



Writing an Appropriate Methods Section for a Research Article: Procedure, Instruments/Measurements and Analysis

In the last issue of the *Thai Journal of Nursing Research*, our editorial addressed the components of design, ethical considerations and sample, in regards to the method section of a research article. The following remarks address the remaining components of the method section, including the procedure, instruments/measurements and analysis. From our experience, as editors of two English language journals, we have found that these components, of a research manuscript, often are either missing or very poorly written. As a result, the reader is left wondering what was done to obtain the data, as well as how the data were measured and analyzed. Thus, we have decided to provide the following information regarding what an author needs to consider when writing the procedure, instruments/measurements and analysis components of the method section of a research manuscript.

Procedure: After ethical approval to conduct the study is presented, the author should describe the actual process by which data were obtained. Keep in mind, if someone wants to replicate a study, they need to understand exactly what was done and how it was done. Thus, the author must, clearly and concisely, explain everything that was done, as well as the order and manner in which it was done. For example, if **survey instruments** were used to obtain data, the author must explain the following:

- How were the survey instruments distributed? Were they distributed by mail, or in person?
- Was a letter attached, to the survey instruments, describing what the respondents should do, or did the researcher describe the instruments' instructions in person?
- How long were the subjects given to respond to each instrument?
- How were the instruments retrieved (by mail, in person, or by way of someone other than the researcher)?
- Once the instruments were returned, what was the response rate regarding the instruments that were usable?
- How were the instruments handled concerning anonymity (code numbers)?
- Where were the completed instruments kept and who viewed them so that confidentiality was maintained?

If **interviews** were conducted, to obtain data, the author must address the following areas of interest:

- Where were the interviews conducted?
- Were there guidelines for the interview process, and, if so, what was the basic content of the guidelines? It often is helpful if several of the questions posed to the respondents, during the interview, are provided.

- How long did it take, on average, to conduct an interview?
- During the interview was any other information obtained, such as a description of a respondent's attitude and non-verbal behavior?
- Where there special considerations regarding the environment for the interviews?
- Was the interview tape-recorded?
- Were field notes made and, if so, what was recorded?
- Was an intervention used and, if so, exactly what was done?
- How often was the intervention conducted?
- How much time did the intervention take to complete?
- If the intervention was done more than once, how often was it done, and what was the time frame between each intervention?
- Who actually did the intervention?
- Where specific measurements made throughout the intervention process, and, if so, what were they, and how often were they made?

A well written procedure leaves no questions in the mind of the reader regarding what was done. Each step of the procedural process must be explained in a logical and sequential manner.

Instruments/ Measurements: It is imperative that an author provide sufficient information about the type of instruments or measurements used during the research process. If the instruments used and/or measurements taken are not clearly described, the reader will not be able to discern if the analyses used were appropriate; nor, will the reader be able to substantiate if the findings of the study have any relevance or meaning.

If **survey instruments** are used, as the data gathering mechanism, the following items need to be addressed, to answer the reader's questions regarding:

- What were the names of all of the instruments?
- Who was the author of each instrument? For instruments not written by the author, was permission to use copyrighted instruments obtained?
- For the demographic instrument, what items were measured (i.e. gender, age, income, education, etc.)?
- How many items were in each instrument?
- What did each instrument measure?
- How long did it take a subject to complete each instrument?
- What type of responses were required for each instrument (i.e. yes/no, a Likert-like scale, etc.)?
- What were the values applied to the type of responses required?
- How was each instrument scored (i.e. were values summed, were the scores of negative items reversed in scoring before summing, etc.)?
- Was there a total score, sub-scores, or both a total score and sub-scores?
- What were the reliabilities of the instruments in other research studies? What were the reliabilities of the instruments in the study being reported?

If **other forms of measurement** were used, the following items need to be considered, so the reader will be able to answer the following:

- What were the names of the measurements conducted (i.e. height, weight, specific laboratory tests, eye examination, assessment of mental functioning, etc.)?
- Exactly what did each form of measurement assess?
- How often, and at what time frame, was each assessment made?
- What type of value did each measurement generate (i.e. kilograms, pounds, milligrams, etc.)? If appropriate, how was the value calculated?
- How long did it take for each measurement to be made?
- What were the reliabilities, if appropriate, for the measurement used? If appropriate, what were the reliabilities for your study?

Data Analysis: The data analysis component, of the method section of a research article, needs to clearly state exactly how all data were handled. If the procedure section and instrument/measurement sections of the research manuscript are clearly and accurately written, a reader can easily discern what type of data analyses should be carried out. The type of data generated drives the type of data analyses that need to be conducted. For example, if a **quantitative research study** was conducted, the author needs to state what specific statistical techniques were used. Keep in mind, when conducting statistical analyses, the data must meet the theoretical assumptions of the statistical process used. The following questions need to be addressed, so the reader will know:

- Were the demographic data analyzed using descriptive statistics? If so, what statistics were used?
- Given the type of data generated (ordinal, nominal, interval or ratio), what specific statistical analyses were done? Was anything special done with the data, prior to analysis?
- Were additional analyses conducted and, if so, why?

If the research was a **qualitative study**, the analysis component of the method section needs to address how the data were handled. Since there are a number of qualitative methods of research, as well as different ways to handle data, within some of the different qualitative methods, the author needs to be specific regarding how the data were analyzed.

- If phenomenology was the research method of choice, the data should be handled in such a way that the respondents' statements are examined within the specific phenomenological philosophy used (i.e. Heideggerian, Gadamerian, etc.), and the respondents lived experiences are captured and described.
- If grounded theory was the approach used, then coding, categorizing of data, constant comparative analysis, with the emergence of themes, along with the generation of a theory needs to be evident.
- Should the approach used be *ethnographic*, the author should clearly indicate whether the data were from an *emic* approach (studying behaviors from within the culture), or an *etic* approach (studying behaviors from outside the culture, and examining similarities and differences among cultures). Regardless of whether an emic or etic approach was use, the analysis should involve identifying the meanings attributed to objects and events by the respondents, with validation, by members of the culture, of the researcher's interpretations.

- For historical research, since a problem usually is not stated, but rather a listing of the topic being examined, the analysis should involve an in-depth examination of the description of events, and their related meanings.
- Finally, for participatory action research, the analysis needs to indicate that the statements and opinions of the respondents were examined through constant comparative analysis, with words and statements being clarified, in an attempt to answer the purpose of the research project.

In summary, **it is imperative that the author provide a thorough description of all of the components of the method section (design, ethical considerations, sample, procedure, instruments/measurements and data analysis) of a research article.** The method section sets the scene, in both quantitative and qualitative studies, for understanding the author's interpretation and presentation of the study's findings.

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