

Author's response to reviews

Title: Patterns of Research Utilization on Patient Care Units

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Author's response to reviews: see over

January 31st, 2008

Martin Eccles
Editor-in-Chief
Implementation Science

Dear Martin,

Re: MS: 1943758707155390
Patterns of Research Utilization on Patient Care Units

Thank-you for the opportunity to revise and resubmit our manuscript, entitled "*Patterns of Research Utilization on Patient Care Units*" for publication within your Journal.

We have paid close attention to the thoughtful comments of the reviewers, and have appended a document that outlines our specific responses to the requested changes.

I look forward to hearing back from you about the review of our manuscript.

Yours sincerely,

Carole A. Estabrooks
Professor & Canada Research Chair
in Knowledge translation

Comments	How Comments Were Addressed
Major Compulsory Revisions	
<p>1. Update/expand the background section to be more inclusive of studies on use of research findings in practice that include nurses; addressing related research about context studies from health services research that have demonstrated several context factors that influence the nature of nursing practice, and set forth characteristics of a model nursing unit</p>	<p>We have expanded the contextual piece of the literature review considerably (see pages 4-8 in the manuscript) to be more inclusive of studies on use of research findings in practice that include nurses.</p> <p>With respect to the characteristics of a model nursing unit there is little consensus in the literature regarding such characteristics from a research utilization perspective. However, there is consensus from magnet hospital research with respect to the characteristics of a model nursing unit from a staff retention and quality patient care perspective. We postulate that a model nursing unit from a research utilization perspective would display similar features (see page 7 in the manuscript)</p>
<p>2. Address the omission of communication from Rogers' theory as you are using it (the theory) for this study.</p>	<p>We have included a more complete description of Rogers' theory on page 8 of the manuscript. We acknowledge that communication is an important element of this theory. However, the study described in this manuscript was not intended to be an empirical test of Rogers' theory; rather we used Rogers' theory to guide the variable selection for the original survey of which an abbreviated version was used in the study reported in this manuscript. (see page 9 in the manuscript and additional file 1 for how Rogers' theory was utilized)</p>
<p>3. Help the reader understand the use of Rogers' theory for this study by describing how the theory was used to guide variable selection and the relationship among the study variables and the theoretical constructs in the study. How do each of the subscales from the multiple instruments fit with the theoretical frame; this will help the reader understand why these concepts/variables were selected for inclusion in the study.</p>	<p>Select components of Rogers' theory (i.e., characteristics of the adopter and characteristics of the environment) were used to guide variable selection for the original survey of which an abbreviated form was used in this study (see pages 8-9 in the manuscript and additional file 1)</p>
<p>4. Provide some justification of why mixed methods were not used to represent the ideal patient care unit and the rationale for focusing on quantitative data only.</p>	<p>Due to the complexity of this research study we have elected to present the quantitative and qualitative findings separately. Some of the qualitative findings related to this research have already been published in other venues (see page 9 of the manuscript). Other manuscripts are under review.</p>
<p>5. Please explicitly describe how the variation index relates to the overall purpose of the study and an explicit research question.</p>	<p>Variation indices are commonly used in research for making comparisons (e.g., Ammenwerth et al., 2003; Bertini et al., 2001; Umene & Nunone, 1991). The purpose of this study was 2-fold – (1) to identify and examine individual and contextual factors at the unit level that influence research utilization among nurses working</p>

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	in acute care hospitals, and (2) to identify differences between adult and pediatric units in research utilization patterns. The variation index, allowed us to index diversity across the units and compare the seven units (see page 14 in the manuscript).
6. Since the patient care units are the unit of analyses, please provide the demographics of the patient care units and the hospitals from which they came.	Table 2 (page 36) profiles characteristics of participating hospitals and units
7. Provide inclusion and exclusion criteria for the individuals who were asked to complete questionnaires Also report the proportion (%) of FTEs that the number of individuals who completed the questionnaires represent? For example, is Unit 3 a small unit with fewer staff than unit 1?	<p>The only inclusion criterion for participants was to be a registered nurse employed in 1 of the 7 participating units. Sealed questionnaire packages were then sent to all nurses working in the seven units (see page 10 in the manuscript).</p> <p>Unit size and FTE is displayed in Table 2. We have not identified bed numbers in Table 2 to protect the identity of the smaller units.. We have also added a second additional file which shows the number of nurses participating from each unit at times 1 and 2.</p>
8. Explain why nurses at time two (n=58) were excluded from the analyses given that the unit of analyses are at the patient care unit level and the researchers combined responses from two different time points. Please provide justification for combining responses from two different time points given that units may change over time?	<p>We excluded nurses at Time 2 who already replied at Time 1 so not to bias the findings by placing a greater weight on the responses from individuals responding twice.</p> <p>We combined responses from Times 1 and 2 because the time frame between the 2 data collection periods was short (6 months). Additionally, we were confident that if anything had occurred on the units between Time 1 and 2 that would have influenced responses at Time 2, our qualitative analyses would have pick this up. See page 10 in the manuscript.</p>
<p>9. Instrumentation. Organizational support for research use asks questions regarding the organization, not the patient care unit, and thus it is not clear why they are included in this paper. Please provide a justification why this variable was included.</p> <p>The dependent variable in this study is research utilization but the question included in the Appendix asks how often the individual has used research Does this mean use research methods, use research findings, participate in conduct of research? Please provide a conceptual definition of research use. Also provide a rationale for the weighting of the RU questio</p>	<p>Organizational support has been shown to an important contextual factor in research utilization. We have aggregated individual nurses' responses to this at the patient care unit level so that it is proxy of organizational support at the unit level.</p> <p>Definition of overall research utilization: <i>The use of any kind of research findings (nursing and non-nursing), in any kind of way, in any aspect of your work as a registered nurse.</i> This definition of overall research utilization is footnoted to the variable in Additional File 1.</p> <p>We recognize that it is possible the increased frequency in the research utilization scores from times 1-3 could have resulted from participants learning how to answer this question. However, we believe it is more likely that the increased frequencies are from learning more about research utilization. The research utilization question was strategically placed throughout the survey</p>

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	to facilitate learning about research use. Furthermore, there is no right or wrong answer to this question and therefore, we feel it is unlikely respondents learned “how” to answer the question. However, we have acknowledged that this is a limitation to our study (see page 25). Also see pgs. 15-16 for rationale of weighting.
<p>10. The investigators provide a detailed analysis to justify aggregating individuals scores to use for unit level measures. Please clarify if the values under the ANOVA heading are means across seven units or means across the individuals – it is unclear what the values for each of the variables under the ANOVA heading represents.</p> <p>Although the analysis in table 2 addresses reliability, it does not include validity values as suggested on page 11. Perhaps the authors could clarify the meaning on page 11 – “Table 2 contains reliability and validity values of the data aggregated at the unit level.</p> <p>As noted on page 12, the relative effect sizes for both the 1) proportion of variance in the individual factor accounted for by group membership, and 2) the relative strength of the aggregated variable at the group level are quite low. This suggests that means of individual scores are not good representations of unit level characteristics. Thus, subsequent analyses at the unit level are compromised.</p>	<p>To create unit scores, data collected at the level of the individual nurse were aggregated to the level of the patient care unit by calculating group means. So the ANOVA scores represent means across the 7 units (which are composed of aggregate individuals scores for the units)</p> <p>η^2 and ω^2 are measures of validity (see page 13 in the manuscript).</p> <p>Aggregation is not without difficulties. We acknowledge the validity for some of our aggregated variables is less than optimal and that this is a limitation of this work (see pages 15 and again in the limitation section on page 25). However, our values are comparable to those reported by others (Estabrooks et al., 2007; James, 1982, Shortell et al., 1991 – also see response to comment 11 below)</p>
11. Please provide the unit level scores both categorical and means (SD) of research utilization for each of the seven study units.	Added to table 4
12. Please define how high, medium and low units were defined regarding RU and were these values determined a priori?	<p>When the adjusted research utilization scores for each of the seven units were graphed (see figure 1) three grouping emerged which we labeled as low, moderate, and high according to where on the seven-point scale their mean values fell. The values were not determined a priori. (see page 16 in the manuscript).</p> <p>ICC(1) of 0.11. ICC(1) is an estimate of individual score variability about the subgroup mean and is used to assess perceptual</p>

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<p>Please justify use of these values given the low values (0.12 and 0.01) in table 2.</p> <p>Please clarify how the relationships between units, factors in figure 2 and RU scores are drawn from the data</p>	<p>agreement among individual responses within a group (or unit). Theoretical values can range from 0 to 1 with 1 representing perfect perceptual agreement among members with the same group. While a value of 0.12 appears low, James (1982) has reported that ICC(1) values cited from the literature to justify some degree of perceptual agreement among group members ranged from 0 to 0.5 with a median of 0.12</p> <p>η^2 of 0.12. η^2 is an indicator of effect size and contributes to the proportion of variance in the individual factor accounted for by group membership. Theoretical values can range from 0 to 1 but Shortell et al (1991) reported values obtained for η^2 ranging from .08 to .22 in the literature, which our value of .011 would fit within.</p> <p>Therefore, based on similar values reported in the literature we proceeded with aggregation realizing that the low values are a limitation to our analyses.</p> <p>Correspondence analysis is designed to analyze two way tables derived from the raw data by measuring the association or correlation between the rows and columns. It measures the distances between the row and column points and presents the inter-relations of variables in a two dimensional space.</p>
<p>13. The discussion section should be focused on context since the analyses were at the patient care unit level rather than on the individual factors.</p> <p>The discussion also needs to be framed within the theoretical frame that was used for the study.</p> <p>Lastly, the statements regarding context factors in the discussion section are exploratory at best and should be noted as such</p> <p>Lastly, authors should integrate findings with other studies and papers</p>	<p>The discussion focuses on our key findings which is a combination of individual and contextual factors. The purpose of the study (which we have clarified) was “to identify and examine individual and contextual factors at the unit level that influence research utilization among nurses working in acute care hospitals”.</p> <p>Selected components of Rogers’ theory guided variable selection in the survey instruments, i.e., characteristics of the adopter and characteristics of the environment. The key individual and contextual elements discussed center on these two components.</p> <p>The discussion now begins with this acknowledgement (see page 20 in the manuscript).</p> <p>We have included additional studies in the discussion.</p>

Minor Essential Revisions	
1. Clarify the y axis on figure 1.	See figure 1
2. Include the test statistic values and p-values for the ECS	✓
3. Provide the names of the two dimensions which captured 2/3 of the variability	Correspondence analysis is a descriptive technique designed to analyze two way tables by measuring the association or correlation between the rows and columns. It measures the distances between the row and column points and presents the inter-relations of variables in a two dimensional space. The dimensions refer to a space, and thus do not have names.
4. Add the low, medium, and high value research utilization scores to table 4.	See Table 4