**Yale New Haven Health**

Nursing Research and Evidence-Based Practice Committee

**Research Literature Appraisal Tool**

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| --- | --- |
| Article Number | Author(s):Article Title:Journal:Year Published: Volume: Number: Pages Numbers:  |
| **Level of Evidence and Grading: Fill in after completing appraisal (see Appendix A)** |
| Level of Evidence (Circle one): I II III IV V  |  Quality Grade (Circle one): High Good Low  |
| Is this a reputable source of evidence? Yes ⎕ No ⎕ |

| **Appraisal Category** | **Summary** | **Appraisal** |
| --- | --- | --- |
| \*Quantitative Study | #Qualitative Study |  |  |
| Define independent & dependent variables | None used | Study purpose, aim, research questions and/or hypothesis: | Was information presented clearly? ☐ Yes ☐ No |
| Theoretical or conceptual framework | Philosophical underpinnings | Study framework or philosophical underpinnings, if evident: | Was information presented clearly? ☐ Yes ☐ No ☐ NA |
| All relevant literature and or seminal work  | Justification for the study: (problem statement [background] literature review) | Does this section address what is known and not known about the problem? ☐ Yes ☐ NoDescribed how study would address gaps in knowledge? ☐ Yes ☐ No  |
| See Appendix ADescriptiveQuasi-experimentalExperimental | See Appendix BNarrativePhenomenologyGrounded theoryEthnographyCase study | Study Methods: *Design* | Was design appropriate?☐ Yes ☐ No |
| No differentiation between study types | Study Methods: *Setting* | Was the setting appropriate for study design? ☐ Yes ☐ No If multiple settings, were they appropriate for study design? ☐ Yes ☐ No ☐ NA |
| Probability sampling (i.e. random)Non-probability (i.e. convenience)Sample size: based on statistical test used and power analysis – goal to generalize results other populations | Purposeful or Theoretical sampling Sample size: based on judgment and experience often smaller than quantitative – goal to gain deeper understanding of concept | Study Methods: *Sample (Describe sampling strategy, inclusion/exclusion criteria, sample size, and characteristics of sample [i.e. people, places, events])* | Was sample size sufficient based on study design and data analysis? ☐ Yes ☐ No \*Was sample representative of population under study? ☐ Yes ☐ No ☐ NA\*If an intervention was used were sample characteristics equivalent between control and intervention groups?  |
| Data Collection Methods:Surveys (include response rate)Measurement instruments, tools, questionnaires) If intervention used, describe fidelity or how researcher made sure the intervention was consistently used with all subjects. | Data Collection Methods and techniques:Interviews, focus groups, observations, documents, (audio and videotaping, field notes)Collection and Analysis often occur simultaneously | Study Methods: *Study Procedures*  (Describe \*interventions, if tested, data collection methods, measurement instruments or data collection tools [including interview guides], timing/sequencing of data collection, human subjects protection) | Was data collection method described clearly? ☐ Yes ☐ No Was data collection method a good fit with the study purpose and design?☐ Yes ☐ No \*For surveys, was response rate adequate (≥25% to 40%)?\*Were measurement instruments validity and reliability discussed (psychometrically tested with adequate reliability (Chronbach alpha ≥0.70)? \*If intervention used, was it described clearly? ☐ Yes ☐ No ☐ NA #Was rigor discussed (credibility, transferability, dependability, confirmability) (see Appendix C Table 3) ☐ Yes ☐ No  |
| See Appendix CDescriptive statisticsBivariate analysisMultivariate analysis | See Appendix BOrganizing data Reading & memoingCoding and themesInterpreting data Presenting data | Study Methods: *Data Analysis (*Describe methods used to analyze data) | Were the analysis methods appropriate? ☐ Yes ☐ No  |
| No differentiation between study types | Results: (Summarize results) | Are results presented clearly? ☐ Yes ☐ NoAre charts, graphs, tables easy to understand? ☐ Yes ☐ No ☐ NAIf used, was description consistent with information found on them? ☐ Yes ☐ No **#**Were narratives used to support results? ☐ Yes ☐ No  |
| No differentiation between study types | Limitations: (Summarize limitations) | Were limitations identified and addressed? ☐ Yes ☐ No |
| No differentiation between study types | Clinical Significance: (Focus on implications that this study has for nursing practice) | Does study contribute to nursing knowledge? ☐ Yes ☐ NoAre the study results generalizable/transferable to our practice setting? ☐ Yes ☐ NoDo the results warrant examining our current practice for changes? ☐ Yes ☐No |

**Appendix A**

**Level and Grading of Evidence by Project Methods**

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| **Level I Evidence** |
| **Systematic Review** | A summary of evidence, typically conducted by an expert or expert panel on a particular topic, that uses a rigorous process (to minimize bias) for identifying, appraising and synthesizing studies to answer a specific clinical question and draw conclusions about the data. |
| **Meta-Analysis** | A process of using quantitative methods to summarize the results from multiple studies obtained and critically reviewed using a rigorous process (to minimize bias) for identifying, appraising and synthesizing studies to answer a specific question and draw conclusions about the data gathered. The purpose of the process is to gain a summary studies (i.e. a measure of a single effect) that represents the effect of the intervention across multiple studies. |
| **Randomized Controlled Trial (RCT)** | A true experiment, (i.e., one that delivers an intervention or treatment), the strongest design to support cause and effect relationships, in which subjects are randomly assigned to control and experimental groups. |
| **Level II Evidence** |
| **Quasi-experiments** | Design that test the effects of an intervention or treatment but lacks one or more characteristics of a true experiment (e.g. random assignment; control or comparison group) |
| **Level III Evidence (Non Experimental)** |
| **Cohort Study** | Longitudinal study that begins with the gathering of two groups of patients (the cohort), one that received the exposure (e.g. to a disease) and one that does not, and then following these groups over time (prospective) to measure the development of different outcomes (diseases). |
| **Case-Control Study** | A type of research that retrospectively compares characteristics of an individual who has a certain condition (e.g., hypertension) with one who does not (i.e., a matched control or similar person without hypertension); often conducted for the purpose of identifying variables that might predict the condition (e.g., stressful lifestyle, sodium intake).  |
| **Cross Sectional Study** | A study designed to observe an outcome or variable at a single point in time, usually for the purpose of inferring trends over time. |
| **Correlational Descriptive Study** | A study that is conducted for the purpose of describing the relationship between two or more variables. |
|  **Correlational Predictive Study** | A study that is conducted for the purpose of describing what variables predicts a certain outcomes. |
| **Descriptive Study** | Studies conducted for the purpose of describing the characteristics of certain phenomena or selected variables. |
| **Qualitative Study** | Research that involves the collection of data in a nonnumeric form, such as personal interviews, usually with the intention of describing a phenomenon. |
| **Level IV Evidence** |
| **Clinical Practice Guidelines/ Consensus Panels** | Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence i.e. National Guideline Clearinghouse |
| **Level V Evidence** (Based on experiential and non research evidence) |
| **Case Reports** | Reports that describe the history of a single patient, or a small group of patients, usually in the form of a story. |
| **Case Study** | An intensive investigation of a case involving a person or small group of persons, an issue or an event. |
| **Expert Opinion/ Manufacturer’s Recommendations** |  |
| Melnyk, B. & Fineout-Overholt,, E. (2011). *Evidence-based practice in nursing and healthcare: A guide to best practice (2nd Ed.).* Philadelphia: Lippincott Williams and Wilkins. |

**I A**

**S ((A)**

**II (B)**

**III (C)**

**IV (D)**

**V (E)**

**VI (M)**

|  |  |
| --- | --- |
| **Level of Evidence** | **Type of Evidence** |
| **Strongest**I (A) | Evidence from systematic review or meta-analysis of multiple controlled studies with results that consistently support a specific action, intervention or treatment |
| II (B) | Evidence from at least one well designed controlled study, randomized & non-randomized, with results that support a specific action, intervention or treatment |
| III (C) | Evidence from qualitative studies, descriptive or correlational studies, integrative reviews or randomized controlled trials with inconsistent results  |
| IV (D) | Evidence from peer reviewed professional organizational standards, with clinical evidence to support recommendations; Includes non-experimental studies |
| V (E)**Weakest** | Evidence from theory based evidence from expert opinion or multiple case reports; Interpretation of non-research based information by experts |
| VI (M) | Manufacturers’ recommendations only |

Based on: AACN’s evidence-leveling system

Armola, R.R., Bourgault, A.M., Halm, M.A., Board, R.M, Bucher, L, Harrington, L., Heafey, C… & Medina, J. (2009). Upgrading the American Association of Critical-Care Nurses’ evidence-leveling hierarchy. *American Journal of Critical Care, 18*, 405-409.

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| --- | --- |
| **Level of Evidence** | **Quality Grading Guides** |
| **Level I** | **A High quality**: consistent results, sufficient sample size, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence. **B Good quality:** reasonably consistent results, sufficient sample size, some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence **C Low quality or major flaws:** little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn.  |
| **Level II** |
| **Level III** |
| **Level IV**  | **A High quality:** well-defined, reproducible search strategies; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies, and definitive conclusions **B Good quality:** reasonably thorough and appropriate search; reasonably consistent results, sufficient numbers of well-designed studies, evaluation of strengths and limitations of included studies, with fairly definitive results **C Low quality or major flaws:** undefined, poorly defined, or limited search strategies; insufficient evidence with inconsistent results, conclusions cannot be drawn  |
| **Level V**  | **A High quality:** expertise is clearly evident. **B Good quality:** expertise appears to be credible. **C Low quality or major flaws**: expertise is not discernable or is dubious.  |

**Appendix B**

**Table 1: Traditions of Qualitative Research (Study Methods)**

|  |  |  |
| --- | --- | --- |
| **Tradition** | **Purpose** | **Key Elements** |
| Narrative | Exploring the life of a single individual or small group of individuals | * Studies one or more individuals
* Uses interviews primarily
* Develops narratives, usually chronologically, about lives
 |
| Phenomenology | Understanding the lived experience of a phenomenology | * Studies multiple people experiencing the same phenomenon
* Uses interviews primarily
* Uses data saturation for sampling
* Describes the “essence” of the experience that is shared
 |
| Grounded Theory | Developing theory based on field-collected data  | * Studies a process or action
* Uses interviews primary
* Uses open, axial, and selective coding
* Uses theoretical sampling
* Generates a graphical representation of the theory
 |
| Ethnography | Describing elements of a culture-sharing group | * Studies a group with the same culture
* Uses observations and interviews
* Analyzes data to determine cultural traits shared by a group
 |
| Case Study | Developing an understanding of a single case or multiple related cases | * Studies an event or activity, or multiple persons
* Analyzes cases to determine themes within and between cases
 |

Source: Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.

**Table 2: Data Analysis in Qualitative Research**

|  |  |
| --- | --- |
| **Data Analysis Step** | **Details** |
| Organizing Data | Converting raw data into organized units such as transcribed interviews into electronic format |
| Reading and Memoing | Reviewing the entirety of data collected for immersion before development of codes and themes |
| Coding and Developing Themes | Categorizing pieces of data into codes (small categorizes of information) and reducing codes into themes (broad units of categories comprised of codes) |
| Interpreting Data | Drawing connections between themes and codes to view a larger picture of the concept being studied |
| Presenting the Data | Using graphical, tabular, or text format to present the interpretation of data |

Source: Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.

**Table 3: Methodological Rigor in Qualitative Research**

|  |  |
| --- | --- |
| **Element** | **Description** |
| Credibility | The degree to which the data collected are accurate, for example through member checking, triangulation, and negative case analysis |
| Transferability | The degree to which the findings can be transferred to another group of individuals (rather than generalized to an entire population) |
| Dependability | The degree to which the steps of the qualitative research process are described within the manuscript and the steps are “transparent”  |
| Confirmability | The degree to which the researcher’s experiences and mindset to the concept are integrated into the data collected and conclusions reached. |

Source: Tappen, R. M. (2011). *Advanced nursing research: From theory to practice*. New York: Jones and Bartlett Publishing.

11/29/16

**Appendix C**

**Choosing the Appropriate Statistical Test: Marge Funk, PhD, RN**

**Bivariate Statistical Tests**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Name** | **Indepen-dent or Related** | **Purpose** | **Measurement Level** |
| **IV** | **DV** |
| **Parametric Tests** |
| Independent t-test | I | Test the difference between 2 independent group means | N | I/R |
| Paired t-test | R | Test the difference between 2 related group means | N | I/R |
| 1-way analysis of variance (ANOVA) | I | Test the difference among the means of 3+ independent groups | N | I/R |
| Repeated measures ANOVA | R | Test the difference among the means of 3+ related groups or sets of scores  | N | I/R |
| Pearson correlation | I, R | Test the existence of a relationship between 2 variables | I/R | I/R |
| Linear regression | -- | Predict value of DV for given value of IV | I/R | I/R |
| **Nonparametric Tests** |
| Mann-Whitney U-test | I | Test the difference in ranks of scores of 2 independent groups | N | O |
| Wilcoxon signed-rank test | R | Test the difference in ranks of scores of 2 related groups | N | O |
| Kruskal-Wallis test | I | Test the difference in ranks of scores of 3+ independent groups | N | O |
| Friedman test | R | Test the difference in ranks of scores of 3+ related groups | N | O |
| Chi square test | I | Test the difference in proportions in 2+ independent groups | N | N |
| McNemar test | R | Test the difference in proportions for 2 related groups (2x2) | N | N |
| Cochran’s Q test | R | Test the difference in proportions for 3+ related groups | N | N |
| Fisher’s exact test | I | Test the difference in proportions in 2 independent groups when N < 30, any expected cell frequency < 5, or cell with observed frequency of 0 | N | N |
| Phi coefficient or odds ratio  | I | Examine the magnitude of a relationship between 2 dichotomous variables | N | N |
| Cramer’s V | I | Examine the magnitude of a relationship between 2 variables (not restricted to dichotomous) | N | N |
| Spearman’s rho | I, R | Test the existence of relationship between 2 variables  | O | O |

IV, Independent variable; DV, dependent variable; I, independent; R, related; N, nominal; O, ordinal or **non-normally distributed interval/ratio**; I/R, interval/ratio.

Note: On some tests, the measurement level of the IV & DV can be switched.

**Multivariate/Multivariable & Advanced Statistical Tests**

**1. ANOVA**

**a. One-way ANOVA (bivariate)**

* Purpose: Test the difference among the means of ≥ 3 groups.
* Variables: IV = 1 N; DV = 1 I/R

**b. Repeated measures ANOVA (bivariate)**

* Purpose: 1) Repeated measures (≥ 3) of DV on same subjects over time; 2) Exposure of all subjects to all treatment conditions (≥ 3).
* Variables: IV = 1 N; DV = 1 I/R

**c. Two-way ANOVA**

* Purpose: Test main effect of each IV on DV and test interaction between 2 IVs.
* Variables: IV = 2 N; DV = 1 I/R

**d. ANCOVA**

* Purpose: Test effect of IV on DV while controlling for covariate(s).
* Variables: IV = 1 N; DV = 1 I/R; Covar = ≥1 I/R (sometimes N)

**e. Mixed-Design ANOVA**

* Purpose: Extension of repeated measures ANOVA but with ≥ 2 groups
* Variables: IV = ≥ 2 N (1 is usually time); DV = 1 I/R

**f. MANOVA**

* Purpose: Test the difference among the means of ≥ 2 groups for ≥ 2 DVs simultaneously.
* Variables: IV ≥ 1 N; DV ≥ 2 I/R

**2. Regression**

**a. Simple linear regression (bivariate)**

* Purpose: 1) Determine if a linear relationship exists between IV and DV; 2) Predict value of DV based on given value of IV.
* Variables: IV = 1 I/R; DV = 1 I/R

**b. Multiple regression**

* Purpose: 1) Test the relationship between 2+ IVs and 1 DV; 2) Determine if an IV is r/t the DV in the presence of or accounting for other factors; 3) Predict value of DV based on several IVs; 4) Determine the amount of variability in DV that is explained by IVs.
* Variables: IV >1 any level; DV = 1 I/R

**c. Logistic regression**

* Purpose: 1) Test the relationship between 2+ IVs and 1 DV; 2) Determine if an IV is r/t the DV in the presence of or accounting for other factors; 3) Determine predictors of a particular outcome.
* Variables: IV >1 any level; DV = 1 N (dichotomous)

**3. Survival Analysis** (e.g., life table or actuarial analysis; Kaplan-Meier method; log-rank test; Cox proportional hazard model)

* Purpose: Determine time to an endpoint when subjects enter study at different times and some subjects may not have reached the endpoint at end of data collection.
* Variables: N/A

**4. Measurement Statistics**

**a. Evaluation of agreement**

* Cohen’s Kappa: nominal or ordinal
* Intraclass correlation coefficient: interval/ratio

**b. Evaluation of consistency**

* Cronbach’s alpha

**c. Comparison of methods**

* Bland-Altman: interval/ratio measured on same scale

**Steps to Determine Appropriate Test to Use**

1. Identify variables (IV vs. DV – be aware of sample)
2. Measurement level of the variables (nominal, ordinal, interval/ratio)
3. # of groups being compared (for nominal variables)
4. Whether the groups are independent or related (measured in same people over time; matched)
5. Whether the dependent variable is normally distributed (use parametric vs. nonparametric test)
6. Sample size
7. # of variables (use univariate, bivariate, or multivariate statistics)
8. If >2 variables . . .
	1. Determine IV(s) and DV(s) and their level of measurement
	2. Determine purpose, e.g. . . . .
		1. Interaction
		2. Involve repeated-measures factors & between-group factors
		3. Prediction
		4. Association of IV(s) with DV in presence of other factors
		5. Amount of variability in DV explained by IVs
		6. Time to endpoint

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