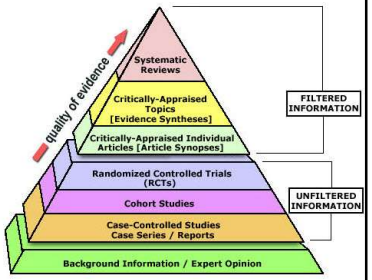
Qualitative Research Designs include

- Phenomenology: lived experience
- Ethnography: social perspectives in cultural context, field work
- Historical: study past events and chronological order of facts
- Grounded-theory: development of a theory and relationships between concepts
- Case study: single case or phenomenon is focus
- Narrative: stories about life experiences
- Exploratory descriptive: specific research question is focus of study

- Research questions that ask about process, meaning, experiences, understanding, or description

How do all these different types of research fit together?

- Evidence based/informed practice is now expected. In addition to conducting clinical research, CNSs facilitate EBP through bridging the available research and clinical practice through interpretation of findings and disseminating relevant evidence in clinical settings.
- "Many nursing questions cannot be answered by a single study, and human conditions are not always amenable to clinical trials." (Schmidt & Brown, 2022, p.5)
- There are many types of research:
  - Qualitative (not generalizable but can be transferable) ,
  - Quantitative (generalizable) ,
  - Mixed Methods, Meta-Analyses, Meta-Syntheses,
  - Scoping Reviews etc.
- The 'question' determines the methods used in a study



https://academicguides.waldenu.edu/library/healthevidence/evidencepyramid

What is the evidence related to how nurses make sense of research? (Hines et al., 2022)

Table 2 Themes

Theme	Subthemes	Elements
Coming into learning about research	Early experiences	Feeling lost
	Help with learning	Not knowing how or if to critique
		Courses, subjects, resources, programs, access to articles, teaching and learning strategies, educators, peers
Fitting research into the reality of nursing life	Organisational issues	Work culture, resources, staffing, roadblocks, disinterest, supportiveness, valuing research
	Interpersonal issues	Hostility, gate-keeping, apathy and reluctance, support, assistance, feeling out of place
	Confidence	Feeling capable and competent dealing with research, feelings about interacting with research
Working towards using research	Approaches to reading and understanding research	Selective reading of research papers, reading strategies
	Using research	Improving practice with research
	Mathematics difficulties	Numerical results, statistics, symbols, as a focus for problems understanding research
	Research language	Research-specific terms as a focus for problems understanding research

- Australian Registered Nurses' experiences and perceptions of reading and understanding/using research for work and education were explored
- Qualitative descriptive study
- Focus groups (online & in-person)
  - N=40 Australian RNs
    - mostly female
    - 21 years of nursing experience
    - Range of educational preparation:
      Hospital certificate (2) , Bachelors (13), graduate certificate (10), Masters (13), and PhD (2)

Research Design Shapes Sample and Analysis

Quantitative Sample Size and Analysis

- Power analysis completed to determine sample size (number of people necessary)
- Statistical Analysis:
  - Descriptive:
    - Mean, median, mode
    - Frequency distribution
    - Standard deviation, variance
  - Bivariate
    - Correlation
    - T-test
    - ANOVA
    - Pearson's r
  - Multivariate
    - Multiple regression
    - Logistic regression

Qualitative Sample Size and Analysis

- Sample from those who can provide the best understanding about the topic (ie., participants, documents), observations, interviews, individuals or groups
- Sample sizes estimated depending on the research approach ie., phenomenology fewer than ethnographic
- Data analysis: Thematic, content, theory, patterns, taxonomic, coding, categories
- Data typically collected until no new themes arise from data or phenomenon can be understood

Statistical and Clinical Significance (Polit, 2017; Wouk et al., 2025)

- Statistical significance does not guarantee clinical significance
- **Statistical Significance**
  - Indicates that at a specific probability level, the results from statistical analysis are not due to chance and that the relationship or differences between groups are real when probability <0.05 (usually <0.01)
  - Statistical significance is influenced by the sample size (large) and statistical power (high)
  - Nursing studies in the past 25 years have reported a 23% increase in large sample sizes (n=500) with power to detect effects increasing from 0.71-0.98
  - Continues to be the gold standard
- **Clinical Significance**
  - Patient reports about outcomes (QoL and pain) have complicated the measure (effectiveness) and definition of clinical significance
  - Clinical significance is determined by clinicians, but change in clinical relevance is challenging to interpret
  - Complex issue that may include improvement or absence of change, but amount of change or gold standard that determines clinical significance is not agreed upon
  - Suggest defining clinical significance when using or avoid using it
  - Study can be clinically relevant without statistical significance
- **Note that one case of Smallpox in a population of 8 billion humans is not statistically significant BUT it is clinically significant**

CNS qualifications matter:

- CNSs are experts in Nursing, prepared at the graduate (Nursing) level with the required education and training in research needed to meet the competencies.
- In critiquing the existing literature, a CNS filters out good studies from bad ones. Good 'crap detection' skills are essential.
- Where gaps exist, there is a need for more research, qualified CNSs are well positioned to undertake studies to fill in the gaps

Resources

- Choose Wisely Canada https://choosingwiselycanada.org/
- Joanna Briggs https://jbi.global/
- The Cochrane Library https://www.cochranelibrary.com/

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